DEVELOPMENT OF SOVIET MARITIME POWER

by

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ABSTRACT OF DISSERTATION

Development of Soviet Maritime Power

The development of Soviet maritime power has been an uneven and complex process closely associated with the level of Soviet industry and supplemented by skillful utilization of foreign technology. The Soviet government inherited a relatively strong maritime tradition and a substantial number of Tsarist specialists. During the restoration stage, 1921-1927, the shipyards were put back into operation, and construction of a number of ships, laid down prior to the Revolution, was completed. Toward the end of the 1920's, the construction of naval ships, particularly submarines, started. Primary attention up to the mid-1950's had been given to the Navy. The development of merchant marine, fishing fleet, and river transport had been exercised mainly on a residual basis. A number of naval programs, approved and partially implemented during Stalin's reign, resulted in a numerically sizable Navy. Rapid development of all aspects of the Soviet maritime power, which started in the mid-1950's, was the result of a major revision of policy, particularly with respect to naval construction. The USSR decided not to build aircraft carriers, not to fight its major opponent with his weapon system, but, instead, to build a Navy whose striking power would be concentrated in new weapon systems—missiles, which can be launced by various carriers from the surface, in the air, and under water. Consequently, a number of classes of Soviet ships have no equal among the major naval powers at this time. The Soviet Merchant Marine presently occupies sixth place in the world. It is capable of satisfying the needs of rapidly growing Soviet foreign trade, domestic sea transportation, and military and economic aids; and it plays a significant role as an auxiliary of the Soviet Navy. Soviet shipbuilding is well developed, utilizing advanced methods of construction. Foreign deliveries played an important role, and permitted concentration on naval shipbuilding. In oceanography, the Soviets are one of the leaders in the world. During the last decade, considerable attention has been devoted to the exploitation of mineral resources from the sea. The appearance of the Soviet fishing fleet in remote areas of the world's oceans preceded that of the Soviet Navy and Merchant Marine. Presently, both the fishing vessels and the gear they employ are among the most advanced in the world. The role of the Soviet fishing fleet in foreign aid is substantial and growing.

The vastness of the Soviet Union's territory and its poorly developed land transportation made inland waterways indispensable for the transportation of goods, raw materials, and people. Efforts to master the Northern Sea Route, which is destined to play an important role, continue. The Soviet maritime power of today is the result of more than 50 years of the Soviet Union's development as a state and represents to a large degree the realization of the long-cherished Russian dream to be a great maritime nation. In May, 1972, Admiral Gorshkov emphasized the peacetime role of navies as "political force at sea" which "continues to have paramount importance as an instrument of policy of great powers." The upward trend in the development of all aspects of the Soviet maritime power should continue, creating greater capabilities and permitting more flexible application of it in the interests of Soviet policy.

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Development of Soviet Maritime Power

Volume I

By

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To those at sea.

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Most of the research material for the dissertation was derived from Soviet sources. Some German and Polish language publications were also used. Use of American and British sources was limited primarily to naval matters. Soviet specialized periodicals (particularly journals and transactions), as compared to books, were found most useful, and provided historical data based on the Soviet archives, most of which is unavailable in the West. These periodicals have presented a detailed picture of current trends in the development of the civilian branches of Soviet maritime structure.

There are many to whom the writer is indebted for various degrees of assistance and encouragement. The idea to study the subject of Soviet maritime development in a broader scope was born during many prolonged discussions of naval development with Robert W. Herrick and a number of mutual friends. In spite of often profound disagreement over various aspects of the subject matter, those discussions were extremely stimulating and contributed heavily to the decision to write.

In addition to the many faculty members of the George Washington University, whose efforts and patience are deeply

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INTRODUCTION

Many scientists have pointed out that a more appropriate name for our planet would be the Ocean and not the Earth, for close to three quarters of the planet surface is covered by the water. Historically, a maritime or sea power has played an important role in international development. Quite often naval power has been associated with such terms as sea power or maritime power, but such important elements as merchant marine, fishing fleet, oceanography, shipbuilding, and associated research and development have been overlooked. Recently, the traditional importance of the sea and its use for communication and application of power or power-in-being has been elevated, and it is rapidly becoming an important source of minerals and food. Post World-War-II changes in the world's socio-political structure, particularly the formation of opposing blocs of nations and the emergence of numerous newly independent states, have provided conditions for the more intensified use of the sea for development, competition, and containment. A pattern of world trade creating a certain interdependency of nations is substantiated by transport, of which the merchant marine is a most vital part, and thus, of great

importance to national economies. Internationally, there is a tendency to solidify maritime nations in a regulated approach, i.e. peacetime mutual protection in the sphere of economics and often in military alliances. Continents which have oceans between them are no longer divided by their expanse but rather are joined by them.

In the post World-War-II period, the originally undisputed and unquestioned capability of the US to control the sea has been gradually contested, particularly in the decade of the 1960's, and the main challenge has come from the nation whose maritime power had not been felt for a long time, and which the West was accustomed to treat as a classical land power, the Soviet Union. Growing Soviet political, economic, and military involvements around the world have recently been practically without exception associated with maritime power. The analysis of this power, its development, internally and in the relation to other states, and the nature of the challenge is of obvious importance.

Not long time ago, one US Air Force general, arguing for a greater budget appropriation for his service vs. the US Navy requirements, expressed what well might have been a widespread feeling: "To maintain a five-ocean navy to fight a no-ocean opponent is a foolish waste of time, men, and resources". Today, no one would seriously support such a statement. But presently,

the mightiest military power ever assembled can hardly be put to the test, particularly in the form of open warfare. Economic competition, on the contrary, is less constrained, and, being one of the constants of foreign policy, can, under certain circumstances, assume a form of economic warfare with maritime power being an essential element of its implementation.

The very size of the Soviet Union makes certain of its regions dependent on maritime transportation. It is transportation in general, more precisely poorly developed transportation, which has kept the rich resources of Siberia, the Far East, and the North, from being utilized in the Soviet economic development up to a recent time, and still handicaps the development of an integrated economy. But it seems that the more unfavorable is the geographic location of a country with respect to the sea, the more mobile and numerous must be her maritime power in order to satisfy internal needs, and to be able to make a bid equal to that of a possible opponent.

With due recognition for the prevailing interest in the present and the future, the past, however, cannot be ignored, for there lies the foundation of the development. For this reason, the development of the Soviet maritime power, the analysis of which is undertaken in this dissertation, is examined in a historical context. All significant facets of Soviet maritime

power, naval, merchant marine, fishing fleet, river transport, shipbuilding, oceanography, and the mastering of world's unique Northern Sea Route, will be examined in connection with the political, economic, and military aspects of the country's recent historical process. In addition, there will be a brief analysis of the post-war maritime development in Eastern Europe, as well as of Soviet Union foreign trade, economic and military aid, and of certain aspects of maritime law. Combining the historical method with functional analysis, it is still necessary to make considerable use of statistics and limited technological data and considerations, for they appear to provide a better guarantee against arbitrary conclusions. Scenarios have become a fashionable approach in analyzing complex socio-economic and military-political problems. But too frequently constructed on the basis of liberally exercised assumptions, and often without consideration of essential factors, many scenarios proved nothing and confused greatly. Dealing with a long neglected and still weakly researched subject, and forced to rely on scarce sources, which obviously do not provide complete information, it was found advisable not to employ the scenario approach at all.

In the process of collecting research material for this dissertation, the main emphasis was on the Soviet sources. Western sources were used when the desired information was not to

be found in Soviet sources, as frequently occurred in matters associated with the Soviet Navy. While tradition has played an important role in the development of all aspects of Soviet maritime power, it has been particularly important for the Navy. For this reason, a brief outline will be provided of Russia's naval development in the continuum of history. The leaders of the Soviet maritime establishment have been using Russian maritime tradition not only for indoctrination of personnel, but to justify Soviet maritime expansion. The West is being frequently attacked for portraying the Soviet Union as a land power. Commander-in-Chief of the Soviet Navy, Fleet Admiral Gorshkov has labeled that alleged practice as a "diversion", a subversive act of psychological warfare emphasizing that the Soviet Union did not build its maritime power "from scratch".

The importance of the ocean to mankind in the future will certainly grow. Many scientists predict that a great age of the oceans is upon us. New factors of a political, military, economic and scientific-technological nature unknown or unforeseen by the classical figures of sea power are now operating. Regardless of which school or theory of international relations one subscribes, the combined effect of these factors exercises a profound influence upon international relations. The share of Soviet maritime power in this influence appears to warrant examination.

CHAPTER I

NAVY

Heritage

The naval tradition which has been vigorously portrayed in pre-Revolutionary Russia and in the Soviet Union became part of the Russian heritage. The extensive Russian naval history which dates back more than a thousand years was initiated with a drive to have access to the open sea. From the 9th to the 11th centuries inclusive, the Kiev princes initiated nine sizeable sea expeditions in the Black and Caspian Seas in order to gain access to the trade routes. The largest was the expedition of 907 led by Prince Oleg, in which an 80,000-man army supported by 2,000 boats participated. Oleg's expedition culminated in the capture of Constantinople, where the decisive role was played by a well prepared and skillfully executed landing.

In the Baltic Sea successful expeditions against Sweden were initiated by Novgorod (1188 and 1191). A

peace treaty with Sweden concluded in 1201 guaranteed Novgorod secure trade routes in the Baltic Sea.

The disintegration of the state of Kiev in the 12th century, the advance of the Mongols, continuous wars with German Orders and Sweden forced the Russians to retreat from the sea. In the 14th century all trade routes in Black, Caspian, and Baltic Seas were lost, although Novgorod continued to navigate the White Sea. In the 16th century, particularly during the reign of Ivan IV (the Terrible), the drive to gain access to the sea became one of the major goals of Russian foreign policy. While Ivan IV opened access to the Caspian Sea but failed to in the Baltic, Peter the Great succeeded.

As a result of prolonged wars with Sweden "the window into Europe" was opened at the beginning of the 18th century and Russia established a stronghold in the Sea of Azov where the first flotilla of ships was organized in 1696, the year considered to be the year the regular Russian Navy was born with Peter the Great as its creator. The first major battle was won by the young Russian regular navy in 1714 at Gangut against the Swedish Navy.

During the reign of Peter the Great not only extensive ship construction but the construction of fleet

bases as well was initiated. In 1700 the Admiralty was organized, and in 1701 a nautical school, the forerunner of the Naval Academy, was established in Moscow. The development of the Russian Navy after the death of Peter the Great in 1725 depended to a large degree upon each ruler's attitude toward it. Its fortunes fluctuated, but in general it was an important element of Russian military power up to the Revolution.

During the reign of the Catherine (1762-1796) the Russian Navy was active in the Mediterranean and Black Seas. The Baltic squadron dispatched to the Mediterranean in 1769 won a victory over the Turkish fleet at Tchesme (June 24-26, 1770) which, together with the Battle of Gangut and Sinope (1853), has been viewed as a most important event in the history of the Tsarist Navy. A number of victories were achieved by Admiral F. F. Ushakov in the war with Turkey (1790, battle of Tendra) and in joint actions with Turkey and the allies against Napoleon's fleet in the Mediterranean (Battle of Corfu, February 1799). Admiral D. N. Sinyavin also won an important victory at Afon in June 1807.

The covenant of 1780, known as armed neutrality, was a Russian attempt jointly with other European nations to

restrict the British application of sea power and to protect neutral merchant shipping.

The beginning of the 19th century was marked by a number of scientific and commercial cruises, including Krusenstern cruise to circumnavigate the globe. In 1814 the Russians made an appearance on Kauai Island, Hawaii. A ship belonging to the Russian-American fur company which had control of the Alaskan fur trade and a base in California was wrecked off the coast. During the following year another ship was dispatched to the island to recover the cargo and possibly set up a trading post. Outposts were set up in Hanalei and Waimea. Kauai's king, Kaumaulii, agreed in writing to place himself and his kingdom under the control of the Tsar and to permit the Russians to establish factories and plantations and export sandalwood. The documents also gave half of Oahu, then ruled by Kamehameha I, to the Tsar. The expedition was recalled in 1819 because of political complications with England.[1]

The success of the Battle of Navarino Bay in 1827 in which a Russian squadron participated on the side of allies in the war against Turkey for Greek independence

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[1] Neighbor Island News, April 12-8 and 16-12, 1971, Hawaii.

was not followed up, due to British opposition to the Russian plan to attack Constantinople.

The first half of 19th century witnessed the beginning of the gradual replacement of sailing ships by steamships, a process which in Russia was delayed by technological backwardness. The first armed steamship, Izhora, was built in 1826 and the first steam frigate, the 1,340-ton Bogatyr', armed with 28 guns, in 1836. The first screw driven steam ship was built in 1848 but construction of ships of the line started just prior to the Crimean War, for which Russia was poorly prepared. Mines were also developed during the first half of the 19th century, and Russia was well advanced in this development.

The year 1853 produced two important events: (a) The first battle between Russian and Turkish steamships on November 5, as a result of which the Turkish ship was captured. The Russian ship was under command of Lieutenant Butakov, a future admiral and author of the first tactics for the steam fleet. (b) The Battle of Sinope of November 18th, during which eight Russian ships under Admiral Nakhimov attacked a Turkish squadron of 16 ships and, using explosive shells, destroyed all but one Turkish ship.

