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*Leopolis Scientifica. Exact Sciences in Lviv until the Middle of the 20<sup>th</sup> Century*, ed. by Oleh Petruk, Institute for Applied Problems in Mechanics and Mathematics, Lviv 2021, pp. 352

This anthology offers a comprehensive historical perspective on a significant yet underrepresented topic in the history of science: Lviv as a hub for the exact sciences, particularly mathematics, physics, and astronomy. The researched time frame spans roughly from the founding of the Lviv Jesuit College in the 16<sup>th</sup> c. (including its predecessors) to the mid-20<sup>th</sup> c. The volume comprises 352 pages and presents eleven articles. The first five cover key educational institutions such as the Lviv University, the Polytechnic, the Underground and Clandestine University, various higher schools, as well as the Shevchenko Scientific Society in Lviv, examined from an institutional perspective on the exact sciences. The latter six articles place the focus directly on the disciplines of mathematics, physics, and astronomy. The articles are primarily framed around a series of brief biographies of selected researchers. Through this approach, the anthology offers a comprehensive overview of the scientific infrastructure, including institutions, individuals, and the civil and educational movements that emerged in and around the Lviv region.

However, the focus, range, and quality – including the translation of the articles – vary significantly. Most of the chapters present an overview based primarily on established sources and biographies, but they lack a clear research question that would interweave the articles with one another. While the first five articles explore the social context and attempt to provide an institutional overview of Lviv's complex history under Austrian, Polish, and Ukrainian influences, most of them do not offer a more systematic approach, such as entangled history or comparative studies, to highlight the complex relationships between institutions and the various (nation-) states, their educational power dynamics, and the associated actor networks. Such omissions may leave the reader with the impression that the articles are more concerned with highlighting 'Ukrainian' contributions to science than with critically analyzing them, often using terms such as 'Ukrainian science' (in fields like mathematics and astronomy) without clarifying their meaning and scope.<sup>1</sup>

The main issue is that many of the articles show strong potential for engaging questions and topics – some even hint at them within the text itself, for example:

Is it not interesting to compare the underground activities of the Ukrainian Higher Schools in the condition of persecutions by the Polish authorities in the interwar period, with the underground activities of the Polish higher educational institutions

1 Cf. *Leopolis Scientifica. Exact Sciences in Lviv until the Middle of the 20<sup>th</sup> Century*, ed. by O. Petruk, Lviv 2021, p. 60, 95, 105, 108, 112, 113, 336.

in the conditions of repression that the Polish culture experienced in a different period of time?<sup>2</sup>

Indeed, it would be interesting to do just that; yet, unfortunately, it does not happen. The anthology presents rather a compendium of the exact sciences than posing questions about them, which a clear editing process could have clarified. Regrettably, there are several problems with this process. Owing to the absence of a common research question, a coherent narrative for the whole anthology is missing, leading to repetitions and an encyclopedic listing of scientific biographies rather than an in-depth examination of the actual scientific contributions and their significance for the development of the exact sciences in Lviv and Ukraine. The absence of a central introduction and conclusion leaves the reader without a clear connection between the chapters. A unifying theme or topic that would have guided the reader through the fascinating field of exact sciences would have helped tie this anthology together under a common narrative.

Furthermore, many articles announce content in their abstracts that is only briefly mentioned but never discussed in detail, which can be misleading. At times, entire pages are quoted verbatim without adequate explanation or integration into the broader narrative, which is a distraction from the actual content.<sup>3</sup> The absence of an index diminishes the anthology's usefulness as a reference book, reducing it to a general overview. More anticipatory editing and critical reviewers could have taken care of some of these issues. Moreover, the approach to sources and the citation system is problematic. References appear only in the bibliography; the anthology contains no footnotes. The use of these sources within the text and the bibliography is not standardized and is rarely explained or integrated into the thematic discussions. Statements are often uncritically accepted and presented without context, which diminishes the scholarly quality of the writing. There is seldom an attempt to critically engage with the presented facts or interrogate their implications, which would have greatly enhanced the articles. To add to that, frequently used images and illustrations often lack proper references, neither in captions nor in the bibliography, which falls short of current academic standards.

