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The role of V. Lihin's scientific publications in international journals

Abstract. In the 21st century, we live in the stage of human history when any information is as accessible as possible. The modern scientific world is based on an extensive network of journals. Thanks to them, we have the opportunity to get acquainted with the latest research results. In the 21st century, every reputable journal also has an online version, which makes the dissemination of scientific information almost instantaneous. We are so accustomed to the conveniences of the information age that it is difficult for us to imagine the difficulties that scientists faced a little over 150 years ago. In the second half of the nineteenth century, almost most of the sciences known to mankind were formed. The genesis of science launched the process of forming branch scientific communities and demanded stable ways of communication for productive and effective development of the branch. Scientific journals have become an ideal means of disseminating information, and a scientific article has been transformed from an ordinary letter into a modern form and has taken on an ideal form. Given all the above, it is important to consider the experience of V. Lihin in publishing articles in scientific journals abroad. Valerian Mykolaiovych was the first scientist from Odessa to join a new type of scientific communication. He became the first Russian-speaking member of one of the oldest Mathematical Societies in Europe - the French. The young mathematician conquered with his erudition, attention to detail, thorough approach and comprehensive analysis of research issues. During his life, V. Lihin wrote more than 30 scientific papers, a third of which were presented in scientific journals abroad. These were complete author's translations or articles based on part of the study. Not infrequently, on the pages of magazines, you could see scientific discussions, in which our compatriot also took an active part. In Odessa, the fate of Valerian Mykolaiovych changed quite radically several times: he was a professor and dean of the Faculty of Physics and Mathematics of Novorossiysk University; an adviser of the mayor, and later the mayor; became a trustee of the Warsaw Educational District. And in Europe, his authority as a scientist was highly valued. He showed that science has no state borders, that it can develop harmoniously - imitating the results of research from all over the world. V. Lihin broke the tradition of "isolated" science when

discoveries in the Russian Empire (and later in the USSR) were made separately from the rest of the world. Scientists, who speak the language of science - speak the language of peace and development. And so, in 2020, the language of medical science has united the world despite its borders, nations and religions.

Keywords: V. Lihin; scientific journal; scientific article; M. Chasles; Mathematical Society of France

Introduction

Valerian Mykolaiovych Lihin was one of the forgotten names of national history. A scientist, a public figure, a person of progressive thinking, whose activity is difficult to overestimate for the development of science and education in Odessa, the region as a whole. And, if for historians of science and technology he was known as a maths and a mechanic scientist, who first developed the questions of kinematics in domestic science, then other aspects of his scientific activity, represented abroad, remain uncovered. The purpose of the article is to highlight the importance of publications abroad both for Lihin himself and for the development of science in general.

Research methods

The basis of this work is the general scientific principles of research, such as objectivity, scientific, historicism, systemic, complexity. When writing the work was applied: historical, problem-chronological, historiographical and biographical methods. Widespread use of analysis and comparative-historical methods allowed identifying and tracking the main milestones of Valerian Lihin's life and work.

Results and discussion

The appearance of the first scientific journals in Europe in the second half of the 18th century became a turning point in the history of science. The age of The Enlightenment came – the development of scientific, philosophical and social thought. The main condition for the emergence of magazines was the formation of a certain intellectual environment, scholars, free from theological restrictions, needed regular scientific communication. But scientific correspondence could not fully meet the needs of the scientific community in the dissemination of new knowledge, information opportunities for periodicals were much greater. Scientific journals arose from the exchange of letters between scientists about the results of research.

In the modern world, when the dissemination of any information is almost instantaneous, it is difficult to understand the complexities of scientists in the second half of the nineteenth century. The desire to bring the results of their research to the international arena was considered revolutionary: it took courage, effort, international connections, multilingualism, and a truly global vision of science.

The need to create a sustainable system of scientific communication has led to the formation of intellectual communities, which became the basis for the creation of scientific journals and new scientific societies. The peculiarity of the first European

journals was the scientific and information orientation, the articles were in the form of letters.