The Crimean War (1854-1855) did not produce naval

battles, for vastly superior British- French fleet was in complete control of the Black Sea. The defense of Sevastopol' for eleven months by the Russians has been glorified since, with the Navy given the major part of the glory. In the Baltic the allied fleet made an attempt to attack Kronstadt, but the strength of the defenses and the first use of mines (contact and controlled) by Russians changed the plan. Defeated in the Crimean War, Russia was denied sizeable naval forces in the Black Sea under the 1856 Paris Treaty. The main goal of the war - to prevent Russia from free access to the Mediterranean through the Straits - was achieved by the allies.[2]

Soon after the Crimean War Russia began an intensive modernization of its navy. Several types of armored ships - ironclad, armored steamers, large gunboats - were built. Russian preoccupation with mine-torpedo warfare resulted in the construction of the first minelayers and steam boats carrying torpedos. The intensive shipbuilding

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[2] The above historical period of the Russian Navy is described in (1) Istoriya Voyenno - Morskogo Iskusstua (History of Naval Art). Textbook for higher naval schools edited by Admiral S. E. Zakharov, Moscow, Boyenizdat, 1969 pp. 20-69. (2) David Woodward, The Russian at Sea (New York, Praeger, 1965) pp. 40-69, 95.

program resulted in a rather strong naval forces toward the mid-1860's.[3]

In 1863 Russia dispatched two squadrons of its ships to the U.S. The motives behind the move remain controversial, but the Russian version, recently reinforced by the Soviet Press, goes as follows: "The Lincoln Administration does not feel too strong: The Southern Confederates are attacking and Great Britain and France are about to give them direct support by intervening in the war with their navies. On 24 September a Russian naval squadron, under the command of Vice Admiral S. S. Lesovskiy, entered the mouth of the Hudson in New York . . . . Then Secretary of War of the United States Wallace, exclaimed: 'God bless the Russians!' New York authorities expressed the same sentiment in a different way: a lavish reception, a "soir'ee Russe", was held for the officers of the squadron.

Why did a Russian squadron come to New York? Vice Admiral S. S. Lesovskiy had his orders: in event of recognition of the Southern Confederates by Great Britain or some other European power, place a squadron at the disposal of the government of President Lincoln. In U. S.

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[3] History of Naval Art, pp. 71-72.

diplomatic documents of the period there is the following message of the U. S. envoy from St. Petersburg: . . . it cannot be doubted that knowledge of this fact by the French and British Governments was the bridle which kept them on a leash."[4]

Modern American writings, while recognizing the existence of speculation in 1863 that the visit of the Russian squadron was the expression of support for the North, emphasize that the real motive was the Russian desire to save the ships in case of war between the European powers and to employ them against the enemy from the American ports, thus downgrading the visit to a sort of deception.[5]

During the 1877-1878 war with Turkey, the Russian Black Sea Fleet was still weak in contrast to a strong

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[4] Izvestiya, 7 October, No. 236, and 18 October, No. 247, 1969. The article by Sagetelyan, "In Neutral Waters", described the cruise of Soviet squadron in Atlantic and its visit to Cuba. Unfriendly remarks of the American press to the presence of Soviet ships in proximity of the U. S. were given in contrast to the described visit of Russian squadron in 1863.

[5] William E. Nagengast, "The Visit of the Russian Fleet to the United States: Were Americans Deceived?" The Russian Review, January 1949 pp. 14-19.

Turkish fleet, which had many new heavy armored ships. The round ironclads designed by Admiral Popov (called Popovki), although well armed and protected by heavy armor, could not be used at sea owing to their poor seaworthiness, and hence were employed only for off-shore (coastal) defense. Mines were widely used for defense in the Danube and in the Black Sea. On the initiative of Lieutenant S. O. Makarov a faster steamer carrying four torpedo boats was used for torpedo attacks. The war ended victoriously for Russia, but the Berlin Treaty of 1878, while removing-- restrictions on Russia's Black Sea Fleet, did not change the Straits situation.[6]

During the last two decades of the 19th century the Russian Navy was reinforced with a considerable number of newly built ships including battle ships and cruisers. The theoretical search for modern naval tactics and employment of naval forces produced a number of major works by the Russians, particularly the works of Admiral Butakov, (New Basis of Steam Navy Tactics 1874), and of Admiral Makarov (Discourses on problems of naval tactics 1896).

At the end of the 19th Century more than 200 years

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[6] History of Naval Art, pp. 75-77.

of a struggle to have direct access to the Mediterranean Sea with the desire to control the Turkish Straits ended in vain for Russia, mainly because of the opposition of the European States, particularly England. While militarily, all wars with Turkey were won by Russia, the desirable outcome was not achieved by diplomacy, although the degree of access as defined in various treaties fluctuated. The treaty of Kuchuk-Kainarji (1774) opened the Straits to Russian commercial shipping. During 1807, at the Tilsit meeting between Napoleon and Alexander I, an attempt was made to determine the boundaries between the spheres of influence of the East and the West. The Tsar claimed Constantinople, but Napoleon exclaimed, "no, never Constantinople, that would mean world dominance!"[7]

The 1829 Treaty of Adrianople opened the Straits to commercial ships of all nations. In 1833 the Sultan was forced by circumstances (advance of rebellious Viceroy of Egypt) to accept a Russian offer of assistance consisting of a Russian warship at anchor in the Bosphorus supported

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[7] Cited by Dr. Egmont Zechlin in awell documented lecture delivered at the meeting of the Joachim Jungius Society for Science, Hamburg, 31 October and 1 November 1963, Goettingen, Vandenhoeck and Ruprecht, 1964, p. 1.

by a 13,000-man army ashore. Under pressure from Western powers, however, the Russians moved off, but only after securing their position by a new Unkiar-Skelessi Treaty, guaranteeing Russians the right of passage of their warships through the Straits and thus into the Mediterranean. The French and the British protested the treaty, supporting the protest with a naval demonstration at the Dardanelles. The London meeting of the Concert of Europe resulted in a different rule (the Covenant of the Straits of 1841), which prohibited naval ships from transiting the Straits in peacetime. This rule was reaffirmed in the Treaty of Paris (1856) and of Berlin (1878), and remained in force until World War I.[8] While offering Russia a safeguard against an attack from the Mediterrannean, it made her "prisoner" of the Black Sea, which proved to be true during the war with Japan, 1904-1905. As a member of the Entente, Russia continued her effort to gain control of the Straits. According to the 1915 London agreement, the Allies agreed that the Straits should go to Russia after World War I. The agreement was nullified by the October Revolution of 1917 and the Soviet government's repudiation of all Tsarist

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[8] Ibid., p. 11.

treaties. The 1923 Treaty of Lausanne demilitarized the Straits and provided for free passage for warships of all nations with some limitations imposed on the total strength of the transiting naval force.

The Montreaux Convention of 1936, which is in force at the present time, permitted Turkey to fortify the Straits again and made passage of Black Sea power warships practically unrestricted, though limiting passage of non-Black Sea power naval forces to size and cruising time. The last time the Turkish Straits became an international issue was in the middle of the 1940's, when the Soviet Union tried unsuccessfully during the Yalta and Potsdam Conferences to obtain support of the Western allies for control over the Straits, and/or to obtain rights for a naval base in the Mediterranean. The Soviet Union tried to apply direct pressure against Turkey in 1946, which met United States opposition and contributed to Turkey's entering NATO. In May 1953 the Soviet Government formally withdrew the demand.[9]

At the beginning of the 20th century growing Russian influence in the Far East (Manchuria and Korea) and her

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[9] Ibid., pp. 45-56

possession of Port Arthur (since 1898) worsened Russo-Japanese relations. When war broke out with the Japanese attack of Port Arthur (February 1904), Russia had considerable overall numerical superiority in ships but qualitatively many of the Japanese ships were better. But the major factor was geography, for most of the Russian ships were in the Baltic, and the Black Sea Fleet was useless.

In the strategic sense, the problem of war was centered in the control of the sea, and the Japanese Navy which was superior to the combined strengths of the Port Arthur and Vladivostok squadrons, exercised that control. In order to reverse it, the Russian government decided to send to Port Arthur the Second Pacific Squadron, which was formed in the Baltic. The squadron consisted of a mixture of new as well as old ships and it had to make an unprecedented 18,000-mile cruise. There were no bases on the way, and replenishments, repairs, and combat training presented the squadron with enormous difficulties. The Second Pacific Squadron left Libau in October 1904 and reached Madagascar, in December where it spent almost three months waiting for the formation of the Third Pacific Squadron, which was being organized in the Baltic from old, slow and mainly obsolete ships. The Third Pacific

Squadron left Libau in February 1905 and in May joined the Second Pacific Squadron at Cam Rahn Bay (French Indochina). With the fall of Port Arthur, Commander of Joint Squadron Admiral Rozhestvenski decided to break through to Vladivostok. In the middle of May the joint squadron reached Korean Straits, where it was met by the Japanese Fleet. In the Battle of Tsushima (14-15 May 1905) the Russian Squadron was destroyed. Of the 37 Russian ships only one cruiser and two destroyers reached Vladivostok. Five ships escaped and were interned in foreign ports, and five other ships carrying the wounded Rozhestvenski and the Commander of the Third Squadron, Admiral Nebogatov, were captured by Japanese. The defeat was disastorous and among other things demonstrated Russia's backwardness and unpreparedness for the war, the lack of talented leadership at the top, mistakes of the command, the low level of readiness, and the poor tactical training of the Russian Navy. In spite of numerous examples of valor on the part of the Russian crews, the extensive use of mine warfare, attempts to employ submarines, and delayed and adventuristic decision to reinforce the Pacific naval forces with the Baltic squadron, the main objective to gain command of the sea was not achieved, and the war was lost

by Russia.[10]

The war clearly demonstrated the importance of the navy. If Russia would control the sea or at least have superior naval forces, Japanese would have little chance for success in Manchuria. The defeat was particularly bitter to the Russian navy for it was the first large scale battle it lost in its 200-year history.

While at the turn of the century the Russian Navy ranked third after Great Britain and France, the war reduced Russia to the sixth place as a naval power. The defeat did not discourage the Russians, for soon a new program of navy modernization and build-up was launched. The semi-official naval officers "League for Fleet Renovation" demanded the construction of the most powerful ships. The naval build-up among leading maritime nations of the time clearly demonstrated the increased role of sea power, and hence, helped to ally various elements of Russian society favoring shipbuilding porgrams in spite of strong opposition in the newly created Duma.

In 1906 the naval general staff was organized and in addition to other functions charged with developing the

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[10] History of Naval Art, pp. 92-93.

shipbuilding program for fleet restoration. The staff worked out four variants of the program of which the last was approved and accepted in 1908 as a minor program. In 1910 a new major shipbuilding program was worked out under which instead of the 1,125 million rubles required for the program, only 787 million were allocated. The government appropriation for shipbuilding and reconstruction of shipbuilding yards grew steadily, however, prior to World War I; in 1908 it was 36 million rubles, in 1908, 35 million rubles, in 1910, 50 million rubles, and in 1912, 114 million rubles.[11] But those amounts were too late and too little, and, when war started, the Russian navy had a preponderance of old ships, repeating to a large degree the sad experience of the war in 1904-1905, and not a single ship visualized by the large shipbuilding program was ready.[12]

In 1910 the naval general staff made an attempt to introduce a Navy Bill visualizing the construction of a very powerful navy. Accordingly, in the Baltic Sea alone,

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[11] Shipbuilding No. 7, 1966, pp. 71-72.

[12] "Floty v pervoy mirovoy Voyne", ("Navies in the First World War"), v. I - Actions of the Russian Navy, Military Publishing House, Ministry of Defense of the USSR, Moscow, 1964.

24 battle ships, 12 battle cruisers, 24 light cruisers, 108 destroyers, and 36 submarines were visualized by the end of the 1920's. The execution of such a program would require tremendous appropriations which Russia could not afford and, instead, the socalled major shipbuilding program of 1911-1915 was approved.[13]

The backwardness of her industry forced Russia to place many orders for ships, and particularly ship machinery, in foreign countries, including Germany. In 1909 began the build-up of a modern Russian navy; four dreadnought type battleships were laid down in Petersburg for the Baltic and two years later, three more battleships for the Black Sea were laid down in the Nikolaev shipyards.[14]

The increased role of torpedo armament was reflected in the construction of the Novik-class destroyer, the best ship of its type in its time.[15] The first detachment of

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[13] M. A. Petrov, "Podgotovka Rossii k pervoy mirovoy voyne ha more" (Preparation of Russia for First World War at Sea) Voenizdat, 1926, pp. 98-100, 133-148.

[14] Sudostreniye No. 10, 1971, pp. 60-62.

[15] In 1911 Novik had most powerful torpedo armament (15 tubes), and during a test in 1913 set a world speed record of 37.3 knots. The ship, modernized in 1928, served the Soviet Navy until 1941 when she took a torpedo intended for the cruiser Kirov and was blown up. Military Historical Journal No. 12, 1970, pp. 109-110.

torpedo boats was formed in the Baltic and was composed of several Nixon patrol boats. The prototype was bought in the U. S. in 1906 and produced in one of the plants in southern Russia.[16]

The Russian navy built the world's first minelayers and minesweepers (Zapal class) during 1910-1912, as was the world's first submarine minelayer, Krab. Under the major program of 1912 four Ismail-class or Borodino-class battle cruisers, 32,000-ton capital ships combining the speed of the cruiser and armament and protection of battleships, were laid down. This ambitious program had no paralled in any other navy. For example, it visualized the construction of most powerful battleships, "monsters, larger and more powerful than anything sought theretofore".[17]

The Baltic and Black Sea battleships were completed

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[16] Sudostroeniye No. 4, 1967, pp. 75-76.