To illustrate the potential and structure of the anthology, all articles are presented in the order of their appearance. The first article, *The Lviv University until the Middle of the 20<sup>th</sup> Century*<sup>4</sup> by Yaroslav Prytula and Roman Tarnavskiy, and the second, *The Lviv Polytechnic as a Centre of Technical Science*<sup>5</sup> by Oleskander Shyska, present established historical facts to trace the development of the Lviv University and the Polytechnic as key centers of the exact sciences. The articles begin with the genealogies of these educational institutions, starting with the Jesuit College in the 16<sup>th</sup> c. and concluding in the mid-20<sup>th</sup> c. While the intention to emphasize the importance of Ukrainian contributions to the institutions' history, in contrast to the predominantly Polish-dominated historiography of Lviv, is apparent, both articles struggle to connect these developments to the broader

2 M. Dudka, Y. Holovatch, R. Samotyj, *Clandestine Ukrainian Higher Schools in Lviv*, [in:] *Leopolis Scientifica*, p. 104–105.

3 O. Shyska, *The Lviv Polytechnic as a Centre of Technical Science*, [in:] *Leopolis Scientifica*, p. 49–50.

4 Y. Prytula, R. Tarnavskiy, *The Lviv University until the Middle of the 20<sup>th</sup> Century*, [in:] *Leopolis Scientifica*, p. 3–36.

5 O. Shyska, *The Lviv Polytechnic*, p. 37–58.

historical and political context of their time. For example, the chapters largely neglect to relate the relationship between the institutions' size in terms of students and academics and the overall development of the population and its composition in the region. While some reference is made to these factors, they remain underdeveloped. Nevertheless, there is original insight, such as a brief mention of the difficult situation of Ukrainian students during the interwar period, which appears to assert the recognition of Ukrainian contributions to the university's history. However, it is not developed into a focused argument. The opening articles do not define 'Ukrainian' – whether by region, language, cultural identity, or nation-building – nor do they construct a narrative that examines the impact of such definitions. The chapters highlight significant individuals and dates, serving to underscore Ukrainian involvement in the university's history, rather than contributing to an analysis of the complex, multinational, and multilingual situation in the Lviv region.

This gap is addressed in Volodymyr Kachmar's article, *The Problem of the Establishment of the Ukrainian University in Lviv at the Turn of the 19<sup>th</sup> and 20<sup>th</sup> Centuries*.<sup>6</sup> Kachmar provides a comprehensive examination of the Ukrainian efforts in Galicia to establish a Ukrainian university in Lviv, exploring the attitudes and decisions of the Austrian authorities, as well as the stance of Polish socio-political forces toward this endeavour. He makes an effort to link the creation of educational institutions to the broader process of nation-building in Ukraine, and he is also the first in the anthology to define the specific meaning of 'Ukrainian' within the context of the Ukrainian University at the time. The article emphasizes that education at a Ukrainian university was viewed as a crucial step in creating a nationally conscious intellectual class. Kachmar notes that such intellectuals would be essential not only for nationalizing legal proceedings and administration but also for fostering the modern national bureaucracy and advancing the concept of Ukrainian autonomy. Moreover, the article highlights the impact this would have had on language use among government officials and its broader economic implications, shaping a 'Ukrainian' university as a centre for political struggles, ultimately contributing to the nation's independence.<sup>7</sup> Kachmar also presents the statistical data that underscores the disparity between Ukrainian students' educational needs and their actual representation at Lviv University, which was missing in the opening articles. The disproportionate number of Polish versus Ukrainian faculty members in the late 19<sup>th</sup> c., especially in key fields such as law, is enlightening.<sup>8</sup>