In the 19th century, specialized journals in the fields of science began to develop, and the optimal form of publications was discovered. In the second half of the 19th century, the scientific article took on a modern form. Due to the formation of the practice of bibliographic research, it was possible to trace the sequence in science, which formed the international nature of research (Kharlamova, 2014, p. 175).

In the 19th century, the first national specialized mathematical journals began to appear, first in England, then in France and other European countries. In the second half of the 19th century, a number of mathematical societies were formed, which began to publish new mathematical journals, some of which are still published today.

One of the first domestic mathematicians to become famous abroad was Valerian Lihin. We can say that his chosen scientific path led him to world science.

Valerian Mykolaiovych Lihin was born on July 26, 1846, in St. Petersburg. Subsequently, in 1854 his family moved to Odesa. In 1864 Valerian Mykolaiovych Lihin entered the Reshylevskyi Lyceum, and then, in connection with the opening of the Novorossiysk University in 1865, he was enrolled as a student of the Faculty of Physics and Mathematics of the same university. In 1869, V. Lihin graduated it with the Candidate of Mathematical Sciences degree and received a gold medal for the work "On the gravity of ellipsoids".

On September 9, 1870, Valerian Mykolaiovych was enrolled in the position of associate professor of the Department of Applied Mechanics. Almost a year later, on July 30, 1871, V. M. Lihin was sent abroad for training for 2 years. There he attended the Zurich Polytechnic School to listen to lectures on practical mechanics. A year later, he returned to Odessa, where during a short vacation he defended his dissertation for a master's degree in applied mathematics "Geometric theory of absolute motion of a fixed system" (Formal list, 1876, pp. 2–11).

The process of defense itself was very unusual, as we can learn from the memoirs of a close friend – Sergei Vitte. "... After graduating, Lihin went abroad, where he listened to lectures in Karlsruhe, that is, preparation for the professorship. Returning to Odessa, he wrote a dissertation on new geometry…. Since there was no mathematical faculty then (and there is still no in university), but there was a physics and mathematics faculty, which studied all-natural sciences, and therefore the professors of natural sciences were full members of the faculty council, then, in the end, the majority votes, dissertation of Lihin was declared unfit. Then I – although I did not belong to the college of professors, because I had just graduated from university - still intervened in this matter and told one of the professors (who I do not remember: either Mechnikov or Sechenov) that their decision is extremely unfair. They told me that they had received information that all the professors of the mathematics department had given an excellent response to Lihin's work only for personal reasons. Then I advised them to send Lihin's dissertation to Paris to Chasles, which, in fact, was the creator of the new geometry, which is now a subject of special

science in all universities. Chasles, having received this dissertation (which was translated into French by Lihin), after a while gave the answer that it is a "wonderful job" and that, since he knows that there are two degrees: master's and doctoral, and you can give a doctor in addition to master's, then he, Chasles, for his part for such a wonderful job would have made Lihin a doctor of mechanics, bypassing the title of master of mechanics. After such a response, the faculty immediately gathered and recognized Lihin worthy of a master's degree in mechanics ... "(Vitte, 1924, p. 57–60).

After his defense, Lihin returned abroad, where he continued his studies, personally met Chasles and became his student.

Michel Chasles was born in 1793 near Paris. After graduating from high school, he entered the Paris Polytechnic School in 1812, which he graduated in 1814.

M. Chasles's first works concerned various issues of geometry, analysis and history of mathematics. In 1830 he drew attention to the fundamental work "Historical sketch of the origin and development of methods in geometry."

In 1841, Shall, already gaining a strong scientific reputation for his publications, was invited to teach at the École Polytechnique in Paris. In 1846 he moved to a specially founded department of higher geometry at the Sorbonne. He devoted 20 years to teaching and then retired. He continued his scientific activity until his death in 1880.

His work entitled "Historical Review of the Origin and Development of Geometric Methods" généraux de la science, la dualité et l'homographie) was published in 1837 and according to Bertrand it "is the most scientific, most profound and most original of the works that have ever appeared in the history of mathematics" (Lihin, 1881, p. 21). The work consists of 3 parts - books, the first of which is entirely an essay on the history of geometry, from Pythagoras and Euclid to the early nineteenth century. The second and third books, to a greater extent, contain data on the scientific developments of Michel Chasles himself. This work marked the beginning of an era of new geometry. Chasles proved that geometry is an independent mathematical science, has its own scientific apparatus and significant practical value.