[17] David Woodward, pp. 161-162, described the ships as follows: "They were to have an armament of twelve sixteen inch guns, equal in power to the armament of nine eighteeen inch guns, which was the main armament of the biggest and most powerful battleships ever built, the Japanese giants Yamato and Musashi which, were laid down twenty years after the Russian ships were designed."

during the war, but the majority of the planned ships were either never completed or even started. The prolonged construction of ships was explained by a shortage of material, a weak industrial base and great dependence upon foreign deliveries some of which were obviously stopped as soon as hostilities commenced and some purposely delayed prior to the war.[18]

The Russian Navy started experiments with what might be termed shipboard aviation at the turn of the century. Experiments with ballons were followed by man-carrying kite systems, one of which was installed in a torpedo gunboat in the Baltic in 1903. A number of seaplane models were designed by D. P. Grigorovich, and the M-5 model was built in considerable quantity. A design of aircraft carrying ship was proposed in 1909 and 1913, both with catapults and speeds up to 30 knots.

The lack of shipbuilding capacities and delays in construction of warships of other types precluded the Tsarist Navy's utilization of such concepts. The ships assigned to carry planes were in the majority obsolete and ill-fitted for the job " a blunder typical of the Tsarist Navy of the period, in which

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[18] This was the case with machinery for a battle cruiser, two light cruisers, and destroyers machinery ordered in Germany. Surprisingly, a somewhat similar picture, though on a smaller scale, was repeated at the beginning of World War II.

technical genius was often thwarted by criminally incompetent administration".[19]

Nonetheless, just prior to World War I, the Russian Navy had aviation schools on the Baltic and on the Black Sea. Naval aviation was widely used during the war, particularly in the Black Sea.[20] When World War I started, the Russian Navy consisted of nine battleships (pre-dreadnought type), 14 cruisers, 62 destroyers, and 15 submarines. In addition there were under construction 7 battleships (dreadnought type), 4 battle cruisers, 6 cruisers, 36 destroyers, and 18 submarines.[21]

Theoretically facing a vastly superior German Navy in the Baltic, the Russian fleet received the defensive task of holding the eastern part of the Gulf of Finland and assuring the defense of the Petrograd from the sea by fighting a mine-artillery position prepared in advance in the narrowest part of the Gulf. In reality, however, the German navy was tied

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[19] "Early Russian Shipboard Aviation", U.S. Naval Institute Proceedings, April 1971, pp. 55-61.

[20] In 1917, the Russian seaplane carrier force was numerically the second largest in the world. U.S. Naval Institute Proceedings, April 1971, p. 63.

[21] History of Naval Art, p. 104.

up by a vastly superior British navy and could spare little to fight Russian navy in the Baltic. The main task on the Black Sea was said to maintain control of the sea. There was not a more detailed plan for the war. But in the Black Sea, the Russian navy was a superior force and was more active during the war.[22]

During the course of war, mine warfare was extensively used in the Baltic, the Black Sea, and the North Sea. Mines used by the Russian Navy were quite advanced and effective for the time. In addition to employment of mines in the central mine-artillery position in the Gulf of Finland, they were used in the southern part of the Baltic Sea, in the blockade of the Bosphorus in the Black Sea and for the protection of sea communications in the north, resulting in a number of losses to the German Navy, including the damaging of the Goeben and the Breslau.

The Russian Black Sea Fleet was also active against lines of communication, particularly against the Zonguldak coal traffic. Both the Black Sea and the Baltic fleets were also active in supporting the army's maritime flanks. Starting in 1915, the Germans became more active against shipping in the

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[22] Ibid., p. 106

north, and the Northern Flotilla was organized to protect it in July 1916. Ship traffic in the north was quite extensive; in two years, 1915-1917, 1,800 ships delivered 5,475,000 tons of various cargo and 1,780 ships departed Arkhangelsk and Murmansk carrying 4,463,000 tons. In addition, 36,000 Russian expeditionary corps troops were delivered from Arkhangelsk to France.[23]

The combat activity of the Russian Navy continued even after the first revolution, in February 1917, in spite of the fact that the command of the navy was gradually disintegrating and was being replaced by committees consisting of elected commissars. The 1917 October Revolution put an end to the Russian participation in the World War I.

By way of summary it can be stated that at the time of the 1917 October Revolution, Russia had a well established naval tradition and a sizeable navy, which although not distinguishing itself in a major sea battle, managed nonetheless to fulfill the basic tasks assigned to it. The first world war interrupted the planned development of the Russian navy. More than 200 years of Russian naval history up to the time of the Revolution had to its credit a number of considerable

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[23] History of Naval Art, p. 128.

achievements as well as disappointing failures, of which Tsushima was the major one. The pre-Revolutionary Russian Navy had traditionally combined the innovativeness and ingenuity of some of its officers with the backwardness of the economy supporting it and the incompetence and corruption of the administration. The established naval tradition served the future Soviet navy well, and represented a powerful base upon which the navy was restored, rebuilt, and developed.

From the Revolution to World War II

During 1905-1906, mutiny and revolutionary movement infected the Russian Navy. In addition to well known mutiny on the battleship Potemkin, there were mutinies on other ships of the Baltic and Black Sea Fleets. The revolutionary movement intensified again in 1911 and 1912, when attempts to organize sailors rebellions were uncovered in the Baltic and Black Sea Fleets.[24]

At the time of the February 1917 Revolution, the influence of various leftist parties in the Russian Navy was quite strong. The period between February and October 1917 witnessed the gradual disintegration of organized command in the navy and the

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[24] S. F. Nayda, <u>Revolutionary Movement in Tsarist Navy</u>, Academy of Science of USSR, 1948, p. 442.

further growth of leftist influence. The Communists skillfully used the confusion created by the February Revolution and indecisiveness of other parties and considerably increased their influence and the number of party organizations under their control in the Navy. At the time of the October 1917 Revolution, a great number of sailors sided with the Communists. Many naval units, particularly from the Baltic Fleet, actively participated in the revolution on the side of Communists. During the civil war which broke out soon after the October 1917 Revolution, the Navy was active again. Although some combat actions took place at sea in the Baltic, the Black Sea, and the North Sea, which have been treated by Soviet historians as important military contributions of the Navy, helped to resist intervention and thus to protect the Young Soviet Republic, the sailors ashore acting as commissars, commanders, members of the newly organized secret police, and agitators played a much more important role. But the Red forces did not enjoy a monopoly of the sailors' affection, for some supported social revolutionaries and some joined the anarchists. In general, Communist influence was considerably stronger in the Baltic Fleet then in the Black Sea Fleet.[25]

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[25] S. S. Khesin, Oktyabr'skaya revolutsiya i flot (The October Revolution and the Navy), Nauka, 1971, p. 488.

The Council of People's Commissars decree 29 January 1918 signed by Lenin announced the disbanding of the Tsarist Navy and the creation of new, workers-peasant Red Navy, based on volunteer service and elected commanders. In addition to the position of People's Commissar for Naval Affairs, occupied by sailor-Bolskevik P. E. Dybenko, the position of Commander of Naval Forces of the Republic was established in September 1918. Rear Admiral of the Tsarist Navy V. M. Al'fater, was appointed to be the first commander of the Soviet Navy. In December 1918, the Naval General Staff was organized.[26]

During the winter of 1917-1918 the majority of the Baltic Fleet ships were at Revel (Tallin) and Helsinki. In February 1918, the Soviet government ordered all ships of the Baltic Fleet to be transferred to Kronstadt in order to prevent their capture by the advancing Germans. Initially, all ships were concentrated in Helsinki, and from there they were moved in three detachments to Kronstadt during March-April 1918. The event known as "the ice cruise" undertaken under severe winter conditions with the Gulf of Finland covered by thick ice, resulted in the arrival at Kronstadt of 236 combatant and auxiliary ships of the Baltic Fleet.[27]

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[26] History of Naval Art, p. 142.

[27] History of Naval Art, pp. 144-146.

During the summer of 1918 somewhat similar situation in the Black Sea had a different outcome. The spring 1918 advance of the Germans threatened to occupy Sevastopol', where practically the whole Black Sea Fleet was stationed. The Soviet government decided to transfer the fleet to Novorossiysk. Because the Bolsheviks' influence in the Black Sea Fleet was considerably weaker than the Baltic Fleet, the execution of the order was delayed until April 30, 1918, when finally most of the ships, including two new battleships, sailed for Novorossiysk. The German High Command, however, demanded the return of fleet to Sevastopol'. The Soviet government formally agreed to satisfy the demand but secretly ordered the scuttling of the fleet. The order again was not executed immediately, and the fate of each ship was decided by a ballot of all the members of the crews. As a result, one battleship, one cruiser, and 6 destroyers returned to Sevastopol' and the rest of the ships were sunk by their crews.[28]

The civil war was fought on land, and naval forces under the command of the Soviet Government were employed exclusively to assist the Red Army maritime flank and also, as was the case in the eastern part of the Gulf of Finland, to protect the

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[28] Sudostreniye No. 6, 1968, pp. 62-66; The History of Naval Art, p. 147.

maritime approaches to the main centers. Many specialists of the former Tsarist Navy were employed, and during 1918-1920 7,605 mines were sown in extensive mine warfare.[29]

A number of river flotillas formed and manned by sailors of the Baltic and Black Sea Fleets took an active part in the combat. At the beginning of 1921, when the civil war was practically over, the Soviet Navy presented a sorry spectacle. In the Black and the North retreating White Guards and intervening foreign powers took away three battleships, 10 cruisers, 64 destroyers, 30 submarines, and many auxiliary ships and transports. Actually, the fleets in the Black Sea, the Pacific, and the North ceased to exist.[30] The Baltic Fleet represented a "gathering of lifeless ships" moored to the docks and manned at only 20-40 % of strength.[31]

Most of the ships were badly in need of repair, but the Navy's supply of spare parts was exhausted. There was no fuel and the greater portion of ship repair facilities were damaged, destroyed, or deteriorated. Added to the Navy's desperate

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[29] History of Naval Art, pp. 166-167.

[30] Boyevoy put' Sovetskogo voyenno-morskogo flota (Combat Path of the Soviet Navy, hereafter referred to as Combat Path), Moscow, Voenizdat, 1967, p. 590.

[31] Ibid., p. 147

material condition was the problem of ideological reliability and the regime's trust in the Navy.

The sailors, particularly from the Baltic Fleet, became "the glory and the pride of the Revolution". Accustomed to having their own organizations such as Baltic-Revvoensovet (Revolutionary Military Council) and Tsentrobalt, the sailors, particularly those in Kronstadt not only continued to enjoy a degree of revolutionary independence but represented a force to be reckoned with. The number of Bolsheviks among the sailors during the civil war was considerably reduced, for many of them left the ships to fight ashore, later to be appointed to party and government positions throughout the country. Measures initiated in 1920 by the Party to tighten political control in the Baltic Fleet (which for all practical purposes meant Kronstadt) was met with great criticism by the sailors. This coincided with the profound disappointment of the Petrograd workers, leading to large-scale disturbances which were ruthlessly suppressed by the regime.[32]

The sailors in Kronstadt proclaimed their support of the Petrograd workers, and in early March 1921 the Kronstadt mutiny began. It lasted 18 days and was crushed by a direct

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[32] Sounders, pp. 89-91.

attack over the ice by Red Army units, with the participation of a few hundred delegates to the Tenth Party Congress which started its work in March 8th in Moscow. Thus, the revolutionary activity in the Navy was ended and the "wings" of the "eagles of the revolution" clipped.

Suppression of Kronstadt mutiny was followed by the purge and the "filtering" of all Navy personnel. These measures, coupled with the discharge of personnel in the course of demobilization, reduced the Navy's manpower from 180,000 to 39,859 men by the end of 1921.[33]

The Tenth Party Congress resolved "to undertake measures for the restoration and strengthing of Red Navy" subject to the "general conditions and material resources of the country". The Congress also decided "to strengthen the Navy with political workers, and to return to the Navy all Communist seamen working in other fields." The decree signed by Lenin ordered the salvage of repairable ships sunk during the civil war and the repair of available ships.[34] The intensity of the 1922 ship repair program, according to Lenin, had to be defined by "the size of the Navy which was necessary to keep

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[33] Combat Path of the Soviet Navy, pp. 148-149.

[34] History of Naval Art, pp. 168-169.

for political and economic reasons".[35] During the 1921-1924 period, two battleships, two cruisers, and a number of destroyers and submarines underwent major repair and entered the service.[36]

The first All-Union meeting of Communist seamen to discuss the problem of restoring the Navy was called in Moscow in April 1922. While they discussed the nature of the future navy, participants rejected proposals of two opposing groups: one headed by a former Tsarist navy specialist demanding construction of "an open sea fleet", e.g. in general a balanced navy built around super dreadnoughts, for "lack of money, production capacity, and human resources", and the socalled "young school", demanding construction of a light navy, a "mosquito fleet", submarines, and aviation for its one-sided emphasis. It was stressed that a navy incorporating all classes of surface ships, submarines, and aviation and "acting aggressively in cooperation with the Red Army" was needed for the country's defense. A resolution also recommended the sale of old ships and the use of the money thus obtained for the speedy restoration of usable ships.[37]

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[35] The Combat Path, p. 148.

