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## On the activities of the Odesa branch of the Ukrainian Submarine Navigation School

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### Abstract

**Relevance.** The issue of Ukrainian submarine navigation has received undeservedly little attention in the modern research literature. Despite the objective importance and the fundamentally innovative potential of this topic, little constructive investigation has been carried out so far in this area.

**Purpose.** This paper aims to conduct a detailed prosographic analysis of the Odesa branch of the Ukrainian School of Submarine Navigation, which operated between 1877 and 1905. The study focuses on understanding the internal dynamics and the broader impact of this branch on national and international submarine navigation practices.

**Methodology.** The study employed the methods of comparative analysis, hindsight, induction, and deduction, using both online and archival sources to cover as much information on the topic as possible. Cliometric studies were also conducted.

**Results.** The presented study provides a prosographic analysis of the Odesa branch of the Ukrainian School of Submarine Navigation, which operated from 1877 to 1905. The branch's basic structure has been defined. Various types of connections have been identified. The influence of the representatives of the Odesa branch on the representatives of other branches and national schools of submarine navigation that functioned in the Russian Empire at the beginning of the 20th century is illustrated.

**Conclusions.** The findings will provide a solid basis for further scientific efforts in this area and for making strategic decisions to protect Ukraine's maritime interests. This investigation can also be used as a source of educational literature for historical and educational materials.

**Keywords:** underwater navigation; school; branch; submarine, naval.

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## Introduction

The study presents a detailed diagram that exhaustively demonstrates all the details of the relationship between the pillars of Ukrainian Submarine Navigation School [1; 2], while also providing all the necessary information to understand the relationships between the elements of the schematic and their historical background. The study is further supported by archival information and a historical retrospective for a more detailed understanding of this topic in the context of analysing all the subtleties of interaction between the subjects.

On January 31, 2022, at a meeting of the single dissertation council DF 41.051.033 at the Odesa I.I. Mechnikov National University, the question of mutual relations in the branches of the Ukrainian Submarine Navigation School (USNS), the hierarchy of its members and the possible influence of the branch or representatives of other national schools of diving, operating on the territory of the Russian Empire, was raised for the first

time. The Odesa branch was chosen as the basis for the systemic activity in Ukraine in terms of the time of activity and scientific and engineering productivity in the USNS. Although the text of the dissertation presented at the meeting for consideration contained separate pieces on this topic, there is an urgent need for a more thorough prosopographical analysis of this microgroup and the development of a relevant diagram, including both internal interrelations and examples of the influence of representatives of the Odesa branch of USNS on prominent figures of other national scientific schools of navigation and their underwater division, in particular Russian and Polish, using the bibliographical reference book of A.M. Pozharsky [3] and other documents [4-7].

## Diagram of relationships of USNS representatives and its interpretation

Below is a diagram showing the prosopographical network of the USNS representatives (Figure 1).



**Figure 1.** Diagram illustrating prosopographic analysis of the interconnections of the Odesa branch of submarine navigation basic structure

: Photos are shown in a clockwise direction, starting from the top (centre): S.K. Dzhevetsky, E.M. Shchensnovych, I.I. Ryznich, M.I. Tymchenko-Ruban, A.K. Hryhorenko, M.Ya. Bal, S.Y. Makarov, O.M. Krylov.

The basic structure of the Odesa branch (yellow rhombus) of four individuals has been identified (S.Y. Makarov, S.K. Dzhevetsky, V.P. Kreminsky, I.S. Zakovenko), of which the latter three are the inventors of the submersibles, and two even managed not only to translate them into metal and present them to both the Maritime Committee of the Odesa Branch of the Imperial Russian Technical Society (OBIRTS), but also to receive positive feedback from military naval officers who took part in demonstration examinations at the Odesa Raid [8; 9].

This "basic structure" professed three different concepts of submarine navigation of the USNS [10; 11] and was the authors of two of them, namely: Makarov-Dzhevetsky combat facilities to strike from underwater [12] and submarine navigation without the use of any mechanical propulsion system proposed by V.P. Kreminsky [13]. Most certainly, this Odesa basic structure was organised through the Marine Committee of the OBIRTS, which decided the fate of the invention, and each of the inventors had their own team. The connections shown in the diagram are relatively speaking both of an

official (black lines) and slightly different nature, in particular: influences through Model 3 of the Dzhevetsky submersible (green lines), family and biographical (purple lines), combat victories (thick red line), combat use of Makarov's towed mine in the horizontal direction in the Russo-Turkish War of 1877-1878 [4-6] and further attempts to use hydrodynamic mines in one cycle of vertical direction (thin red line), search and rescue (thin blue lines), teacher-student (blue lines), "French trail" (brown lines), etc.