Thus, after the founding of the Department of Higher Geometry at the University of Paris in 1846, M. Chasles began work on an academic textbook of Higher Geometry. The textbook was published in 1852, which actually confirmed the birth of new science.

In the second half of the XIX century. France became a leader in the development of mathematical sciences, which naturally contributed to the emergence of scientific societies. The French Mathematical Society (French: Société mathématique de France, abbreviated SMF) is a public professional organization of mathematicians in France. Founded in 1872 by Emile Lemoine and is one of the oldest mathematical societies in the world. The main purpose of the Society in the charter is to promote the development of pure and applied mathematics. The Society publishes several magazines. One of them comes from the day of its foundation and to this day. ***Bulletin de la Société Mathématique de France*** *(since 1872).*

In 1873 the president of the society became Michel Chasles. It is quite natural that among the first authors of the magazine were students and acquaintances of the French academician. M. Chasles quite actively contributed to the young scientist from Odessa. He was introduced to French mathematicians and invited to the Mathematical Society of France, of which he became a member in 1873. It should be noted that V. Lihin was the first mathematician of the Russian Empire admitted to the Mathematical Society of France. Next precedents for membership in the Society of Representatives of the Russian Empire occurred almost a decade later (in 1882 – D. Selivanov and P. Chebyshev, 1886 – V. Maksimovich) (Vie de la société. Bulletin de la S. M. F. 1888, pp. 5–14).

Valerian Mykolaiovych doctoral dissertation consists of two sections, one of which "On the acceleration of higher orders in the motion of a constant system" contains a generalization in the case of n-th accelerations of the theorem of Rezal, Bress and others and represents the natural development of the idea laid in Somov and Jordan and on these issues. In the second part of the dissertation "On the geometric properties of the displacements of flat figures" for the first time raises the question of the motion of a system by a plane collinear variable, and their main properties of its displacement - variable and immutable systems, previously studied by Chasles.

Valerian Mykolaiovych became the first scientist-mathematician to be the first to present his research to the European scientific community. ***Sur le lieu des points d'un système invariable mobile d'une manière générale dans l'espace, dont les accélérations du premier ordre sont constantes.*** The article was received in May 1873, and the dissertation was defended in March 1874. The article reflects the material on the history of the issue and refers to the first part of the dissertation. It should be noted that this was the first case of approbation of dissertation research at the international level in domestic science (Liguine, 1873a, pp. 152–154).

But the Bulletin of SMF was not the only mathematical journal in France. It was M. Chasles who stood at the origins of the first international mathematical journal – Bulletin des Sciences Mathématiques et Astronomiques.

Chasles in 1869 persuaded the French Ministry of Public Instructions to create the Bulletin. He handpicked his former doctoral student Jean Gaston Darboux as the editor-in-chief. The 27-year-old Darboux was energetic, bold, spoke German, and almost always a dissident. He shared Chasles's opinion that French mathematics had to reform immediately. He had, in fact, long thought that all French geometers of his time are old-fashioned like dinosaurs.

The *Bulletin* was officially launched in 1870 and appeared monthly. Before 1878, each issue had 32 pages, containing four parts

✓ Revue Bibliographique (Book reviews)
✓ Bulletin Bibliographique (List of books recommended to readers)
✓ Revue des Publications Périodiques (Review of journal articles)
✓ Mélanges (Featured research articles or summary of an author's previous research).

In 1876, the Bulletin published a 6-year collection with a list of all its authors and contributors during the previous 11 volumes: there are more than 2000 authors listed, spanning from the United States to Russia, and everywhere in Europe. In a world without Facebook, le Bulletin Darboux accomplished a mission impossible (Gaston Darboux in "the beautiful years", 2019).

