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## Professor Józefa Joteyko – The distinguished Polish scientist at the turn of the 19th and the 20th century

Professor Józefa Joteyko (1866-1928) was the remarkable Polish scientist, very well-known in the world of science in the end of the 19th and in the beginning of the 20th century, about whom we still know far too little<sup>1</sup>. She was born on the 29th of January 1866 in the well-off Lithuanian family of landowners, in Poczujki near Kijów, in Skwieriski district. She moved with her whole family (parents and her three siblings) to Warsaw. After taking lessons at her family home she completed a secondary level of education. Her higher education studies at the Geneva University were begun on the faculty of the natural science and completed them with the baccalaureate degree in the natural science<sup>2</sup>. Afterwards she undertook the medical studies in Brussels and continued them in Paris. During that time Józefa Joteyko got particularly interested in neurology and psychiatry and she was perfecting her skills with the help from the greatest masters of that time: Jean-Martin Charcot, Fulgence Raymond, Édouard Brissaud, Pierre Marie and Joseph Jules Dejerine. In Paris she had performed her science and research work in the field of neurology and also had medical practice running, but eventually she decided to choose the neurophysiology. Józefa Joteyko returned to Brussels and from 1898 took up the assistant position in the Solvay Physiology Institute. Then she took charge of the manager position of the physiology laboratory at the University of Brussels<sup>3</sup>. During the period 1898–1903 Professor worked in the psychophysical

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<sup>2</sup> Feliksiak S., *Słownik biologów polskich (Dictionary of Polish biologists)*. Państwowe Wydawnictwo Naukowe, Warszawa 1987, p. 239.

<sup>3</sup> Herman E., *Neurologrzy Polscy (Polish Neurologists)*, PZWL, Warszawa 1958, p. 289–290.

laboratory where she taught the experimental psychology and then became the manager of this laboratory. Joteyko was occupied there with physiology of work and together with Charles Henry she presented the equation of the ergographic curve. On the basis of this curve she formulated the law which determined that the values expressing the level of the fatigue are increased in the geometric progression and the values related to the working time create the arithmetic sequence. Professor also formulated other physiological laws related to a fatigue, among them the Joteyko's disposable minimum law. This law states that even the exhausted muscles retain the strength which cannot be decreased further. To sum up, in Solvay Institute Joteyko was engaged in the multi-task research on the fatigue of the muscles, nerves and nerve centres. She published then many articles, dissertations and reports based on the outcome of her studies in the journal "Travaux de l'Institut Solvay de Physiologie". Joteyko devoted many years of her most prolific and creative work to the problems of the physiology of the muscles and nerves. In the period spanning seven years from 1900 till 1907 she published 88 articles and reports which were the result of her individual work or work carried out together with M. Stefanowska, V. Kipiani and Ch. Henry. Almost all of this publications concern the research on physiology. After 1907 there are more and more of her works in the fields of psychophysiology, psychology and finally also pedagogy<sup>4</sup>.

In 1906 Joteyko started lecturing on the subject of pedagogic psychology at the teachers' seminars in Mons and Charleroi. She was very keen on this work and despite the fact having had to take arduous journeys to get to the places which were many kilometers away from Brussels, she managed to teach continuously for several years up until the outbreak of the First World War. Professor organized the psychological laboratories at both seminars. At that time she invented the individual student's card – the questionnaire which was later used by other teachers' educational centres in Belgium<sup>5</sup>.

In 1905 Józefa Joteyko became the chairperson of the 1st Congress of Belgian Neurologists and Psychiatrists. In 1906 she became the chairperson of the Belgian Neurologists Society and in 1911 she took the function of the secretary of the 1st International Congress of Pedology and the editor of the Belgian journal of psychology "La Revue Psychologique"<sup>6</sup>. In 1909 Joteyko was elected as the only woman to the orga-

<sup>4</sup> Lipkowski O., *Józefa Joteyko. Życie i działalność. (Józefa Joteyko. Life and activity)*, PWN, Warszawa 1968, p. 36–38.