[36] History of Naval Art, p. 169.

[37] The Combat Path, pp. 149-150.

During 1921-1922 all shore fortifications were taken away from the navy and subordinated to the army.

The Fifth Congress of Komsomol (Young Communist League) in 1922, acting on Party orders assumed the role of Navy patron.[38] In addition to sending thousands of its politically reliable and hard working activists for Navy service, the Komsomol conducted an effective pro-navy propaganda campaign and organized socalled "The Navy Week". As a result in 1922-1924 over 10,000 young Communists joined the Navy and more than a thousand of them entered the Navy's educational institutions. A considerable amount of money and goods, including clothes, were collected and sent to Navy units and many enterprises, districts, and cities, became patrons of individual navy units.

Certain measures to train future command personnel, as officers were called at that time, were undertaken as early as October 1918, when an eight-month officer training course was organized. In 1922 a number of preparatory schools (some with three-year programs) were opened to train future cadets of the naval school, which at the same year switched over to a four-year program. In February 1922 the naval academy for the advanced

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[38] The Komsomol has continued this role of patron of the Navy from 1922 up to the Present. It sends its "best representatives" for service in the Navy.

training of senior naval officers resumed operation. In addition, a special school to train political officers for the Navy was also organized.[39]

In 1922 ship exercises were resumed in the Gulf of Finland and in October 1923 Baltic and Black Sea naval units held maneuvers with the participation of Red Army units. In 1924 the number of ships in commission increased considerably, and in addition to regular exercises the training detachment of the Baltic Fleet (cruiser Aurora and training ship Komsomolets) performed a 47-day cruise from Kronstadt to Arkhangelsk and back with calls at Bergen and Trondheim (Norway). In the same year the Soviet ship Vorovskiy was transferred to the Far East via the Cape of Good Hope. The ship stopped in Canton where it was visited by Sun Yat-sen. The appearance of a Soviet ship in China resulted in considerable pro-Soviet propaganda.[40]

In 1925 Soviet ships visited Norway, Sweden, Italy, and Turkey, those visits helping the Soviet government to strengthen its position in foreign relations. During the same years extensive minesweeping was conducted, and in 1925 the approaches

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[39] Morskoy Sbornik No. 6, 1971, pp. 16-19; Combat Path of the Soviet Navy, pp. 153-154.

[40] Combat Path, pp. 155-157

to the Soviet ports were declared to be clear from mines in the Baltic, the Black Sea, and the Sea of Azov.[41]

In 1924 the first stage of the Red Navy restoration was completed. In addition to the Baltic and Black Sea, modest naval resources, primarily patrol ships, appeared in the Caspian Sea, the Far East, the Amur River, and the North.

The second stage of the Red Navy development and the final stage of its restoration started in 1924. The years 1924 and 1925 are known as a period of "military reform" worked out by Frunze, who replaced Trotsky as chairman of Revvoensovet and the People's Commissar of Military and Naval Affairs. Approved by the April 1924 Plenum of the Party Central Committee, the military reform influenced the organization, personnel policy, training and hardware development of the Red Navy and Red Army.[42]

Fleets, shore defense systems and naval aviation were united into the Naval Forces under a single chief. The military law approved 18 September 1925 established compulsory military service, and the duration of conscript service in the Navy was set at four years. Starting in 1925 the gradual transformation to the one-man command system to replace the

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[41] Ibid., p. 158.

[42] Sudostroyeniye No. 2, 1970, pp. 52-55.

dual commander-commissar system was initiated in the Soviet Armed Forces. In the Navy the process was particularly slow and exercised with great care, continuing until 1933.[43]

The October 1924 decision of the Council of Labor and Defense approved a shipbuilding program, authorizing major repair of a battle ship, cruisers, and destroyers, as well as completion of construction of ships laid down prior to the Revolution and found suitable for completion. Thirty-five million rubles were appropriated for ship restoration in 1925, and 64 million rubles, in 1926.[44] The year 1925 was marked by more extensive combat training. For the first time, a squadron of ships headed by the battleship Marat with Frunze aboard entered the Baltic Sea and sailed to Kiel Bay where it anchored. During the year, Soviet Navy ships sailed a total of 260,000 miles, 159,000 in the Baltic Sea, 49,000 in the Black Sea, and 24,000 in the Far East.[45]

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[43] The number of socalled old specialists, former Tsarist naval officers, in the Navy was considerable and proportionally higher than in any other services. On the other hand, Party members represented only 27% of the naval officers. The special nature of the service was also taken into consideration. Combat Path of the Soviet Navy, p. 196.

[44] Shipbuilding No. 4, 1971, pp. 45-48.

[45] Combat Path, p. 160.

The first Soviet six-year (1926-1932) shipbuilding program authorizing the construction of 12 submarines, 18 patrol ships, and 36 torpedo boats was approved and successfully fulfilled.

When the second period of development ended in 1928, the Soviet Navy in general had recovered from the ordeal of the Revolution, the civil war, and the Kronstadt mutiny; there was an established system of organization and command; a number of documents defining principles of combat training and combat employment of the ships were produced; the majority of ships suitable for restoration were repaired and in commission; the gradual construction of new ships had begun. The Soviet Navy had in commission three battleships, five cruisers, 24 destroyers, 18 submarines, and a considerable number of smaller combatant and auxiliary ships.[46]

Rapid industralization of the nation, initiated in 1928 with the launching of first Five Year Plan, was an important factor in future naval development.

The construction of first Soviet naval units commenced in 1927, when the first D-class (Dekabrist) submarines were laid down in Leningrad. In the Black Sea, the first Soviet

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[46] History of Naval Art, p. 169.

torpedo boat, Pervenets, was built in the same year, to be followed by the construction of the G-5 series of torpedo boats (Tupolev's design) and later the D-3 class. The construction of escort type ships of the Uragan class (also known as the "bad weather" class) was initiated in 1928.[47]

During the years of the second Five Year Plan, naval construction not only intensified quantatively but became more diversified and sophisticated qualitatively. While the construction of L and Shch classes of submarines initiated during first Five Year Plan continued, the Soviets started to build railroad transportable submarines of the M class. Construction of more sophisticated submarines of the P and S classes was also started. In 1936 the first K-class submarine, the largest and most powerful for that time, was laid down. The development of surface forces was accelerated concurrently. In 1932, the destroyer leader Leningrad was laid down, followed by Minsk (Baltic Fleet), Moskva and Kharkov (Black Sea), Baku and Tbilisi (Far East). During the same period construction began of a large series of destroyers (Project - 7, Gnevnyy-class) and of the cruiser

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[47] Sudostroyenie No. 4, 1971, p. 47, Combat Path, p. 165, and History of Naval Art, p. 170.

Kirov. A considerable number of minesweepers, coastal patrol boats, and torpedo boats were also built.[48]

When the second Five Year Plan was completed, the Soviet Navy had in commission more than 6 times as many submarines, twice as many destroyers, 6 times as many aircraft and 3.5 times as many torpedo boats as in the last year of first Five Year Plan.[49]

The Soviet Pacific Fleet was organized in 1932 and the Northern Flotilla in 1933 (since 1937, the Northern Fleet), thus establishing the Soviet naval forces in all four major theaters.

The Spanish Civil War (1936-1937) clearly demonstrated to the Soviets the need for stronger naval power. They did their best to provide assistance to the republican government, but could not convoy their merchant ships delivering the war material. They also could not produce any convincing show of naval strength which would restrain the activity of the Franco Navy, patently supported by German and Italian forces; a few Soviet merchant ships were sunk or captured. As Admiral

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[48] _Ibid._, A short review of the development of individual types of ships by the Soviet Union will be presented later.

[49] S. Gorshkov in _Morskoy Sbornik_ No. 7, 1963, pp. 9-18.

N. G. Kuznetsov noted, "At that time it became particularly apparent how important the sea is for us and how we need a strong navy."[50]

A separate Commissariat of shipbuilding was organized and a new shipbuilding program worked out toward the end of 1937 was approved in 1938. While the program visualized the continued construction of submarines and destroyers, it placed heavy emphasis on building battle ships, heavy and light cruisers, and minesweepers.[51]

While the events in Spain had definitely contributed to the size of the approved program and speed with which the Soviets began to execute it, the Soviet awareness that a larger, more balanced and modern navy was needed had existed before. But the extremely limited resources and industrial capacity had excluded the initiation of any sizeable shipbuilding program. In 1935, then Soviet industrial czar Ordzhonikidze, on a visit to the Black Sea Fleet, predicted the construction of larger ships of "any type" in the not so remote future, but emphasized "the difficulties with metal and the fabrication of large turbines".[52] In January 1936 Soviet President M. I.

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[50] N. G. Kuzhetsov, Nakanune (On the Eve), Moscow, Voenizdat, 1966, p. 257.

[51] Sudostroyeniye No. 4, 1971, p. 47.

[52] Nakanune, p. 94

Kalinin, when presenting medals to a group of naval officers, stated that the "time had come for the Navy to take a greater part in the country's defense".[53] Ordzhonikidze also stressed the necessity to count on Soviet production capacity alone; a statement which requires some qualification. The Soviet Union had tried hard for years, and not without some success, to receive foreign assistance to its naval construction. In 1926 there were official contacts between representatives of German and Soviet navies to that end.[54] The Soviets desired German cooperation in the reconstruction of their navy, particularly in submarine construction. In spite of German reluctance, plans for a submarine were purchased. Consequently, the modified and improved version of the German B-3 submarine designated Type-S by the Soviets was built in a large series. Many Soviet ships of the pre-World War II period showed many signs of foreign design (particularly Italian and some French). One destroyer leader, Tashkent, was even built in Italy and blessed by a Catholic priest. Machinery for some propulsion

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[53] _Ibid._, p. 103

[54] _D. Woodward_, p. 202; The visit of a German naval mission to the Soviet Union led by Admiral Spindler mentioned in the book was actually preceded by the March 1926 Berlin meeting between Germans and a group of high-ranking Soviet naval officers.

installations, particularly for Project-7 destroyers, was bought in England, but the American government rejected requests for capital ship designs.[55]

After the 1939 German-Soviet Treaty was signed, the Germans were asked for blueprints of a battleship (Sharnhorst class) and an aircraft carrier (the Graf Zeppelin class). The request was turned down, but a deal to buy the cruiser Lutzow was concluded.[56] The Soviet spy apparatus was also involved in obtaining the blueprints of new foreign ships.[57]

The knowledge of foreign ship designs and construction methods had certainly helped the Soviet shipbuilding industry. Nonetheless, it would be wrong to conclude that the foreign assistance and/or information was crucial, for the bulk of the weapon systems and main propulsion and auxiliary machinery had been Soviet designed and built. The decisive factor determining the Soviet shipbuilding output and the quality (or lack of it) of Soviet ships was the industrial capacity (volume output) and

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[55] D. Woodward, p. 203.

[56] D. Woodward, p. 207-211, and S. Breyer, "Guide to the Soviet Navy", United States Naval Institute, 1970, pp. 21-37.

[57] For example, the blueprints for a new Italian submarine were obtained by master spy Krivitsky. Washington Post, February 13, 1966, "Who Killed Krivitsky?".

the precision in production of machinery and armament systems. Many quite advanced systems were designed which could not be produced for lack of the same production capacity, materials, and experience. In 1937 when two Five Year Plans of industrialization, with the great emphasis on heavy industry, were fulfilled, the Soviet Union managed, despite the great strain on its economy, to increase naval construction. The decision to develop a "large sea and ocean navy" and to start the construction of ships of all types was made in 1937. The 1938 shipbuilding program was prepared in the typical Stalinist style manner, i.e. in great secrecy, without consultation with the top naval leadership. Execution of the program started before it was formally approved by the government.[58]

Realization of new naval development program generated

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[58] N. G. Kuznetsov, Nakahune, pp. 221-226. Other important events of the period were:

(1) June 1933 - Naval development program for 1933-1938 approved.

(2) October 1938 - After clashes with Japan in the area of Lake Khasan (August 1938) decision to accelerate the development of Pacific Fleet was made.

(3) 25 May 1940 - Decision to strengthen the Black Sea Fleet

(4) 19 October 1940 - A decision of CC of CPSU and the Soviet Government to "accelerate construction of light naval forces". Combat Path, p. 582-583.

a shipbuilding boom. Three new battleships of the Sovetskiy Soyuz-class, and a number of Chapaev-class cruisers were laid down. Construction of improved destroyers (Project-7U) and of submarines was accelerated. As a result, the total tonnage of the Soviet Navy surface fleet grew by 108,718 tons and submarines by 50,385 tons from 1939 to June 1941.[59] As early as 1939 the Soviet Union had more submarines than any other country in the world. In fact, the Soviet submarine fleet was larger than those of Germany and Japanese combined.[60] The task to build "the open sea and ocean navy worthy of Soviet Union as a great sea power" was proclaimed. Molotov's statement to the First Session of the Supreme Soviet of the USSR that the "mighty Soviet state should have an open sea and ocean navy corresponding to its interests and worthy of its great tasks" became a slogan. Minister of Shipbuilding Industry, I. Tevosyan, writing in Pravda[61] promised to move his industry from 6th place in the world in 1939 to first place in 1942-1943.