The next article, *Clandestine Ukrainian Higher Schools in Lviv* by Maksym Dudka, Yurij Holovatch, and Renata Samotyj, provides a detailed examination of the Ukrainian University and the Ukrainian Higher Technical School that operated underground in Lviv from 1921 to 1925.<sup>9</sup> These institutions are presented as a direct response to the exclusion of Ukrainians from higher education in the newly-established Polish state following the Polish-Ukrainian War (1918–1919). The article develops a narrative that guides the reader through the complex process of organizing an educational system outside the legal framework, examining the involvement of various social organizations in its development, the structure of the educational process, the composition of the teaching staff, and the financial challenges these institutions

6 V. Kachmar, *The Problem of the Establishment of the Ukrainian University in Lviv at the Turn of the 19<sup>th</sup> and 20<sup>th</sup> Centuries*, [in:] *Leopolis Scientifica*, p. 59–72.

7 Ibidem, p. 60–65.

8 Ibidem, p. 70–71.

9 M. Dudka, Y. Holovatch, R. Samotyj, *Clandestine Ukrainian Higher Schools*, p. 73–106.

faced. These clandestine institutions are presented as symbols of Ukrainian resilience and determination to maintain their cultural and national identity in a period of repression. However, while the article presents the emergence of these underground universities as a unique phenomenon in Lviv, this claim is somewhat limited in scope. The establishment of underground educational institutions was not an isolated occurrence but part of a broader trend across Europe, including Poland and other regions. The Ukrainian underground universities were part of a wider phenomenon where national groups subjected to repression took education into their own hands. For example, similar initiatives emerged in the form of Poland's Flying Universities<sup>10</sup> and the Underground Universities<sup>11</sup> during World War II. Thus, while the situation in Lviv was undoubtedly significant, it was not entirely 'unique'.<sup>12</sup> Nevertheless, the article does an admirable job detailing the creation, development, and efforts to gain international recognition for these underground institutions.

Halyna Svarnyk's article, *The Shevchenko Scientific Society in Lviv*, starts with the establishment of the Society in 1873 and describes its evolution from a literary society into the first unofficial Ukrainian Academy of Sciences and its role as the sole representative of the Ukrainian intellectual and cultural community in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries.<sup>13</sup> In a context in which today's Ukrainian territory was divided between hostile empires, the Society took on the mission of raising international awareness of the Ukrainian people and promoting a vision of Ukrainian history, language, culture, and territory. It made significant efforts to promote the use of the Ukrainian language at international scientific congresses and conferences. The Society's contributions to world science, particularly in the exact sciences, are also emphasized, although the specifics of these achievements could have been contextualized in greater depth. Nevertheless, it is one of the very few articles in this anthology that provides further details and information about women in the exact sciences in the Lviv region. Women such as Yelyzaveta Myloradovych-Skoropadska, Lesia Ukrainka, Olena Pchilka, and others played a crucial role in the fight for the right to higher education and in promoting women's contributions to public life, science, and politics.<sup>14</sup> Unfortunately, the chapter touches on gender issues only briefly and leaves them largely unexplored, thereby underdeveloping a potentially rich area of inquiry.

Yaroslav Prytula authored a second 87-page-long article titled *Mathematics in Lviv*, in which he provides a comprehensive history of mathematical education and research in Lviv from the 15<sup>th</sup> to the mid-20<sup>th</sup> c.<sup>15</sup> Prytula presents individual biographies, resulting in a fragmented portrayal of the Lviv mathematical landscape. These biographical sketches are organized by affiliation with their respective mathematical institutions. While these mathematicians, such as Stefan Banach, Stanisław Ulam, Jan Łukasiewicz, and many others, are undoubtedly central to Lviv's mathematical legacy, their integration into Lviv's

10 See for example: *The Lvov-Warsaw School and Contemporary Philosophy*, ed. by K. Kijania-Placek, J. Woleński, Dordrecht 1998 (Synthese Library, vol. 273); J. Dybiec, *Nie tylko szablą. Nauka i kultura polska w walce o utrzymanie tożsamości narodowej 1795–1918*, Kraków 2004; H. Volkman, *Die Polenpolitik des Kaiserreichs. Prolog zum Zeitalter der Weltkriege*, Paderborn 2016, DOI 10.30965/9783657784332; *Szkolnictwo i oświata w Galicji 1772–1918*, ed. by J. Dybiec, J. Krawczyk, A. Meissner, K. Szmyd, Rzeszów 2015.