<sup>5</sup> Izdebski P., *Józefa Joteyko: testy psychologiczne (psychological tests)* [in] Volkman-Raue S., Lück W.E., Zeidler W. (ed.) *Najwybitniejsze kobiety w psychologii XX wieku (The most outstanding women of the 20th century psychology)*, Gdańskie Wydawnictwo Psychologiczne, Sopot 2015, p. 324.

<sup>6</sup> Herman E., *Neurologzy Polscy (Polish Neurologists)*, PZWL, Warszawa 1958, p. 290.

nizational committee of the 6<sup>th</sup> International Congress of Physiological Psychology which was held in Geneva<sup>7</sup>.

From this moment J. Joteyko began to continue in the discipline of pedology which she understood as “the science about a child, the science which aimed at knowing a child with regards to a physical, psychic and social aspect, in order to raising a child in a good way and directing it to a suitable profession”<sup>8</sup>. The noble purpose of the pedology was, as Joteyko described: “To achieve knowledge about a child in its physical, mental and moral manifestations”<sup>9</sup>.

In 1912 PhD Józefa Joteyko organized the faculty of pedology at the University in Brussels where she personally was giving lectures. The First World War interrupted this activity and she had to move to Paris where a scientist Charles Richet granted her access to the experimental laboratory. In 1916 as a result of voting held by professorial panel, by a large majority of votes, she had attained the great and special honour. In 1903 M.G. Michonis placed a legate for a faculty at Collège de France and its realization was achieved in 1905. Joteyko was entrusted with this faculty. By that achievement, she became the first woman who gave lectures at Collège de France. Before Her Adam Mickiewicz (1798–1855) was the only Polish lecturer there<sup>10</sup>. It is worth noting that A. Mickiewicz was a famous Polish poet, dramatist, professor of Slavic literature and political activist.

The first and inaugural lecture of Józefa Joteyko in the Collège de France was given on the 24th of January 1916 and this lecture was the object of interest of the whole intellectual world of Paris as it was the first one given by a woman in this old academy established in 1530. J. Joteyko presented herself where before her the greatest authorities of science gave their speech, exactly 70 years earlier Adam Mickiewicz had appeared as the lecturer there<sup>11</sup>.

Now she had attracted the great number of listeners and managed to command the general attention as the woman and speaker and on the very next day French press enthusiastically commented her performance: “The Collège de France had the great honour of receiving this Polish scientist”<sup>12</sup>. PhD Józefa Joteyko made the statement

<sup>7</sup> Izdebski P., *Józefa Joteyko: testy...*, op. cit., p. 324.

<sup>8</sup> Joteyko J., *Wykłady z Pedologii (Pedology Lectures)*, “Szkola” Lwów 1912, p. 1, 3.

<sup>9</sup> Sedlaczek S., *Józefa Joteyko*, Dział Wydawnictw Naczelnictwa Związku Harcerstwa Polskiego, Warszawa 1928, p. 8/published in digital version, see: <http://rcin.org.pl>.

<sup>10</sup> Herman E., *Historia neurologii polskiej (The history of Polish neurology)*, Zakład Narodowy Imienia Ossolińskich, Wrocław 1975, p. 212–213.

<sup>11</sup> Michalik M., *Kronika Kobiet (The Chronicle of Women)*. Wydawnictwo Kronika, Warszawa 1993, p. 412.

<sup>12</sup> Herman E., *Historia...*, op. cit., p. 212.

on the neurophysiological subject, namely – the tiredness in action of movement “La Fatigue dans le Fonction Motrice”. In the end of 1917 and in the beginning of 1918 Joteyko had given lectures in Sorbonne and in the summer of 1918 at the University in Lyon, where she presented the lecture on the experimental psychology titled “The Experimental Research on Intelligence”. In the same year she established in Paris “The Polish League of Teaching” which had a function and activity aimed at promoting and collecting knowledge in the field of a school organization, teaching and upbringing methods in line with the most modern discoveries of contemporary psychology and pedagogy. The collected information was published in “The Chronicles of The Polish League of Teaching”. Professor managed to issue only one volume, because when she was given a chance to return to her home country, she made use of it immediately and left the honourable post at the Collège de France. Józefa Joteyko had only published in Paris her popularizing work: “The Rebuilding of the Polish School” and the funds from selling it were donated to Polish prisoners-of-war in France<sup>13</sup>.