On the movement of an invariable figure; properties relating to areas, arcs of curves described and the volumes of the trajectory surfaces. In the geometric study of the movement of a plaiic figure invariable in its plane, we mainly dealt with the relations which take place between the tangents, the normals and the radii of curvature of the trajectories described by the different points of the moving figure, as well as between the speeds and accelerations of various orders of these points, and, from the point of view of these problems, the theory of planar movements is perhaps the chapter the most complete of Pure Cinematics (Liguine, 1878, pp. 306-333). The questions raised by Lihin were immediately answered by the magazine's editor-in-chief and in the same volume: The very interesting work of M. Liguine has recalled my attention to research which I did, quite a long time ago... To complete Mr Liguine's history, we will point out two very remarkable statements, due to Mr Zeuthen and published in the Nouvelles Annales de Mathématiques, 1871, p. 90. The first of the theorems of this learned geometer, suitably developed, could give everything you know about the areas described by the different points of a plane figure moving in its plane (Darboux, 1878, pp. 333–356).

As a teacher and scientist, Lihin was engaged in methical work. So, he compiled several bibliographic guides – ***List of works on the ovals of Descartes***. The author gave the following description of this list: Interrupted, by special circumstances, in the preparation of a monograph on Descartes' ovals, I thought it there would be some interest in publishing this list separately, enough I hope to complete books and memoirs concerning these curves, list that I was led to draw up by studying the history of the question. In addition to the works of a certain extent, there were instead of citing many questions, proposed on ovals in various newspapers, mainly in the Educational Times; to these quotes, I added the very statements of the theorems to prove, in order to save readers from tedious research and to present at the same time a series of relatively less known properties of ovals (Liguine, 1882b, pp. 40-49).

List of works on articulated systems. The list of publications includes monographs and articles for almost 100 years (from 1796 to 1882) (Liguine, 1883, pp. 145–160).

The ***Nouvelles Annales de Mathématiques*** was a French scientific journal in mathematics. It was established in 1842 by Olry Terquem and Camille-Christophe Gerono and continued publication until 1927.

On some geometric properties of the displacement of a plane figure in their plan. The article is another approbation of Lihin's dissertation, where he studied the laws of finite and infinite displacements of points without the notion of time, and in

the mechanical part, we studied the laws of change of velocities and accelerations of points, which were deduced as a consequence of the geometric part. (Liguine, 1873b, pp. 481–494).

"On Hinged Systems Poselie, Hart, Kempe" He developed the theory of hinged guides, derived the relationship between the kinematic characteristics of this and transformed motion in each of the mechanisms Poselie-Lipkin, Hart, and Kempe (Liguine, 1882a, pp. 153–163).

Conclusion

These are just some of the works that Valerian Lihin presented to the world scientific community. The works are diverse both in their issues and in form. The main leitmotif of all his works was consistent in the development of science, the author always paid attention to the history of the problem and tried to find solutions in the context of world knowledge. Thus he tried to unite domestic science with the world. A profound connoisseur of the latest ideas of European machine science, he constantly acquainted the domestic scientific community with the works of its founders, stimulated the development of applied mechanics in Russian Empire.

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Роль наукових публікацій В. Лігіна в міжнародних часописах

Анотація. В XXI столітті ми проживаємо той етап людської історії, коли будь яка інформація є максимально доступною. Сучасний науковий світ базується на розгалуженій мережі журналів. Завдяки їм ми маємо можливість знайомитись з останніми результатами досліджень. В XXI столітті кожен поважний журнал має ще й он-лайн версію, що робить розповсюдження наукової інформації майже миттєвим. Ми настільки звикли до зручностей, що