The growing importance of the Soviet Navy was formally

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[59] Combat Path, p. 166.

[60] N. G. Kuznetsov, Pravda, 25 July 1939.

[61] Pravda, 21 and 23 July 1939

recognized by the establishment of an independent People's Commissariat of the Navy of the USSR in December 1937 and by the organization of the Main Political Directorate of the Navy and the Main Naval Military Council.[62] One of the Stalin's top lieutenants, a member of the Politburo and Secretary of the Central Committee of the Party, A. A. Zhdanov, who since the middle 1930's had been responsible for naval development, was appointed as a member of the Main Naval Military Council.[63]

In 1939 the naval officer's schools, which had grown in number, acquired the status of higher educational institutions and increased their enrollment. While the number of young officers graduating from naval school increased, the Stalin's purge of 1937-1938 considerably reduced the number of experienced senior officers, particularly flag officers. Former commanders-in-chief of the Soviet Navy Orlov, Murlevich and Viktorov, fleet commanders Dushenov, Sivkov, Kozhanov, and Kireev, and many other senior flag officers were arrested and most of them shot. Only one, Pacific Fleet Commander N. G. Kuznetsov, survived and was appointed as a

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[62] Combat Path, pp. 168-169.

[63] Nakanune, pp. 221-222.

People's Commissar of the Soviet Navy. Many young inexperienced officers were promoted to fill the positions of the liquidated commanders of fleets, flotillas and units. The widespread belief that nearly all of the former Tsarist naval officers left the Navy[64] and that the majority of them became victims of the purge is erroneous. Surprising as it may be, the percentage of former Tsarist officers who fell victim to the purge was considerably smaller than that of the purely "Soviet bred" officers. Moreover, the most senior of them (Admiral Galler and Fleet Admiral Isakov) were promoted and became Chief of Main Naval Staff and a Deputy People's Commissar of the Navy respectively. In general, the wide use of the former Tsarist officers by the Soviet Navy continued up to the end of 1947, they were particularly numerous in the scientific, research, and educational establishments.[65]

The problems associated with the development of Soviet Naval theory, especially in connection with the old specialists, the former Tsarist officers, should be briefly mentioned. The

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[64] See for example, R. W. Herrick, "Soviet Naval Strategy", United States Naval Institute, 1968, p. 45.

[65] In 1947, for example, majority of position of full professors and heads of the departments both in the Soviet Naval Academy and Frunze Higher Naval School were occupied by former Tsarist officers.

decade of the 1920's and first half of the 1930's witnessed the theoretical struggle between the various points of view on construction and combat employment of naval forces in the Soviet Union. In general, the debates were mainly conducted in the Naval Academy and naval schools, although occasionally commanders of fleets and even the commander-in-chief participated in them.[66] Basically, the two opposing points of view were most loudly expressed. One, held mainly by the socalled old specialists (primarily, but not exclusively, former Tsarist officers) argued for the balanced navy, an open seas fleet composed, together with light surface forces and aviation, of capital ships as the backbone of the Navy. The proponents of the other view, the "young school", rejected any crucial role for the capital ships and argued for a light-forces navy with preference given to submarines. "Down with the doctrine of the command of the seas" became the main slogan of the young school, expressed by its loudest proponent, A. B. Alexandrov. The debates have received comprehensive analysis in Western as well as Soviet literature.[67]

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[66] Nakanune, pp. 49-51.

[67] See for example, D. Woodward, pp. 205-208, and particularly, Fedotov-White in Journal of the Royal United Services Institution, August 1935; R. W. Herrick, Soviet Naval Strategy; N. G. Kuznetsov, Nakanune, pp. 49-55; and S. Gorshkov in Morskoy Sbornik, No. 2, 1967, pp. 9-12.

The debates definitely contributed to the development of Soviet naval theory, helped Soviet naval officers to learn more about Western naval theories, and in general reflected the concern of naval circles regarding the condition of Soviet Navy and the need for its improvement. However, the debates neither resulted in an officially approved theory nor influenced any shipbuilding program. The theory of "small war" which was most widespread and recognized since the mid 1920's up to beginning of the 1930's reflected the pragmatic recognition of the weakness of the Soviet Navy at that time. The Soviet shipbuilding of pre-World War II period reflected, at most, the occasional excessive utilization of available industrial capacities assigned to naval construction by arbitrary decision of Stalin and his immediate circle. Thus, newly appointed Commissar of the Navy, N. G. Kuznetsov, learned about the details of 1937-1938 shipbuilding program from the head of the shipbuilding industry. His previous knowledge of the program was limited to "rumors" and "some small details" overheard during the sessions of Main Naval Council.[68] Of course, the future program was discussed and debated among top leaders of the Navy, but the opinions expressed were so much at variance

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[68] Nakanune, p. 221.

with one another that, when top naval commanders were invited to the conference with Stalin in late 1936 or early 1937 and were asked what kind of navy was needed and what types of ships should be built, they could not give uniform answers. Reportedly, Stalin concluded the meeting with this remark that they themselves did not know what they needed.[69]

The war with Finland (November 1939-March 1940) produced important consequences for the pre-World War II development of the Soviet Navy. The role of the Baltic Fleet in the War was limited to the support of the Red Army and marginal submarine activity. The war revealed the extremely poor preparedness of the Red Army and the absolescense of its armament. The March 1940 Plenum of the Party Central Committee "analyzed the results and lessons" of war with Finland[70] and decided to speed up the rearmament of the Red Army, particularly its armored and air branches. Implementation required industrial capacity and steel, both of which were in short supply. As a result, the construction of large ships, battleships, and cruisers was slowed down in the spring of 1940 and,

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[69] Ibid., p. 257.

[70] "Spravochnik ofitsera" (Officers' Reference Book), Voenizdat, Moscow, 1971, p. 157

after drastic revision of the shipbuilding program in October of 1940, was stopped completely. Only the construction of submarines, destroyers, and smaller surface ships continued.[71] Simultaneously, the accelerated development of naval bases and shore defense installations was undertaken.

During the 14 years of pre-World War II shipbuilding (1927 to June 1941) 433 ships (excluding torpedo and patrol boats and auxiliaries) were laid down. Of that number, 312 including 206 submarines and 106 surface ships (4 cruisers, 7 destroyer leaders, 30 destroyers, 18 escorts, 38 minesweepers, 1 minelayer, and 8 gun boats) were completed before the war started and commissioned. At the beginning of the war, 219 ships, including 3 battleships, 2 heavy cruisers, 10 cruisers, 45 destroyers, and 91 submarines were on the building ways. Twenty-three submarines were completed during the second half of 1941.[72]

The Soviet pre-World War II naval development has been differently assessed at home and abroad. The main controversy have been centered around the role of the submarines in over-all naval construction and the theory of their combat employment.

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[71] Nakanune, p. 261.

[72] Voenno-Istoricheskiy zhurnal - VIZ (Military Historical Journal) No. 6, 1971, pp. 36-37.

For example, some claim that the submarines were under evaluated in theory and practice.[73] While others came to the opposite conclusion, claiming that submarines were the main striking force of the Soviet Navy.[74]

It is hard to agree with either conclusion. The May 1928 decision of the Revvoensovet of the USSR, which discussed the role of Navy in the military forces of the country, stated "while developing the Navy it is necessary to combine surface and submarine fleets, shore and mine position defense, as well as naval aviation in proportion corresponding to the character of combat operations".[75] The naval development program incorporated into the second Five Year Plan again emphasized close cooperation between fleet aviation and shore defense but some preference was shown to the development of submarines and "heavy aviation".

In the late 1930's preference was given to surface ships, which were viewed as the nucleus of the navy. The submarines were supposed to act against enemy communications, and when this task was the main one, the submarines were viewed

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[73] _Voennaya Strategiya_ (Military Strategy), Third Edition, 1968, p. 168.

[74] _Combat Path_, pp. 216 and 368.

[75] _VIZ_ No. 6, 1971, p. 34.

as the main forces. The 1937-1938 program was visualized as a program for the development of a balanced navy. Not a single Soviet pre-World War II program neglected submarine construction, and each one planned and actually built more submarines than the previous one. Accelerated construction of surface ships became possible because of new shipbuilding capacities introduced in the mid and late 1930s, but by no means did it affect the construction of submarines. The fluctuation in the number of submarines built (6 during the first Five Year Plan, 137 during the second Five Year Plan, and 86 during uncompleted third Five Year Plan) is explained by the construction in the third period of a larger number of more sophisticated classes (S, L, M, and K) submarines, which obviously lengthened the average time for construction of one unit.[76]

To summarize the pre-World War II development of Soviet Navy it should be stated that with the exception of a short period of disgrace following the Kronstadt mutiny, considerable attention was devoted and effort spent to restore the available naval units, to organize naval forces, and to incorporate them into combined all-arms forces. Considering the exceptionally

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[76] *Ibid.*, pp. 36-37.

weak Soviet economy, the shortage of industrial capacities, which were overtaxed, the number of ships built and the even larger number laid down in the pre-war period is remarkably high. The initiation of the 1937-1938 shipbuilding program borders on adventurism, for, apart from the demands of the civilian sector, which had been traditionally neglected, the program was carried out to the detriment of the other services, including the army. The minor war with Finland clearly revealed this weakness, forcing redistribution of industrial capacities and, hence for all practical purposes termination of the program as far as capital ships were concerned. Tremendous expenditures of money, production capacities, and steel for the program brought little benefit to the Soviet naval forces.

To a certain degree, the situation in 1941 was the same as the one in 1914. Moreover, in an operational sense, the planned naval employment, particularly of the Baltic Fleet and the Black Sea Fleet, was not much different from that of the pre-Revolutionary period. The decisive battle on the mine-artillery position held sway in the theory of naval employment. Moreover, while the Tsarist Navy was well prepared for mine warfare, the Soviet Navy had fallen behind in mine development

and had neither magnetic mines nor the means to sweep them. The number of minesweepers and anti-submarine ships was inadequate, and there were no amphibious ships. Neither ships nor aircraft were equipped with radar, and sonar was in the embryonic stage of development. Soviet naval gunnery was good, as was torpedo armament, but the anti-aircraft artillery of ships was weak. Naval aviation had about 2,000 aircraft, but many of them were old.[77] The geography of the Soviet Union has forced it to keep naval forces in four major theaters, with primary attention as far as strength is concerned given to the Baltic Fleet and the Pacific Fleet, a logical step, for the major threat was anticipated from Germany and Japan. However, what is logical does not always turn out to be practical, as the war confirmed for the Northern Fleet, which was the most active, was at the same time the weakest of four major Soviet fleets, and had the least well developed base system.

The importance of Northern Fleet apparently was well understood by the Soviet command and Stalin personally. N. G. Kuznetsov, pre-war and wartime chief of the Soviet Navy, in his memoirs described a conversation with Stalin

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[77] History of Naval Art, pp. 171-174.

during which the latter emphasized the necessity to train the fleet under much harsher conditions in the North and the whole year round, and the necessity, with the aid of the largest Soviet shipbuilding yard, to create large naval forces in the naval theater which was ice free and had outlets to the oceans. The admiral concluded that "It is more difficult to train and educate skillful commanders and sailors than it is to build ships" is quite revealing and correspouds to the conditions prevailing in the Soviet Navy in the pre-war period.[78] In general, Stalin's role in the Soviet naval development was crucial. Admiral Kuznetsov stated, "The Navy was allowed under an unwritten rule to decide on any important matters only after consultation with him (i.e. Stalin), although Molotov and Zhdanov were sometimes authorized to prepare naval decisions before they were examined by Stalin". And further: "After my first few meetings with him in 1938, I became convinced that he had a clear idea of the importance of the Soviet Navy, which by then had grown. The Soviet Union had come to occupy a fitting place in the world political arena. The events in Spain from 1936 to 1939, and the need to back up our foreign policy with the strength of our navy well beyond the nearest seas like

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[78] The War Years, p. 164.

the Baltic, which were restricted or almost closed, made us speed up the working out and implementation of a large-scale shipbuilding programme. In that period, Stalin took the most active part in creating a big navy. It was he, as I later discovered, who had taken the fundamental decision that we should have a big navy, and it was a correct one. The policy of building up the Soviet Union's defense might, which was pursued by the Party and the government, called for readiness to fight not only on land, but also at sea".[79]

The Soviet naval command had been analyzing German submarine operations in the Atlantic and the Weserubung (the Weser Exercise, i.e., the capture of Norway and Denmark) and was convinced that "the importance of sea battles was not to be underestimated". Evaluating the Weserubung as "an adventuristic operation" the Soviets nonetheless that "nobody could say with conviction that their adventure was not to be repeated when Germany attacked the Soviet Union" somewhere in the Baltic or in the North.[80]

In spite of the Navy's subordinated role in the Soviet

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[79] The War Years, p. 163.

[80] Ibid., p. 124.

general staff strategic plans,[81] the existence of an independent People's Commissariat of the Navy permitted the naval staff to analyze the situation independently. Soviet naval intelligence detected the German preparation for the war and reported its findings, but as was the case with a number of other sources, the warning was apparently ignored by Stalin. Nonetheless, the Soviet Navy, by order of Admiral Kuznetsov, had been alerted to readiness state No. 2 since June 19, 1941, and at 2335 H on June 21st was placed in state of readiness No. 1 (war). As a result, during the first day of war, June 22, 1941, and in spite of first German air strikes on Sevastopol and the Baltic Fleet naval bases, there were no losses of Soviet ships. As a matter of fact, Moscow learned first about the war from Sevastopol (the main base of the Soviet Black Sea Fleet).[82]

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[81] N. G. Kuznetsov, Second Book of Reminiscence, the War Years, Oktyabr', No. 12, 1968.