Stepan Y. Makarov (27.12.1848/8.01.1849, Mykolaiv, Ukraine – 31.03.1904, external raid of Port Arthur, Yellow Sea) and Stefan Karlovych Dzhevetsky (26.07.1844, Kunka, Podilsk Governorate, (today) Haisyn Raion (District), Vinnytsia Oblast, Ukraine – 23.04.1938, Paris, France) are connected by at least four factors. First, they were both awarded St. George crosses for their heroic victories during the fighting on the Black Sea in the Russo-Turkish War of 1877-1878, and their ships were based in the port of Odesa [14]. Secondly, after the successful presentation of his first submersible model, S.K. Dzhevetsky was invited by the Commander-in-Chief of the Ports and Fleet on the Black Sea, Mykola Andriyovych Arkas (20.05.1816, Mykolaiv – 20.06.1881, Mykolaiv), where Captain 2nd Rank Makarov and the main star of the banquet met for the first time. Third, in November 1879 in Odesa S. Y. Makarov married his bride Kapitolina Mykolaivna Yakimovskaya (1859-1946, France), and the comrades in arms could sit at the same table. And finally, S. Y. Makarov, relying on his own combat experience, and practical demonstration of S.K. Dzhevetsky's first model at the Odesa Raid and intelligence on submarine military navigation during the Crimean (East) and the American Civil War, in the fourth section of his treatise (on submarines) [15] outlined the concept of the use of combat facilities from underwater, regarded as Dzhevetsky-Makarov concept [12].

The above illustration diagram arguments the existence of such a branch not only according to the criteria of geography, time and purpose but also demonstrates the connection of personalities in micro-groups and the influence of representatives of the Odesa Submariners' Branch on the emergence of other branches both in Ukraine and abroad.

Makarov's thoughts on rescuing the sunken armoured submarine *Rusalka*, where he served as a lieutenant, prompted I.S. Zakovenko to invent and then build a search and rescue structure with an underwater capsule specifically to search for the sunken *Rusalka*. And the first chairman of the naval commission which helped to give permission for I.S. Zakovenko to cross from Odesa to Sevastopol for subsequent examinations and demonstrations before the highest Black Sea authorities was Captain 2nd rank Mitrofan Yakovych Bal (1.06.1851 – after 12.1916), at the time commander of the torpedo boat *Bug*, who in turn had served as a midshipman under S. Y. Makarov during the first months of the Russo-Turkish War of 1877-1878 on the armed steamer frigate *Velykyy Knyaz Kostyantyn* [16].

The cross-mediated ties in the yellow rhombus involved S.K. Dzhevetsky and I.S. Zakovenko, both through Odessa submarine workshops (essentially unrelated) and by each eventually approaching French

engineers, sponsors, etc, as their country became firmly established as the leader in submarine shipbuilding in the late 19th century. The second pair, S.Y. Makarov and V.P. Kreminsky, are linked together through the logic of the development of naval submarine weapons, which S.Y. Makarov invented and applied in the form of towed wing mines in the horizontal plane. Then the wing mines were replaced by self-propelled mines (torpedoes), and instead of towed wing mines, experiments were conducted on hydrodynamic wing mines using a single trajectory cycle already in the vertical plane [17-19]. In his monograph, V.P. Kreminsky [20] argued for this movement as a multi-cyclical one. That is, the evolution of navigation in the sea depths gives a qualitatively new result.

V.P. Kreminsky also explored the idea of searching for and recovering shipwrecks through the use of an underwater vessel of his theoretical design. And on V.P. Kreminsky, as well as the commander of the Black Sea No. 3 mine company of Mykola Ivanovych Tymchenko-Ruban (13.11.1849 – Kharkiv Region, after 1920 – Yugoslavia), S.K. Dzhevetsky also had indirect influence through a series of underwater vehicles of the 3rd model.

M.I. Tymchenko-Ruban, who headed the Ochakov fortress mine company after Odesa, was the direct superior of the officer of this company, lieutenant Mykola Apollonovych Hryhorenko (1866, Mykolaiv – 7.08.1896, Mykolaiv), son of the Mykolaiv rear-admiral Apollo Kalynkovych (Kalynnykovych) Hryhorenko (10.12.1834 – 25.12.1917, Mykolaiv) and Olha Petrivna Bal (1845 – 3.08.1881, Mykolaiv). A relative of Olha Petrivna M.Ya. Bal, which was mentioned earlier, closed the chain with both I.S. Zakovenko, and with S.Y. Makarov (albeit with a time difference of almost 20 years) [16; 21-25].