11 See for example: F. Cain, *Wissen im Untergrund. Praxis und Politik klandestiner Forschung im besetzten Polen (1939–1945)*, Tübingen 2020.

12 M. Dudka, Y. Holovatch, R. Samotyj, *Clandestine Ukrainian Higher Schools*, p.74.

13 H. Svarnyk, *The Shevchenko Scientific Society in Lviv*, [in:] *Leopolis Scientifica*, p. 107–144.

14 Ibidem, p. 125, 140.

15 Y. Prytula, *Mathematics in Lviv*, [in:] *Leopolis Scientifica*, p. 145–234.

intellectual network and their influence on the development of the mathematical schools are not analyzed in depth as promised.<sup>16</sup> For instance, while the achievements of these men are noted, the actual explanations of their scientific contributions and their impact on the scientific community and society are often glossed over quickly in favour of the next biography, creating a rushed narrative. Furthermore, while the Lviv-Warsaw School and the Lviv School of Mathematics are mentioned, their actual meaning as a network of internationally circulating knowledge and their entanglement in international research processes are not demonstrated. The work of key figures such as Kazimierz Twardowski, Leon Chwistek, Jan Łukasiewicz, and others is mentioned without a thorough discussion of their impact on broader academic networks, their pedagogical framework, or their involvement with other schools. This is particularly disappointing, as it does not accurately represent the current state of research.<sup>17</sup>

What is more, the chapter suffers from a significant gender imbalance. Throughout the entire text, only one female scientist, Sala Weinlös, the first woman to receive her PhD in Lviv, is mentioned. However, the presence of notable female mathematicians and logicians such as Izydora Dąmbska, who made important contributions to logic and mathematics within the Lviv-Warsaw School, is not mentioned once.<sup>18</sup> The absence of female voices is not only unfortunate but a missed opportunity, particularly when the historical context of the period could have provided a fascinating exploration of gender dynamics in academia.

The following two articles – *Physics in Lviv Institutions for Higher Education*<sup>19</sup> by Andrij Rovenchak and *Physics and Physicists in the Shevchenko Scientific Society*<sup>20</sup> by Yuriy Holovatch, Yulian Honchar and Marinana Krasnytska – present ‘the development of physical science in Lviv starting from the 17<sup>th</sup> century ... by the means of biographies of the scientists who worked at the Lviv University and the Lviv Polytechnic’<sup>21</sup> and ‘the physicists who were full members of the Shevchenko Scientific Society in Lviv’.<sup>22</sup> Unfortunately, the excessive use of short biographies distracts from the main narrative instead of connecting these lives to the broader developments in physics. In addition, the two articles are not linked to each other or to any other text in the anthology, resulting in noticeable overlaps with Halyna Svarnyk’s piece on the Shevchenko Scientific Society. This results in a body of text that reads as a conglomerate of encyclopedic short biographies. A network analysis could have offered an excellent opportunity to connect the three articles, particularly through the lens of the Shevchenko Scientific Society as a precursor to the Ukrainian Academy of Sciences (now the National Academy of Sciences of Ukraine).

The final three articles focus on astronomy. The first, *The Astronomical Observatory of the Lviv University* by Stepan Apnuevych and Bohdan Novosyadlyj, offers a well-crafted

16 Ibidem, p. 145.

17 See for example: C. Maisch, *Polens kritische Theoretiker. Ludwik Fleck und der doppelte Positivismusstreit*, Bielefeld 2024, DOI 10.1515/97838389472576; S. Werner, *Lemberger Moderne. Studien zur Entstehung einer Wissenskultur*, Paderborn 2023, DOI 10.30965/9783846767092.