дає інформаційна епоха, що нам важко уявити труднощі, з якими стикались вчені трохи більше 150 років тому. В другій половині XIX століття сформувалась майже більшість відомих людству наук. Ґенеза наук запустила процес формування галузевих наукових спільнот і вимагала сталих шляхів комунікації для продуктивного та ефективного розвитку галузі. Наукові журнали стали ідеальним засобом для розповсюдження інформації, а наукова стаття пройшла трансформацію від звичайного листа до сучасного виду і набула ідеальної форми. Зважаючи на все вище вказане, важливо розглянути досвід В. Лігіна в публікації статей в наукових журналах за кордоном. Валеріан Миколайович був першим вченим з Одеси, що долучився до нового виду наукового спілкування. Він став першим російськомовним членом одного з найстаріших Математичних товариств Європи – Французького. Юний математик підкорив своєю ерудованістю, увагою до деталей, ґрунтовним підходом та всебічним аналізом проблематики дослідження. За своє життя В. Лігін написав більше 30 наукових робіт, третину з них було представлено в наукових журналах за кордоном. Це були і повні авторські переклади, і статті на основі частини дослідження. Не рідко, на сторінках журналів можна було спостерігати і наукові дискусії, в яких брав активну участь і наш співвітчизник. В Одесі доля Валеріана Миколайовича кілька разів досить кардинально змінювалась: він був викладачем та деканом фізико-математичного факультету Новоросійського університету; товаришем голови, а згодом і головою міста; став попечителем Варшавського навчального округу. А в Європі високо цінили його авторитет, як ученого. Він показав, що наука не має державних кордонів, що вона може розвиватись гармонійно – наслідуючи результати досліджень з усіх куточків світу. В. Лігін розірвав традицію «ізольованої» науки, коли відкриття в Російській імперії (а згодом і в СРСР) робились окремо від усього світу. Вчені, що говорять мовою науки – говорять мовою миру та розвитку. Так, у 2020 році мова медичної науки об'єднала світ не дивлячись на кордони, нації та віросповідання.

Ключові слова: *В. Лігін; науковий журнал; наукова стаття; М. Шаль; Математичне товариство Франції*

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Роль научных публикаций В. Лигина в международных журналах

Аннотация. *В XXI веке мы проживаем тот этап человеческой истории, когда любая информация является максимально доступной. Современный научный мир базируется на разветвленной сети журналов. Благодаря им мы имеем возможность знакомиться с последними результатами исследований. В XXI веке каждый уважаемый журнал имеет еще и онлайн версию, что делает*

распространение научной информации почти мгновенной. Мы настолько привыкли к удобствам, которые дает информационная эпоха, что нам сложно представить трудности, с которыми сталкивались ученые чуть более 150 лет назад. Во второй половине XIX века сформировалось почти большинство известных человечеству наук. Генезис наук запустил процесс формирования отраслевых научных сообществ и требовал постоянных путей коммуникации для продуктивного и эффективного развития отрасли. Научные журналы стали идеальным средством для распространения информации, а научная статья прошла трансформацию от обычного письма до современного вида и приобрела идеальную форму. Учитывая все выше указанное, важно рассмотреть опыт В. Лигина в публикации статей в научных журналах за рубежом. Валериан Николаевич был первым ученым из Одессы, кто присоединился к новому виду научного общения. Он стал первым русскоязычным членом одного из старейших математических обществ Европы – Французского. Юный математик покорил своей эрудицией, вниманием к деталям, основательным подходом и всесторонним анализом проблематики исследования. За свою жизнь В. Лигин написал более 30 научных работ, треть из них была представлена в научных журналах за рубежом. Это были и полные авторские переводы, и статьи на основе части исследования. Нередко, на страницах журналов можно было наблюдать и научные дискуссии, в которых принимал активное участие и наш соотечественник. В Одессе судьба Валериана Николаевича несколько раз довольно кардинально менялась: он был преподавателем и деканом физико-математического факультета Новороссийского университета; товарищем головы, а затем и главой города; стал попечителем Варшавского учебного округа. А в Европе высоко ценили его авторитет, как ученого. Он показал, что наука не имеет государственных границ, она может развиваться гармонично – используя результаты исследований со всего мира. В. Лигин разорвал традицию «изолированной» науки, когда открытия в Российской империи (а впоследствии, и в СССР) делались отдельно от всего мира. Ученые, говорящие на языке науки – говорят на языке мира и развития. Так, в 2020 году язык медицинской науки объединил мир, не смотря на границы, нации и вероисповедания.