Blue and red triangles are also important. In the first case, between S.Y. Makarov, S.K. Dzhevetsky and O.M. Krylov. When the first two left Odesa and moved to St. Petersburg and Kronstadt, and their exerted influence on Oleksiy Mykolayovych Krylov (3/25.07.1863, the village of Visyaga of the Alatyrsky Uyezd of the Simbirsk Governorate – 26.10.1945, Leningrad), who became the head of shipbuilding in both the Russian Empire and the Soviet Union. O.M. Krylov referred to S.Y. Makarov his teacher regarding the doctrine of unsinkability of seagoing vessels [26] (teacher-student line in blue), and he also made calculations for S.K. Dzhevetsky on the hull of his now classic model submarine when the inventor left the Russian Empire and settled in Paris (grey line), and accompanied S.K. Dzhevetsky's last submarine "Poshtovyy" [27-36].

The red triangle on the diagram shows the influence of S.K. Dzhevetsky (indirectly through model No. 3 in the Training Unit Of Submarine Navigation (TUSN)) and another outstanding representative of the USNS Ivan Ivanovych Riznich (17.01.1878, Gopchytzia, Pohrebyshe Raion, Vinnytsia Oblast, Ukraine – 1920) on Edward Szczęsnowicz (25.12.1852, the island of Solombala, Arkhangelsk – 20.12.1910 St. Petersburg), who authored the concept for the operational and strategic requirements for the Russian Empire's submarine fleet [37-39]. Representatives of Polish origin E. Szczęsnowicz, D.M. Verderevskyi (1873-1947), Waclaw Kłoczowski (1873 –1930) led the highest positions in the submarine fleet and were well positioned to introduce the Polish

submarine navigation branch into the Russian Empire, and after its collapse, within a reconstituted Poland.

### **Composition and Features of the Training Unit of Submarine Navigation (TUSN)**

An introduction to TUSN With the division of the torpedo boats into a separate class of submarines and their significant complication, on 27.03./09.04.1906, a training unit of submarine navigation was established with a base in Libava/Port Alexander III (modern Liepāja) and initially equipped with five submarines (Peskar, Sterlyad, Beluha, Losos and Syh), a floating base “Khabarovsk” and a supply vessel “Slovyanka”, where both submarine officers (at the Officer Classes of Submarine Navigation) and lower ranks (at the Submarine Navigation School) were trained. The first commander of the detachment was Eduard Mykolayovych Shchensnovych. In May 1906, the regulations on the TUSN were published. Since 1907, the “Visnyk z pidvodnoho plavannya” (“Bulletin on Submarine Navigation”) was regularly published, and from 1916 the title was changed to “Shchomisyachnyk z pidvodnoho plavannya” (“Monthly on Submarine Navigation”). In 1914, the TUSN relocated from Libava to Revel (today Tallinn), and in April 1915, to Petrograd.

Graduate statistics are distributed as follows: 1907 – 68 officers and 148 lower ranks; 1908 – 24 officers and 170 lower ranks; 1909 – 11 officers and 207 lower ranks. Judging by the aforementioned data, the number of officers is decreasing year by year and the number of lower ranks is increasing. Thus, among the first graduates of the officer classes in submarine navigation in 1907 were Oleksandr Ottovych Gadd, Mykola Oleksandrovich Gudym, Vyacheslav Yevhenovych Klochkovsky, Lev Makarovich Matsievich, Yakov Ivanovich Pidgorny, Ivan Ivanovich Riznich, Yakov Savvyeh Soldatov, who made a significant contribution to the establishment Ukrainian school of submarine navigation. Levytsky Pavlo Pavlovych graduated in 1911. The list of command staff of the TUSN at the time of its deployment in Libava was as follows:

1. Detachment commanders: Rear Admiral Eduard Mykolayovych Shchensnovych (from 19.03.1906 to 1909), captain 1st rank Pavlo Pavlovych Levytskyi (from 17.06.1909 to 25.02.1911).

2. Submarine commanders:

– SS Beluha: deputy commander of TUSN Lt. I.I. Riznich (...11/1905); A.A. Andreev (29.08.1905-26.07.1907); P.V. Volkov (26.07.1907-10.01.1908); N.K. Nordstein (7/23.01.1908-28.11.1910); O.E. Tsiolkevich (1910); I.V. Messer (24.11.1910-31.03/01.05.1914); H.E. von Dicht (25.04.1914-06.06.1916); P.I. Lazarevych-Shepelevych (19.05-06.06.1916); V.N. Khomutov (06.06.1916-31.07.1917);

– SS Peskar (till 1.01.1910): Oleksiy Yevhenovych Tsiolkevych;

– SS Sterlyad (till 1.01.1910): Lt. I.I. Riznich (1904-1906); H.M. Palitsyn I;

– SS Losos (till 1.01.1910): Lt. I.I. Riznich; Captain Lt. M.M. Belkin (4.06.1907-25.06.1907);

– SS Syh (till 1.01.1910): Lt. V.I. Dmitriev VII (1908);

– SS Makrel (till 1.01.1910): V.E. Maydel II, V.V. Wilken III;

– SS Okun (till 1.01.1910): S.V. Nikolaev.