18 E. Pakszys, *Women’s Contributions to the Achievements of the Lvov-Warsaw School: A Survey*, [in:] *The Lvov-Warsaw School and Contemporary Philosophy*, p. 55–71, DOI 10.1007/978-94-011-5108-5\_6.

19 A. Rovenchak, *Physics in Lviv Institutions for Higher Education*, [in:] *Leopolis Scientifica*, p. 235–272.

20 Y. Holovatch, Y. Honchar, M. Krasnytska, *Physics and Physicists in the Shevchenko Scientific Society*, [in:] *Leopolis Scientifica*, p. 273–302.

21 A. Rovenchak, *Physics in Lviv Institutions for Higher Education*, p. 235.

22 Y. Holovatch, Y. Honchar, M. Krasnytska, *Physics and Physicists*, p. 273.

overview of the observatory's history from the late 18<sup>th</sup> c. through the first half of the 20<sup>th</sup> c., emphasizing its foundation, decline, and eventual revival.<sup>23</sup> The article presents a clear narrative, using well-chosen biographies – such as that of Marcin Ernst – to exemplify the development of the observatory and the city of Lviv.<sup>24</sup> The history of the observatory is traced up to the plundering and destruction during the Soviet and Nazi occupations of the city, and it is consistently and effectively connected to the broader social history. This piece is an example of what this anthology could have been.

The article is followed by Stepan Savchuk and Liubov Yankiv-Vitkovski's *Astronomy at the Lviv Polytechnic*.<sup>25</sup> The authors focus on the astronomical observatory and the development of geodesy as a foundation for astronomical research, through biographical descriptions and institutional accounts. The article briefly touches upon the historical context of military interest in geodetic data during and after the Napoleonic Wars, as well as the role of the Polytechnic afterwards.

The final article, *Astronomy in the Ukrainian Scientific Societies in Lviv*<sup>26</sup> by Oleh Petruk, outlines the discrimination faced by Ukrainians in higher education, particularly in astronomy, until 1918, and how the Shevchenko Scientific Society became an academic sanctuary. Unfortunately, the article is contradictory at times. While the article acknowledges the discrimination faced by Ukrainians under Polish authorities, it also emphasizes the cordial relations between the Ukrainian Astronomical Club and the Polish-led Astronomical Observatory. This paradox is intriguing, but it remains unexplored and undeveloped.

In summary, the anthology offers a wealth of interesting facts and insights about the exact sciences in Lviv; however, it often fails to situate them within a broader scientific or social-historical context and to explore them in depth. Just as the anthology lacks a central introduction, it also omits a concluding section that could have synthesized and explained the significance of the contributions. The dominant approach of presenting historical and institutional developments through biographies is promising, but it is seldom carried through effectively, resulting in a series of brief, encyclopedic entries that are simply listed rather than meaningfully integrated. The opportunity to contextualize the networks and achievements of so many scientists and tie them together with a clear narrative is thus, unfortunately, missed. Although many intriguing points in the development of the exact sciences are mentioned, they are rarely fully developed. Examples include the absence of a genuine discussion on women's contributions to science and a broader exploration of the role of the Ukrainian language in the exact sciences, as opposed to the social sciences. Addressing these topics would have offered valuable insights into how language intersects with nation-building and identity formation. Since these aspects are not addressed, the anthology remains a useful reference work but falls short of its potential and remains incomplete.

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23 S. Apnuevych, B. Novosyadyj, *The Astronomical Observatory of the Lviv University*, [in:] *Leopolis Scientifica*, p. 303–323, 312.

24 Ibidem, p. 315–317.

25 S. Savchuk, L. Yankiv-Vitkovski, *Astronomy at the Lviv Polytechnic*, [in:] *Leopolis Scientifica*, p. 323–334.

26 O. Petruk, *Astronomy in the Ukrainian Scientific Societies in Lviv*, [in:] *Leopolis Scientifica*, p. 335–348.