[82] History of Great Patriotic War, Vol. II, p. 12; Voenizdat, Moscow, 1961; and D. Woodward, p. 209.

The Soviet Navy during World War II

The element of surprise achieved in the German attack on the Soviet Union and the fast advance of German Army created conditions under which the traditional role of the Soviet Navy to support the Red Army's maritime flanks gained in overwhelming importance. While German naval activity, centered mainly around the air and mine warfare action in the Baltic and nearly totally absent in the northern region and the Black Sea, inflicted considerable losses on the retreating Soviet fleets it did not prevent them from fulfilling their assigned tasks completely, but did reduce their effectiveness.

The Baltic Fleet

The Baltic Fleet had in commission 2 old battleships, 2 cruisers, 2 destroyer leaders, 19 destroyers, 6 minelayers, 7 escorts, 33 minesweepers, 48 PT boats, and 65 submarines. The fleet aviation had 656 aircraft, including 172 bombers.[83] Between June 23 and the end of the month, several minelaying operations were conducted, and the central mine-artillery position in the western part of the Gulf of Finland as well

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[83] Combat Path, p. 288.

as a number of secondary minefields were established.[84] The fleet bases of Libau, Riga, and Tallin were captured by the German Army. Considerable resistance was offered by joint efforts of the Baltic Fleet and Red Army units during the defense of Tallin and the Moonsund Islands. The Baltic Fleet bombers based on Sarema Island managed to bomb Berlin, carrying out a total of 9 raids in August and the first four days of September. Although the material losses inflicted on Berlin were negligible, the raids had some psychological value, for it was the only time that Soviet aviation succeeded in bombing Berlin until 1945.

Despite considerable losses inflicted by German mines and aviation, the evacuation of Tallin saved not only most of the ships, but most of the personnel as well. The defense of Hanko Naval Base in Finland lasted 165 days, until December 1941. The evacuation of the base ordered by Moscow was conducted under extremely unfavorable conditions and resulted in considerable losses in people and in ships. Nonetheless, the Leningrad garrison was reinforced by 23,000 men with combat experience and a large amount of badly needed hardware and ammunition from Hanko.[85]

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[84] _Ibid._, p. 290.

[85] _Morskoy Sbornik_ No. 12, 1971, p. 63

The loss of bases bottled up the Baltic Fleet in the eastern part of the Gulf of Finland, mainly in Leningrad and Kronstadt. The naval guns even from damaged and partially sunken ships were effectively used in the defense of Leningrad, but massive German air raids (particularly in September 1941) inflicted additional losses on the ships. One out of two old battleships lost half its guns, but its two remaining turrets continued to fire.[86]

During the winter of 1941-1942 and the spring of 1942 Germans improved the minefields in the western part of the Gulf of Finland, of which both shores were in German hands, thus effectively blocking the surface forces of the Baltic Fleet in their remaining bases. The only forces of the fleet which could be used for a campaign at sea were submarines and naval aviation, and the latter was used mainly against land targets. This is how Admiral Kuznetsov describes the use of naval aviation during the first year of war: "Torpedo-carrying planes were, of course, the best means of striking at transports, and for years they had been preparing for just that. But in view of the emergency, the bulk of the fleet air arm had been sent against the enemy's tank columns moving towards Leningrad.

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[86] VIZ, No. 10, 1970, pp. 72-78.

In addition, it was providing cover for the Eighth Army fighting in Estonia, and bombing German units advancing on Tallin."[87] Later, particularly after 1943, when the situation at the land front stabilized, fleet aviation was reinforced and it resumed its activities in the Baltic against German ships, particularly transports in the route along Swedish coasts.[88] The light surface forces of the Baltic Fleet, especially PT boats, maintained combat activity through all over the war, in 1942-1943 in the eastern part of the Gulf of Finland and starting with the summer of 1944 in its western part as well as the Baltic Sea.

The activity of the Baltic Fleet submarines was the most interesting. In spite of the most adverse conditions for transiting the Gulf of Finland, the Baltic Fleet submarines, with marginal assistance from naval aviation and the minesweepers in the eastern part of the Gulf of Finland, managed to reach the open Baltic and inflicted losses on German shipping in every year of the war. The number of submarines sorties into the open sea and their successes varied, the low point being in 1943. But in spite of the considerable losses, the overall

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[87] The War Years, p. 118.

[88] Combat Path, p. 296.

combat effectiveness of Soviet Baltic Fleet submarines towards the end of the war increased steadily. While in 1941 only seven submarines scored successes, sinking fifteen ships including one submarine; in 1942 14 submarines sank 37 ships; in 1943 only 2 submarines managed to sink 4 ships; in 1944 13 submarines sank 37 ships, and in 1945, 12 submarines sank 35 ships.[89] One Soviet submarine, L-3, was successful in each of the 4 years of the campaign, specializing in gunnery attacks to which 17 ships, mainly small, fell victim. The greatest combat successes in torpedo attacks were scored by submarines Shch-310 and Shch-307, which sank 10 and 9 enemy ships respectively. Submarines S-13, K-52, and L-3 were credited with having torpedoed 6 ships each. The activity of the Soviet Baltic Fleet submarines forced the Germans to introduce the convoy system in 1942 and again in the second half of 1944.[90] Submarine S-13 is credited with six sunken ships, among them two large ones, Wilhelm Gustloft (25,484 tons) sunk January 30, 1945 and Steuben (14,660 tons) sunk February 9, 1945. The loss of

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[89] Morskoy Sbornik No. 8, 1967 and No. 11, 1967, pp. 46-52. These well documented articles presented only confirmed enemy losses and are the first Soviet open press publication of this nature.

[90] Morskoy Sbornik No. 11, 1967, p. 49. For example, in December 22, 1942, in a communication to Hitler's headquarters it was pointed out that "every submarine breaking through the blockade is a threat to shipping throughout the Baltic Sea and endangers the German merchant fleet, which is barely sufficient as it is."

Wilhelm Gustloft was the largest marine catastrophe, in which 4,000 people perished.[91] In 1945, with the advance of the Soviet armies, larger surface units of the Baltic Fleet, destroyers and cruisers, continued to be kept mainly in the eastern part of the Gulf of Finland, for neither their condition nor the navigational situation (mine danger) permitted their employment. Besides the submarines only light surface forces (PT boats and patrol boats) and naval aviation were active in the Baltic.

The Black Sea

At the beginning of the war the Soviet Black Sea Fleet had in commission one old battleship, 5 cruisers, 3 destroyer leaders, 13 destroyers, 2 escorts, 47 submarines, 84 PT boats, and 626 aircraft.[92] At the beginning of the war, Germans did not have their own naval forces in the Black Sea and were apparently counting on the Rumanian Fleet, which was greatly inferior to the Soviet Black Sea Fleet. However, with the majority of Soviet naval aviation involved in the land struggle, 650 Rumanian and 450 German aircraft represented a real threat to the surface forces of the Soviet Black Sea Fleet. Later,

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[91] N. Kuznetsov in Novy Mir No. 7, 1969, pp. 150-156, "S-13 Attacks".

[92] Combat Path, pp. 367-368.

in the course of the war, Germans brought their own naval forces consisting primarily of light surface ships and several submarines to the Black Sea, but they were not very effective against the vastly superior Soviet Black Sea Forces. The German advance on the land represented the main problem encountered by the Black Sea Fleet just as in the Baltic. The defense of the naval bases of Odessa (more than two months) and Sevastopol' (more than eight months) was assigned mainly to the Navy and commanded by admirals. Supported by a number of amphibious landings, particularly at Kerch-Feodosiya, the defense of the naval bases tied up a considerable number of German troops.

From the very beginning of the war, Black Sea naval aviation made a number of strikes against Rumanian oil refinery centers with marginal success. However, when the situation on the land front worsened, the aviation was tied up and its activity in support of the naval operation diminished. In mid 1942, because of the loss of all major bases the Black Sea Fleet was forced to operate out of the auxiliary bases of Poti and Batumi. More than ten amphibious landings were made by the Black Sea Fleet, including sizable ones at Novorossiysk and Kerch.[93]

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[93] History of Naval Art, pp. 256-271.

The forces of the Soviet Black Sea Fleet were used in all types of naval operations. However, the special nature of the opposition and the often not very skillful application of forces precluded the Soviets from achieving a more effective employment of their fleet. For example, the dogmatic approach to mine warfare produced a number of mine fields in the Black Sea which handicapped the operation of Soviet naval forces much more than they did the Germans. The submarines, particularly in the early period of war, were not employed aggressively and were losing valuable combat time waiting at assigned positions for the few enemy ships navigating the sea. Naval aviation, in contrast, was very active in the Black Sea and is credited with 80% of the enemy tonnage sunk.[94] In 1944, when the Germans were retreating, the Soviet Black Sea Fleet failed to completely interrupt German communications, thus permitting the partial evacuation of German troops from Crimea.[95]

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[94] History of Naval Art, p. 417.

[95] Ibid., p. 418.

The Northern Fleet

When war broke out, the youngest Soviet fleet, the Northern, was in a stage of accelerated development. One of the main problems was the absence of a well-developed base system, which detained the reinforcement of the fleet with ships and aircraft. There were only 8 destroyers, 7 escorts, 2 minesweepers, and 15 patrol boats in commission. The fleet also had 15 submarines and 116 aircraft, both of which were considered to be the main striking force. But, almost half of the aircraft were obsolete seaplanes and there were only 11 bombers.[96] By a special decision of the State Committee for Defense, the Northern Fleet was reinforced by 130 civilian ships (merchant ships, fishing trawlers, etc.) converted into minelayers, patrol ships, minesweepers, and tenders. But the quality of the converted ships was such that they were a poor imitation of what was needed; they were badly suited for the intended missions. In addition, by the same decision, 8 submarines (out of 20 planned), six PT boats, and 4 patrol boats were transferred via the White Sea-Baltic Canal from the Baltic Fleet. Eight small submarines were delivered from the industry in 1942. During July-October 1942, the Soviet Pacific Fleet sent one destroyer leader and

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[96] *Combat Path*, p. 216.

two destroyers, which for the first time traversed the Northern Sea Route from East to West. A number of minesweepers for sweeping influence mines were bought in England. In the middle of 1942, the fleet aviation was reinforced by 318 aircraft from the Baltic Fleet, the Black Sea Fleet, and the Caspian Flotilla.[97] The Pacific Fleet sent 6 submarines to reinforce the Northern Fleet in the fall of 1942. Those submarines had to make a secret crossing of the Pacific and to enter the Atlantic through the Panama Canal. In the process of this 17,000-mile transfer, one Soviet submarine, L-16, was torpedoed by an unidentified submarine 800 miles from San Francisco.[98] The base system of the Northern Fleet was also improved in the course of the war. In August of 1941 the White Sea Flotilla was formed. In 1941 the naval base on Novaya Zemlya was organized, and, to protect communications in the Kara Sea, the Kara Naval Base was organized in 1944 on Island Dikson.[99] As was the case in the Baltic Sea and the Black Sea, no large scale naval operations were planned by the Germans in the Arctic waters. Plan Barbarossa visualized the capture of Murmansk

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[97] History of Naval Art, pp. 294-295.

[98] The War Years, pp. 148-149.

[99] Combat Path, pp. 244-250.

by ground forces. When the Germans failed to fulfill the plan, the Allied convoys started to arrive at Murmansk with vital supplies and armaments. The Germans own shipping supporting forces in Norway began to be attacked by forces of the Soviet Northern Fleet. The Germans then shifted considerable naval forces to the north and engaged in more active operations against the Allied convoy system as well as the Russian Northern Fleet. The general weakness of the Soviet naval forces in the North and their preoccupation with supporting the Army flank limited their operations against Nazi shipping and in defense of their own shipping, thus precluding any substantial contribution by the Northern Fleet to the protection of the Allied convoy system, which took on strategic importance. Overall, 41 convoys totalling 797 transports arrived in the Soviet Union and 36 convoys totalling 726 transport left Soviet ports in the North during the war. Eighty-three transports, including seven Soviet ships, were lost.[100] During the war there werel,471 internal Soviet convoys involving 2,568 transports escorted by total number of 3,617 naval ships. The system assured the transportation of 1,672,000 men, 3,863 guns, 380 tanks, 13.5 thousand vehicles, and other military cargo totalling 1.5 million tons.[101] In the

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[100] VIZ, No. 11, 1971, pp. 22-29.

[101] Combat Path, p. 252.

summer of 1944 the Soviet Northern Fleet was reinforced by a number of British and American ships, including one battleship, one cruiser, 9 destroyers, and 4 submarines. Those ships were employed mainly in the White Sea Flotilla.[102]

The action of the Soviet naval forces caused some damage and forced Germans to escort their convoys. According to the Soviets, 158 German transports and up to 50 combatants were sunk or badly damaged.[103] During the first two years of the war, the submarines occupied first place in the number of enemy ships sunk, but starting in the second half of 1943, naval aviation took the lead. Lack of repair facilities and a weak base system led to the steady decline in number of Soviet submarines at sea. Thus, whereas at the beginning of wa r an average of up to six submarines were on patrol, in 1944 this number was reduced to 2 or 3.[104] The submarines of the Northern Fleet made 194 attacks, fired 676 torpedos, and placed 887 mines. The Germans in turn were also active in mine warfare;

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[102] All the ships were old and could hardly be used in the high seas. After the war all of them minus two which were lost, were returned to their original owners. D. Woodward, The Russians at Sea, p. 214.