That is, in the only maritime educational institution of submarine navigation, which was stationed outside the borders of ethnic Russian territories, 7 ethnic Russians were opposed by 5 Germans, 5 natives of the Grand Duchy of Lithuania (2 Ukrainians, 2 Lithuanians, 1 Pole), who also held leading positions.

I.I. Riznich [40], elaborating on the views of his Training Officer, developed his own concept of classic submarine navigation, with great attention to: submarine accidents, design, crew requirements and, most importantly, requirements for a submarine commander.

The theoretical constructs presented in the study can be supported by cliometric investigations concerning the total number of submariners in the Russian Empire (commanders, engineers and officials of the Naval Office) from 1834 to 1918 according to Captain 2 rank A.M. Pozharsky's [3] list consisting of 705 names. And five people are repeated in different surnames. Of these 705 men, 106 belong to submariners of presumably Ukrainian origin, which would amount to:  $106 : (705 - 5) = 15.14\%$ , suggesting that this should reflect only the quantitative weight of the USNS in the Russian Empire. However, one of the factors in the qualitative composition is the written works on submarine navigation, left only by V.P. Kreminsky [20], S.Y. Makarov [15; 26], submarine navigation theorist, engineer O.M. Krylov [29; 30], A.O. Kononov [28], M.Ye. Kuteynikov [41], E.N. Shchensovich [42], I.I. Riznich [40], Ya.S. Soldatov [43], V.A. Merkushev [44], V.A. Poderni [45], M.M. Tieder [46], M.A. Kititsyn [27]. Of these, six are Ukrainian natives, which already accounts for 50% of the qualitative share.

### **Conclusions**

Firstly, a thorough prosographic analysis of the basic structure of the Odesa branch of the Ukrainian Submarine Navigation School was carried out, identifying interpersonal links based on different types of motivations: comrade-in-arms, St George's Cavaliers, like-minded submarine conception, service, affinity and search-and-rescue, sponsorship, etc. Secondly, the leaders of national scientific schools (Polish and Russian) that existed within the Russian Empire in the early 20th century, are identified and the influence of representatives of the USNS, including the Odesa branch, is investigated.

Thirdly, a visual diagram of the prosographic analysis of the relationships both inside the Odesa branch (the yellow rhombus of its body) and outside: with part of the Ochakiv-Mykolaiv plot and the leaders of the Polish and Russian scientific schools of navigation that operated in the Russian Empire (blue top to left and red top to right, triangles in the aforementioned illustration) has been developed. Fourthly, a single submarine navigation training institution in the Russian Empire was identified and cliometric studies were carried out on the quantitative and qualitative factors of the USNS.

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None.

### **Conflict of Interest**

None.

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## **Про діяльність Одеського осередку та Української школи підводного мореплавства**

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### **Анотація**

**Актуальність.** Питанням українського підводного судноплавства в сучасній науковій літературі приділяється незаслужено мало уваги. Попри об’єктивну важливість і принципово інноваційний потенціал цієї теми, конструктивних досліджень у цій галузі досі проведено мало.

**Мета.** Ця стаття має на меті провести детальний просопографічний аналіз Одеського відділення Української школи підводного плавання, яке діяло в період з 1877 по 1905 рік. Дослідження фокусується на розумінні внутрішньої динаміки та ширшого впливу цієї філії на національні та міжнародні практики підводного плавання.

**Методологія.** У дослідженні використовувалися методи порівняльного аналізу, ретроспективного аналізу, індукції та дедукції з використанням як онлайн, так і архівних джерел, щоб охопити якомога більше інформації на тему. Також були проведені кліометричні дослідження.

**Результати.** У представленому дослідженні здійснено просопографічний аналіз Одеського відділення Українського училища підводного плавання, яке діяло з 1877 по 1905 рік. Визначено основну структуру відділення. Виявлено різні типи зв’язків. Проілюстровано вплив представників Одеського відділення на представників інших відділень та національних шкіл підводного плавання, що функціонували в Російській імперії на початку 20 століття.

**Висновки.** Отримані результати стануть міцним підґрунтям для подальших наукових розвідок у цій сфері та для прийняття стратегічних рішень щодо захисту морських інтересів України. Це дослідження також може бути використане як джерело для написання історичної та навчально-методичної літератури.

**Ключові слова:** підводне плавання; школа; відділення; підводний човен, флот.