In 1919 Józefa Joteyko came back to her homeland and took over the faculty of general psychology and pedagogy in the National Pedagogical Institute (1919–1925). She was in charge of the psychological laboratory there. This Institute was the important and pioneering Polish scientific centre in the field of pedagogy. The following scientists worked there: Waclaw Sierpiński, Bogdan Nawroczyński, Tadeusz Jaroszyński, Marian Falski, Józef Kotarbiński, Jan Baudouin de Courtenay, Alfred Tarski. The last two mentioned ones, as well as Joteyko, were the scientists of international status. Joteyko published the only one in Poland psychological journal “Bulletin of Psychological Club”, which she subsequently transformed in 1926 into “Polish Psychological Archive”. It was also the first journal on the subject of theoretical psychology in Poland and it was available for every member of the Polish Teaching Society as the free supplement to the periodical “The Teacher’s Voice”. In this way it reached to the farthest corners of Poland. From the moment of establishing the “Polish Psychological Archive”, Joteyko published almost all her works there till the very end of her career. At the same time these were the most valuable of her works in the fields of psychology and pedagogy, and were also the synthesis of her views on the problems of the actual state of the psychological sciences, the organization and the direction of the research and the goals and aims of Polish school. It was her desire that her views on the urgent problems of education were common among teachers and educational workers<sup>14</sup>. She also edited

<sup>13</sup> Konieczna S., *Profesor Józefa Joteyko – neurolog rozwojowy, psycholog, pedagog przełomu XIX i XX wieku (Professor Józefa Joteyko – child neurologist, psychologist, pedagogue of XIX/XX<sup>th</sup> century)*, *Poznańskie Zeszyty Humanistyczne*, Wydawnictwo Pomost, Poznań 2014, no. 23, p. 2–8.

<sup>14</sup> Lipkowski O., *Józefa Joteyko. Życie...*, op. cit., p. 115.

“The Pedagogical Chronicle” and during 1922–1923 “The Upbringing Encyclopedia”<sup>15</sup>. Apart from that she taught psychology in the Free Wszechnica of Warsaw together with Antoni Dobrowolski, Józef Radliński, Bogdan Suchodolski, Helena Radlińska, Stefan Rudniański, Lucjan Zarzecki, and when the Institute of Pedagogy was closed in 1925, she began her lectures in psychology in the Institute of Special Pedagogy which educated teachers of schools for blind, deaf-mute and mentally disabled<sup>16</sup>. Joteyko was disappointed with the fact that she wasn't granted the faculty of psychology at the University of Warsaw, even more so because in 1926 she received the postdoctoral degree in psychology at the medical faculty of the University of Warsaw<sup>17</sup>.

Józefa Joteyko pursued the above mentioned task using the support of very specific scientific tools which she invented herself. In 1924 Książnica Atlas published Joteyko's work: “The method of mental tests and its scientific value”. The volume had 272 pages with presentation of some of the most modern tests and 33 drawings. It consisted of a preface, 5 chapters, conclusion and desideratum. This was a guide with a purpose to explore the problems in psychological tests, which were used after the 1st World War, and contributed to the development of tests in Poland before the 2nd World War. Joteyko used the questionnaire from the National Institute of Pedagogy in Warsaw and sent it to psychologists in the world and Poland which was aimed at producing the scientific opinion about the value of the tests method. Today the tests are a starting point to a psychological and pedagogic assessment of a child. They are the basis for determining the level of a child's disability or a child's ability to begin education or a kind of suitable education.

After the return to Poland in 1919, Józefa Joteyko became strongly involved in the championing and the implementation of the psychological tests which were designed to assess an intelligence, a creativity, abilities and predispositions of a child. The immensely important fact was that her work titled “The method of mental tests and its scientific value” had been written in Polish and directed at Polish psychologists, educationalists, teachers and readers in general<sup>18</sup>.