[103] VIZ, No. 12, 1970, p. 20.

[104] History of Naval Art, pp. 452-453.

50% of Soviet submarine losses are credited to mines.[105]

During the war with Germany the Soviet Pacific Fleet represented a deterrent force against Japan, and also served a role of reserve fleet for the Soviet Navy from which some ships and considerable numbers of personnel were transferred to active Soviet fleets, particularly the Northern. In August 1945, when war against Japan was declared, the fleet had in commission 2 cruisers, one destroyer leader, 12 destroyers, 19 escorts, 78 submarines, 10 minelayers, 52 minesweepers, 49 submarine chasers, 204 PT boats, 19 landing ships, and 1,549 aircraft. In addition, the Amur Flotilla had about 200 ships and 70 aircraft. The fleet was in good level of training and combat readiness.[106] The remnants of the Japanese Navy still tied up by the US Navy could hardly offer substantial resistance. The capture of Sakhalin, the Kurile Islands, and a number of ports in northern Korea was the main task set forth for the Pacific Fleet. A number of successful amphibious landings, during which for the first time in the Soviet Navy specially built (mainly American) amphibious ships were used, were executed. The war was over in seven days, although the

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[105] History of Naval Art, p. 454, and VIZ No. 12, 1970, p. 21.

[106] Combat Path, p. 511, and History of Naval Art, pp. 505-509.

occupation of the Kurile Islands took until 31 August.[107]

In summary, World War II threatened the very existence of the Soviet Union. To be or not to be was not an academic question. The main role of the Soviet Navy in such a struggle, auxiliary in nature, was "to assist the Army in the maritime flanks", and was determined mainly by the interests of the ground forces. However, the defense of Leningrad, Odessa, Sevastopol, as well as Moonsund Islands, Tallin and Hanko, in which the Navy played a very important role, had strategic importance.[108] The Soviet Navy was neither prepared for nor there was any necessity created by the opponent to contest the control of the sea in a strategic sense, for German naval activity with the exception of in the North, where they challenged the allied convoy system, was marginal. To a large degree that was attributable to the intense naval campaign conducted by the Allied naval forces in Atlantic. The former head of the Soviet Navy, Admiral N. G. Kuznetsov, evaluated the situation as follows: "It must be said in all fairness that the deployment of the German Navy against the Soviet Union depended, in certain measure, on the battles which had been

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[107] History of Naval Art, pp. 513-514.

[108] VIZ, No. 5, 1970, pp. 88-89.

fought at sea since the opening of the war. If it had not been so, the German High Command would have assigned its navy a bigger role in Plan Barbarossa. The actions in the Atlantic prevented the German High Command from switching its ships to the Soviet shores .... our allies' success or failure in the Atlantic determined the size of their aid to us during the hardest years of the war. The battle for the Atlantic was, to some extent, fought to allow passage of convoys to our ports of Murmansk and Archangel."[109]

The Germans failed to conduct a single amphibious operation on the maritime flank of the Soviet Army, nor was there any indication they planned to. The Soviets, however, made several dozens of landings. Navy infantry and socalled naval rifle brigades formed from sailors and navy shore units totalling 405,000 men, were often incorporated in the ground forces and used as shock troops, in addition to their role in the defense of naval bases. Moreover, the formation of the numerous naval flotiallas mainly on the rivers (Volga, Dnepr, Danube) played an important role in the war. In spite of the predominant importance of the land struggle, naval combat, limited mainly to coastal waters, was intense during

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[109] *The War Years*, p. 113.

certain periods of war. The main role on both sides was played by the land based aviation, followed by submarines and light surface forces (particularly Soviet PT boats). The Soviet Navy was poorly prepared for antisubmarine warfare. Only towards the end of war were anti-submarine forces increased and their equipment, thanks mainly to the Allied deliveries, improved.[110]

Mine warfare was also extensively used, but the Soviet Navy, while improving towards the end of the war, was not at its best in this traditional form of warfare. The Soviet Navy neither had influence mines at the beginning of the war nor the means to sweep them. Again, it was the Allies who supplied the original equipment to the Soviet Navy. The Soviets failed to enlarge its navy with merchant ships capable of operating as minesweepers.[111] The leading role of aviation in naval combat was clearly established. When circumstances permitted, during the second half of the war, Soviet naval aviation was increased considerably.[112] The important role

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[110] Morskoy Sbornik No. 11, 1971, pp. 25-28.

[111] The War Years, p. 134.

[112] Soviet sources credited naval aviation with two thirds of all enemy ships sunk or damaged during the war. History of Naval Art, pp. 523-525.

of the aircraft carriers was clearly demonstrated to the Soviets by its Western allies. But the conclusions drawn by some Western students of Soviet naval affairs that the carriers could have greatly changed the conduct of the war in the Baltic and the Black Seas are clearly erroneous to say the least, and ignore the then existing realities.[113] The anti-aircraft defense of the Soviet ships was weak, and the short radius of Soviet fighter aircraft and their small number, particularly during the initial period of war, were additional obstacles to more active Soviet surface forces operations.

The Soviet Navy of the war years could in no sense be called a balanced fleet. However, the construction of a considerable number of surface ships in addition to numerous submarines, particularly during the late 1930's, demonstrated the Soviet understanding of the concept of a balanced fleet in general, but it did not have the capability to realize it. Defending the pre-World War II naval development, Admiral Kuznetsov stated: "The war showed that the sea power was

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[113] For example, R. W. Herrick in the Soviet Naval Strategy, p. 53, stated, "Had the Baltic and Black Sea fleets had their own carrier-based air cover to protect the forces afloat, including carriers themselves, from the Luftwaffe attacks, there is every possibility that those fleets could have continued offensive operations and greatly retarded the Nazi offensive, to say the least".

something more than just submarines".[114]

The pre-war distribution of naval forces with traditional concentration in the two closed seas, the Baltic Sea and the Black Sea, did not meet the requirements of the war. The delayed development of system of bases in the North with the resulting weakness of the forces of the Northern Fleet, which was most active during the war, was one of the serious mistakes committed in the pre-war naval development. The rapid advance of the German Army interrupted the attempted reinforcement of the Northern Fleet from the Baltic.

In spite of the considerable losses in submarines, particularly in the Baltic, the Soviet Navy stubbornly continued to employ them throughout the war. Initially suffering from poor training and the consequences of the pre-war purges, the Soviet Navy had considerably improved its operational and tactical skills toward the end of the war. The combat activities of Soviet submarines, naval aviation, and PT boats forced Germany to escort shipping in the North and in the Baltic. In the Black Sea, the Soviet Navy managed to retain supremacy but it is doubtful that the Black Sea Fleet potentials were fully realized in the war.

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[114] The War Years, p. 162.

The outcome of the war produced considerable improvements in naval geography for the Soviet Union, compared with what it had been prior to the war. Both successes and failures of the Soviet Union and its allies on the one hand and the enemy on the other produced rich material for examination and evaluation which influenced the consequent development of the Soviet Navy.

The First Post-World-War-II Period to the mid 1950s

When World War II ended, the Soviet Navy had in commission 2 old battleships, 9 cruisers, 48 destroyers, 173 submarines, 393 torpedo boats, 59 patrol ships, 208 minesweepers, and 4,150 aircraft. The civilian ships mobilized at the beginning of war were transferred according to a special decision of the Soviet Government to their previous owners.[115]

When the navies of defeated opponents in World War II were divided among the victors, the Soviet Union received: from Germany one cruiser, 10 destroyers, 10 submarines, 44 minesweepers, 30 torpedo boats, and other ships, mainly auxiliaries; from the Italian Navy, one battleship, one cruiser, 2 destroyers, 3 destroyer escorts, two submarines, and 11

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[115] Combat Path, p. 534.

miscellaneous boats; from Japan, 7 destroyers, 17 escort ships, 2 mine layers, one sub chaser, 4 minesweepers. According to an agreement, all Japanese ships were disarmed. Most of the ships received from the former German, Italian, and Japanese navies, with the exception of some German submarines, particularly those captured by the Soviets as a war prize in Gdansk, were of old designs with worn out machinery and armament. There was a very limited supply of spare parts and ammunition for them. Many of the ships were never commissioned in the combat nucleus of Soviet Navy, and those which were did not serve for a long time.[116] The ex-German submarines of the XXI, VII, and XXIII types, minesweepers, and some auxiliaries were used by the Soviets up to the late 1950s.[117]

The degree of destruction of Soviet industry caused by the war, particularly in the Soviet European part, was colossal. Yet, the first post World War II Five Year Plan approved March 18, 1946, and devoted mainly to the restoration of the economy, visualized the "1950 level of shipbuilding exceeding that of 1940 by two times" and "the development of

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[116] Combat Path, p. 535.

[117] The detailed list of disposals of older submarines and surface ships by the Soviet Navy are given in 1962-1963 and earlier editions of Jane's Fighting Ships.

strong and mighty navy in the USSR".[118]

But, during the first 3 to 4 years, Soviet industry was in no condition to assure construction of newly designed ships. Soviet Navy attempts to force the shipbuilding industry to accelerate the beginning of construction of new ships failed and the ships of pre-World War II design, whose shortcomings were revealed during the war, were built at first. Thus, a number of Chapayev-class cruisers, Otlichnyy-class destroyers, and improved M-class (M-V) submarines were built.[119]

Toward the end of the 1940s the construction started on Sverdlov-class cruisers, Skoryi-class destroyers, large ocean-going Z-class submarines and medium-range W-class submarines. Foreign experience, particularly that of the Germans, became known in detail and helped the Soviet Union in the development of new ship types. The development and beginning of construction of new destroyers and escorts, both with flush decks, with improved armament started as early as 1950. The destroyer Neustrashimyi (Tallin-class) served as a prototype for a large series of Kotlin-class destroyers. The construction of a number of Kola-class escorts was followed by the construction of the improved

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[118] Combat Path, p. 585.

[119] Kuznetsov, Nakanune, pp. 262-263.

and modernized Riga class. A large number of minesweepers, PT and patrol boats, and submarine chasers were built. Also in the early 1950's two Stalingrad-class battle cruisers were laid down, but their construction was stopped soon after Stalin's death.[120]

The post-war development of the Navy was accompanied by traditional reorganizational measures and repressions which were particularly harsh under Stalin. On 25 February 1946 the People's Commissariat of the Navy was abolished. Four years later, 25 February 1950, the Naval Ministry of the USSR was reinstituted in order to "focus attention on the speediest development of the navy". On March 15, 1953, the separation was ended, and the Ministry of Defense of the USSR was formed unifying both ministries, the military and the navy. Stalin's post-war order to have two fleets instead of one in the Baltic and Pacific was abolished in 1956.[121] Among other organizational changes was the abolition of a number of naval flotillas (White Sea, Danube, and Dnepr) and the socalled naval defense districts. In the mid 1950s the Soviet Union returned its naval bases in Port Arthur and Porkalla-Ud to China and Finland

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[120] Stalin had "unexplainable partiality for heavy cruisers", and people around him were advised not to test it. Kuznetsov Nakanune, p. 259.

[121] Ibid., pp. 276-278.

respectively.[122] In 1947, the top leadership of the navy was shaken by Stalin. The head of the navy, Fleet Admiral Kuzhetsov was demoted in rank to Rear Admiral and sent to the Far East.[123] Kuznetsov's three top deputies, Admirals Alafuzov, Galler, and Stepanov, were court martialed and sentenced to prison, where Galler, a former Chief of Main Naval Staff, died. The waves from this Moscow repression reached the lower echelons of the navy structure, but were not as disastrous as in the late 1930s. Commander of the Pacific Fleet Admiral Yamashev was appointed Commander-in-Chief of the Soviet Navy. In July 1951, however, Vice-Admiral Kuznetsov was recalled to Moscow and appointed Minister of the Navy.[124] Kuznetsov's name again became associated with the accelerated development of the Soviet Navy. In the same month of his appointment as minister, Kuznetsov went on an inspection of the Baltic Fleet. All the best units of the fleet were gathered near Riga for

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[122] Combat Path, pp. 539-540.

[123] Nakanune, p. 212.

[124] While commanding a fleet in the Pacific, Kuznetsov was promoted to vice-admiral, for the second time.. The third was in 1956, when he was demoted again from the rank of Fleet Admiral of the Soviet Union, a rank he also held twice. Combat Path, p. 579.

the review. After the parade the Admiral called a meeting of officers at which hedescribed the bright future of the navy and the large shipbuilding program for the development of an ocean-going navy. He also declared that in the not-too-remote future, the Soviet Union would start the construction of aircraft carriers.[125]

Parallel to the shipbuilding activity, considerable research and development efforts were initiated in atomic weaponry, rocketry (missilery), electronics (radar, sonar, communications, and control), and propulsion. In 1950 aviation received the first free-fall atomic bombs. At the beginning of the 1950s nuclear warheads for torpedos and cruise missiles were developed. In 1953 the first hydrogen bomb was tested. Also at the beginning of the 1950s the Soviet Union started the development of nuclear propulsion systems, and the construction of nuclear powered submarines dates back to 1953.[126] Simultaneously, the experiments were being conducted on a wide scale to employ closed-cycle engines for submarines.[127] During

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[125] This was the last time that the subject of aircraft carrier construction was raised in such a definite manner.