In this book the author analysed the scientific foundations and the development of contemporary method of tests. Joteyko published the results of the questionnaire

<sup>15</sup> Dudnyk N., Krasieńska I., *Poglądy pedagogiczne Józefy Joteyko 1866–1928 (The pedagogical views of Józefa Joteyko 1866–1928)*, Nauczyciel i Szkoła 2017/1, Mysłowice 2017, p. 175.

<sup>16</sup> Miąso J., *Historia wychowania wiek XX (The history of upbringing the 20th century)*, part I, Państwowe Wydawnictwo Naukowe, Warszawa 1984, p. 48.

<sup>17</sup> Sedlaczek S., Józefa..., op. cit., p. 5.

<sup>18</sup> Majchrzyk-Mikuła J., *Józefa Joteyko – prekursorka szkolnictwa specjalnego (Józefa Joteyko – The pioneer of special education)*, Piotrkowskie Studia Pedagogiczne 9/2001, Piotrków 2001, p. 373–375.

relating to the scientific value of mental tests. It should be noted that she prepared the questionnaire herself and sent out to the most important psychologists and psychiatrists in Europe and in the world, for example Pál Ranschburg, László Nagy (Budapest, Hungary), Victor Mercante (Argentina), Henri Louis Charles Piéron (France), Sante de Sanctis (Italy), William Stern (Germany), Jan Piltz (Poland) and many others<sup>19</sup>.

The questionnaire was prepared by Joteyko and sent out by the psychological laboratory of the National Educational Institute in Warsaw. This fact along with the response to the questionnaire from many eminent specialists were the proof of the high scientific position of J. Joteyko. Professor knew many outstanding psychologists, creators of the new tests and experts in the methodology of psychological research. She corresponded with the great psychologists and psychiatrists and the selection of questionnaire respondents made the work highly exceptional. Joteyko analyzed the statistical methods, classification of tests and the newest research tools. She presented the very modern approach towards psychology and pedagogy and promoted the need to create the full-time job position for school psychologist<sup>20</sup>.

Józefa Joteyko was this kind of exception in many aspects. She was the scientist from an occupied country, she was a woman and in Europe scientists of this gender made up a minority among educated elite. Professor did not have any connections but despite that the scientific establishment acknowledged her intellectual potential, the profound medical and neurological education and most importantly her knowledge of pedology.

The first area of neurological interests of J. Joteyko was the problem concerning physiology and fatigue of muscles, the question which is subjective up until today in the contemporary neurophysiology. In 1896 Joteyko received the distinction at the University of Paris for the work which she carried out in the physiological laboratory of Charles Richet. The subject of this work was just the fatigue and breathing of muscles<sup>21</sup>.

The excellent Polish neurologist Eufemiusz Herman analyzed her work in the following way: "In the research she proved that a cut-out muscle of a frog regains its function under the influence of the oxygen from air and by using this example she formulated the theory of a fatigue". She explores even further the problems in electrophysiology by examining a shrinkage of muscles, a fatigue of nervous centres, and creates the mathematical formula for the ergographic curve or she defines the economic law for effort in the nerve dynamics<sup>22</sup>.

<sup>19</sup> Izdebski P., *Józefa Joteyko: testy...*, op. cit., p. 329.

<sup>20</sup> ibidem, p. 326–328.

<sup>21</sup> Konieczna S., *Profesor Józefa...*, op. cit., p. 2–8.

<sup>22</sup> Herman E., *Historia...*, op. cit., p. 212–213.

The next area of the neurological interests of Józefa Joteyko was the aspect of the feeling of pain, which she began to examine by carrying out the research on the anaesthesia of muscles and subsequently separated nerves and nerve centres with a use of ether and chloroform. Joteyko did this research between 1899 and 1902 with her long-term Polish co-worker - Michalina Stefanowska. Also with her she had tried to spot the location of the pain centre in brain hemispheres and she proposed its position near Rolands scrolls. The summary of this research was published as “The sensory asymmetry and pain centres” and presented in “The Physiological Review”. In 1905 at the 1st Congress of Belgian Physiologists and Psychiatrists she gave the lecture about the feeling of pain and substances which produce the pain. Professor presented her own pain theory looking for the factor which stimulated nerves to the feeling of pain. She was suggesting that when the severe irritation of nerves' endings occurs, then in the place of this irritation chemical substances appear and they produce the toxic effect on nerves. She called these substances as the algogenic substances which induce the feeling of pain. The culmination of Professor Joteyko's research on the feeling of pain in humans, was the lengthy volume published in 1909 together with Michalina Stefanowska titled “Psycho-physiologie de la Doleur” (*The psycho-physiology of the pain*) for which work these Polish women received the Award of Paris Academy of Science<sup>23</sup>.

Apart from the careful analysis of biological mechanisms responsible for feeling the pain, Professor Joteyko tried to unravel also the psychological aspects of feeling the pain. She considered the problem of physical, psychic and moral suffering which was inflicted by the pain. Joteyko was interested in the psychological context which in some instances concerned the pain and the mental fatigue and a subjective feeling of pain as a moral suffering.

Józefa Joteyko considered pedology, the science about development, as her utmost scientific challenge. Obviously she was the doctor and this influenced her view on a child. She began her scientific work from achieving medical knowledge during medical studies. Professor was very interested in psychology and that is why she decided to study it by experimenting. She was fascinated by the nervous system, because it is the system which manages the functioning of the human. Her concentrating on the nervous system of a child was a result of its possibility to trace the forming of the nervous system on the developing organism (until the age of 17 the brain is in the developmental phase). The development of speech, senses, perception, behaviour, interests and skills of a child changes with every month and every year. The neurological basis, which was at J. Joteyko disposal after completing her medical practices at such hospitals as Pitié and Salpêtrière in Paris, was very useful in her moving

<sup>23</sup> Sedlaczek S., Józefa..., op. cit., p. 7.

forward. She had carefully examined the physical development of a child, its memory, imagination, concentration of an attention, an intelligence, predispositions, character, senses. It can be said that Professor Józefa Joteyko was blazing a trail for the developmental neurology. She attempted to link the anatomy and the physiology of a nervous system with the above mentioned aspects of child's behaviour, a feeling of various experiences, a fatigue of muscles, a mental fatigue, a feeling of pain, a handedness. The establishment of this link was the real progress even more so because the world of child experiences was the great mystery at that time and it was marginalized by adult people. J. Joteyko wanted to expose this.

In the end of the 19th and the beginning of the 20th century Józefa Joteyko alongside with Maria Skłodowska-Curie was the most famous, revered and honoured woman and scientist of Polish origin. Even the doctoral thesis of Professor Józefa Joteyko was distinguished by the faculty in Paris. The Royal Society of Medical and Natural Sciences in Brussels honoured Professor with the awards twice, the first one was Prix Desmath in 1900 and the second one was Prix Dieudonne in 1901, she was also chosen for the member correspondent there<sup>24</sup>. The French Academy of Science in Paris (Institut de France) awarded her four times, and the Medical Academy in Paris awarded her twice<sup>25</sup>. In 1917 Joteyko was awarded by Collège de France with Gran Prix Saintour and The Society of Chemists honoured her with the golden medal<sup>26</sup>.

In 1905 she was chosen the chairperson of the Belgian Neurological Society. Earlier in 1904 the Philosophical Society in Lwów invited her to become their member which was particularly meaningful because Joteyko was a woman. The scientific societies were elite and the domination of men was clearly visible. The reports, articles, thesis, opinions of Professor Joteyko were quoted, printed in European students' books, series of lectures, leaflets regarding neurophysiology, psychology, psychiatry, pedagogy and pedology<sup>27</sup>.

It is worth emphasizing that Joteyko played the important role in establishing the Polish Psychotechnical Society and she became the first president of this institution in 1926<sup>28</sup>. Among the earlier mentioned awards of The French Academy of Science, the special attention should be paid to the one from 1909 for the work "Psycho-physiologie de la Doleur" (*The psycho-physiology of the pain*). This work was written together

<sup>24</sup> Kosnarewicz E., Rzepa T., Stachowski R., *Słownik psychologów polskich (The dictionary of Polish psychologists)*, Zakład Historii Myśli Psychologicznej UAM, Poznań 1992, p. 105.

<sup>25</sup> Konieczna S., *Profesor Józefa...*, op. cit., p. 2–8

<sup>26</sup> Kosnarewicz E., Rzepa T., Stachowski R., *Słownik...*, op. cit., p. 105.

<sup>27</sup> Konieczna S., *Profesor Józefa...*, op. cit., p. 2–8.

<sup>28</sup> Lipkowski O., *Józefa Joteyko. Życie...*, op. cit., p. 114.

with Michalina Stefanowska with whom Joteyko had been collaborating for many years. Stefanowska was Joteyko's partner in personal and professional life. She was a naturalist, psychologist and physiologist. Stefanowska started working in the Solvay Physiology Institute before Joteyko and later she worked there with her on the neurophysiological subjects such as the feeling of a pain, the locating of a pain center in brain hemispheres and the substances which cause a pain<sup>29</sup>. Stefanowska was interested in the neurological system through all her life and she was in fact habilitated in the physiology of the nervous system and the senses at the Medical Faculty of the University of Poznań. In 1922 she became the associate professor there and at the end of her professional activity she concentrated on the special education, especially the education of mentally disabled children. She also organized the methodical courses for the future teachers of the special education<sup>30</sup>.

The term pedology wasn't introduced for good in the psychological and pedagogical language, but the quintessence and measurable effect of Józefa Joteyko's activity at the turn of the century are expressed in the nowadays psychological and pedagogical clinics in every city. In these places there are psychologists, educationalists, neurologists, psychiatrists who work and use the tests and all together with interdisciplinary approach they assess individual students and decide what his/her educational way and progress should be. Sometimes it is a special education, sometimes an individual education and also not often a special education with revalidation hours. These clinics give an opinion about an early support of a development or about an adjournment of obligatory education or about lengthening of exam times. A lot of place in her studies was devoted by learning about a child and organization of education<sup>31</sup>. As a result there is a complex and widely specialized assessment of a child, which was initiated by Józefa Joteyko one century ago when it was really both challenging and innovating. The contribution of Józefa Joteyko deserves to be recalled and appreciated.

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<sup>29</sup> Lipkowski O., *Józefa Joteyko. Życie...*, op. cit., p. 33.

<sup>30</sup> Możdżeń S., *Historia wychowania 1918–1945 (The history of upbringing 1918–1945)*, Wydawnictwo Diecezjalne i Drukarnia w Sandomierzu, Sandomierz 2006, p. 137, 204.

<sup>31</sup> Okoń W., *Nowy Słownik Pedagogiczny (New Pedagogical Dictionary)*, Wydawnictwo Akademickie „Żak” 2004, p. 164.

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**Professor Józefa Joteyko  
– The distinguished polish scientist  
at the turn of the 19th and the 20th century**

Józefa Joteyko was the outstanding scientist in the end of the 19th and in the beginning of the 20th century. Together with Maria Skłodowska-Curie she was the most famous woman and scientist of Polish origin in Europe. She was given the right to present her lectures in the Collège de France and she was, after Adam Mickiewicz, the second Polish lecturer at this great academy. She had committed her life to scientific disciplines which included child neurology, neurophysiology, psychology and pedagogy. She had managed to develop each of them evenly with the same progress and in relation to children. Such approach was aimed at understanding the child and gathering the knowledge about its character and predisposition. These was also meant to help in determining what kind of educational and professional way the child should take. The present-day psychological and pedagogic clinics are the practical fulfilment of Józefa Joteyko's idea and we cannot imagine the contemporary education without the support of such institutions.

**Key words:** Józefa Joteyko, Polish scientist, neurology, pedology, psychology, education