[126] Combat Path, p. 544, and Morskoy Sbornik No. 6, 1971, p. 18.

[127] Combat Path, p. 542.

the first half of the 1950s the Soviet Union conducted an extensive research and development program with various missiles, including those for the Navy. The first elements of the Navy for which missiles were developed were aircraft (TU-4, Bull, in the early 1950s and later the TU-16, Badger) and the submarines. The first experimental launch of a ballistic missile from an obviously submerged submarine (most likely converted Z class) was conducted in September 1955.[128] In addition to the TU-4, TU-16, and IL-28 bombers, a [129]considerable number of jet aircraft, mainly MIG-15, MIG-17, and YAK-25 fighters were delivered to the Navy.

Thus, during the first post-war decade, the Soviet Navy was reinforced with a considerable number of newly built ships, submarines, and aircraft. Many old and obsolete ships were decommissioned. A number of ships built just prior to World War II were modernized. The research and development efforts resulted in a number of successes in the nuclear field, missilery, and electronics. The first cruise missiles entered the service, more missiles were under development, and some had even been

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[128] Combat Path, p. 585.

[129] The IL-28 were first delivered to the Navy in 1951 in two versions, one as a bomber-mine-torpedo carrier, and the second as a reconnaisance aircraft, designated IL-28R; the TU-16 aircraft were first received in 1954.

tested. In short, the prerequisites were achieved for the future development of qualitatively new navy on the basis of what the Soviets later called the "scientific and technological revolution in the military affairs".

By the mid-1950s, the Soviet Navy had become larger than any in the world except that of the United States, but qualitatively, particularly in the relation to the threat from the most likely opponent and in the relation to the tasks which it had to fulfill, the Soviet Navy was in no better position than that prior to World War II. The Soviet Navy long-range forces were still in very short supply, while the forces for the traditional mine-artillery position warfare were in abundance. But it was highly problematic that a potential enemy would be so obliging as to bring itself into position and subject itself to very powerful combined gunnery torpedo attacks. The employment of submarines was planned independently from the main forces, the squadrons of surface ships, and the main tasks of submarines were preliminary, independent strikes against enemy forces.[130] Such forms of naval combat represented nothing more than the use of naval

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[130] History of Naval Art, pp. 564-565, and S. Gorshkov in Morskoy Sobrnik No. 2, 1967, pp. 9-21.

forces in the proximity of one own shore, i.e. the forms typical for a coastal navy. The main limiting factor, of course, was the absence of carrier-based aviation and the dependence upon land based aviation of very limited radius of action (particularly fighters). It had become evident to the Soviet leadership, particularly the military, that despite considerable resources devoted to the Navy under conditions of a very tight economy, it was not going to fulfill its major tasks unless drastic changes were instituted. While apparently there was a mutual understanding of the necessity for change, what was desirable was viewed differently by the various power groups. Except for the loud pronouncements of Khrushchev against large surface ships (which, considering the types the Soviet Navy had at the time, were basically correct) there is no indication whatsoever that the Party leadership had turned anti-Navy. But some Army leaders came very close to demanding the practical abolition of the Navy, claiming that there were not many naval tasks (as they understood them) which the army, armed with the nuclear missiles, could not fulfill, including strikes against carriers (with long-range aviation) and against amphibous forces approaching a defense area.[131] Particularly strong attacks were launched

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[131] See S. Gorshkov, The Development of Soviet Naval Art, Morskoy Sbornik No. 2, 1967, pp. 9-21.

against the surface ships and naval aviation. It was also claimed that the ground troops did not need the Navy's support even during anamphibious operations and, thus, the amphibious ships and the naval infantry (marines) were obsolete and not needed.[132]

The need for the submarines was never challenged by any group.

The period of the mid 1950s and the decisions made at the time resulting in "the decisive changes in the shipbuilding program in the direction of the creation of nuclear missile-carrying submarines, missile-armed surface ships and ships armed with modern anti-submarine, anti-mine, and anti-aircraft weapon systems and missile-carrying aviation" were crucial for the further development of the Soviet Navy.[133] It seems appropriate at this point to interrupt the examination of naval development and to make a brief analysis of international factors influencing the military policies of the Soviet Union, to indicate the major stages in the development of Soviet military doctrine, and briefly examine the Soviet military science and the role envisaged for the Soviet Navy. Such

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[132] Combat Path, pp. 545-546.

[133] Ibid., p. 547.

considerations are also essential for the establishment of the role assigned to the various naval forces by Soviet military theory, and for a clear understanding of the employment of those forces under various conditions.

Military Theory

"Whoever operates without principles has not pondered on what he wants, falls into hesitation and half-measures, and loses all in war." Napoleon

Soviet military thinking focuses primarily on three broad interrelated concepts: military doctrine, military science, and the military art. In spite of a distinct overlapping of these three concepts, there are clear distinctions as to their particular content and purpose, and a clear hierachical relationship among them with military doctrine at the top.

Military doctrine is defined as "a system of states guiding opinions on the character of war under given specific historical conditions, the determination of the tasks of the armed forces and the principles of their construction, as well as the methods and forms of armed conflict, following from the goals of the war, and the socio-economic and military technological capacities of the country."[134] Developed and determined by the

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[134] Spravochnik ofitsera (Officer's Reference Book) Voenizdat, Moscow, 1971, pp. 73-74.

political leadership of the state, the military doctrine, according to the Soviets, reflects the social, economic, political, and historical characteristics of the state, the nature of its internal and external policies. Military doctrine, when adapted and put into effect, acquires the nature of a state law.

Usually five periods in developing Soviet military doctrine are distinguished:

(1) 1917-1928 that is, the Civil War and the time preceding the industrialization of the country;

(2) 1929-1941, up to the beginning of World War II. In view of the predominantly continental character of the war contemplated, the main role during this period was assigned to the Army, although considerable attention was devoted to the role of the Navy, and it was correspondingly strengthened.

The main emphasis was on the combined efforts of all forces and resources, and the ideas of waging war by any particular predominant branch of the armed forces (for example, Douhet's aviation theory) were rejected.[135]

(3) 1941-1945, the war period. In spite of the fact

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[135] In the course of the second world war, the Air Force certainly proved its indispensibility but not its independent and conclusive power without the effective support of the other armed forces, as was foreseen and preached by Douhet's theory.

that much new and original was contributed to military theory in the course of war, the period can hardly be recognized as a stage in doctrinal development, because, for all practical purposes, it was a reaction to the reality imposed by the enemy.

(4) 1946-1953, the post-war period, when the experience of World War II, the sharp deterioration of relations between two opposing systems in the international arena, and the availability of nuclear weapons were determining factors.

(5) From 1954 to the present. The period began with the availability of nuclear missiles, and is characterized in the Soviet military writings as a revolution in military affairs, with corresponding fundamental changes in the doctrine. Usually two sub-stages in the development of doctrine are distinguished in this period; the first, 1954-1959, when the introduction of nuclear armament into the Soviet armed forces and its quantative accumulation started, accelerating towards the end of the stage; and the second stage, starting in 1960, during which the rearmament of Soviet military forces with nuclear missiles was concluded on a broad scale.[136] Major

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[136] Istoriya voyn i voennogo iskysstva (History of wars and military arts) Textbook for officers-students of higher educational establishments of the Soviet Armed Forces. Approved by the Minister of Defense, Military Publishing House, Moscow, 1970, pp. 466-467.

changes occurred in the views on the character of combat actions. Toward the end of the 1950s, defense as a combat action had started to be considered as acceptable only for the secondary areas and only at operational and tactical levels. Defense on the strategic level was rejected as unacceptable. The defense of the country and its military forces from the enemy's nuclear strikes had started to be viewed as an independent type of strategic action. The naval combat activity acquired the same importance, i.e. independent strategic actions.[137] Thus, it took a considerable period of time, close to a decade, before the present Soviet military doctrine was formulated in the years 1963-1964.[138]

The Soviet doctrine emphasizes that a future war will be a decisive armed clash of two opposing social systems characterized by the unprecedented bitterness of the armed conflict. That doctrine reserves decisive role in a modern war

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[137] Ibid., pp. 499-500.

[138] The practice of many Western military analysts to consider changes in the doctrine and the development of Soviet armed forces in connection with changes at the top leadership is erroneous. While there is no denying the influence of various top men upon the development of military policy, it has to be stressed that in the post-war period, the Stalinist stage not excluded, socalled Zadel or laying the foundation for change was the work of the predecessors. The wave of writings which inevitably occurred right after the change of the leadership were probably encouraged by it to promote appearance of novelty.

to nuclear missile armament. Simultaneously, the use of conventional armament is not excluded and the need is stressed for a flexiable organization of military forces corresponding to the various conditions of the conduct of the military struggle.[139] Two facets, or principles, of military doctrine are distingusihed, the political and the military-technical. The political principles apparently reveal the socio-political essence of the war, the character of political objectives, and the strategic tasks of the state. The military-technical principles, being more dynamic, determine problems of organization, the tasks of military forces, and the means, methods, and forms of military struggle. With respect to means of conducting warfare, both nuclear and non-nuclear war are considered, and to scale, world and local. A world war is viewed most likely to be anuclear war, and under certain conditions of short duration; and yet, together with the action of strategic nuclear forces, which include the strategic missile troops and ballistic missile nuclear submarines, are visualized the independent operations of naval forces.

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[139] Officers Reference Book, p. 77-78. See also, Major General S. N. Kozlov, "Military Doctrine and Military Science" in Kommunist vooruzhennykh sil, No. 5, March 1964, and Thomas W. Wolfe, Soviet Military Theory: An Additional Source of Insight into Its Development, p-3258, Santa Monica, California, The Rand Corporation, November 1965.

Soviet military science includes the following:

general theory (general basis) of military science; theory of education, training and indoctrination;

military historical science; military administration (organization and control of military forces); military geography;

military technical sciences.[140]

The theory of military art, or just military art, is considered to be the most important component part of Soviet military science, and has been traditionally divided into strategy, which studies the conditions of the preparation and conduct of war as a whole and its campaigns, and operational art, which is the study of operations and of tactics, of battle. It has been the tradition of Soviet military science to consider all three component parts of military art as being mutually connected and inter-dependent, with the leading role reserved to strategy. In the nuclear age, the role of strategy has been elevated even more, basically because of the crucial, decisive role upon the outcome of the war of nuclear strikes, which are controlled by strategic leadership. Strategy constitutes the direct executor of the orders of the doctrine,

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[140] Officers' Reference Book, p. 60.

but the armed struggle is directly guided not by doctrine, but by strategy.[141] The major propositions of strategy, as part of military science are taking into consideration in doctrine, and represent the main content of its military technical principles. The Soviets view strategy as common and unique for all services of the military forces of the country, for war is conducted by the joint efforts of all of them.[142]

Operational art (not tactics) dealing with the preparation and conduct of combined and independent operations of the armed forces is more heterogeneous, and each branch of the armed forces has its own operational art.

No single branch of the Soviet armed forces i.e. ground forces, air force, strategic missile troops, and air defense, with the notable exception of the Soviet Navy, claims to have, apart from the operational art and tactics, a different concept of the military art, not to mention of military science as a whole. The Soviet Navy, however, does and proclaims it quite loudly. Accordingly, naval science is a part of the military science to the extent that it uses most of the common laws

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[141] Marshal V. Sokolovskiy and Maj. Gen. M. Cherednichenk, "O sovremennoy voennoy stategii" (On Contemporary Military Strategy), Kommunist Vooruzhennykh Sil, No. 7, April, 1966.

[142] Officers' Reference Book, p. 68.

of the latter and is subordinated to the common military strategy. In its turn, naval science includes as a main component, naval art divided into tactics, operational art, and strategic employment of the Navy.[143] Moreover, the growing importance of the Navy, under contemporary conditions, was said to contribute to the appearance of a "qualitatively new naval art" and "further outgrowth of naval science from military science", particularly as far as the development and the operations of the Navy are concerned.[144] In general it is claimed that naval science is based on the common laws with military science, and naval art on the common principles with the military art, but "in the area of tactics, the theory of naval art is practically independent and in the area of operational art it is to some degree connected with the theory of military art; but only in the area of strategic employment of the Navy does it (the theory of naval art) have its source in military strategy, except however, for features completely

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[143] Rear Admiral K. A. Stalbo, "Razvitiye voenno-morskoy Nauki" (The Development of Naval Science), Morskoy Sbornik No. 12, 1969, pp. 32-37.

[144] Ibid., pp. 35-36.

secular to it".[145] Thus, the independent character of Soviet Navy operations has been recognized, first when its fleets were converted into "striking power oriented first of all against the land" and now when they are considered together with the strategic missile troops as "the main deterrent to aggression".[146] Nevertheless, it is basically wrong in the framework of Soviet military theory and terminology to speak about the Soviet naval strategy, for such a category does not exist.

In general, Soviet military theory as a well organized discipline has been developing all of its elements in historical perspective and conceptual unity. It took into account changes which occurred in the political and technological spheres. It seems that both understanding of the power of threat and the power of presence have been demonstrated by the Soviet Union lately, particularly through the employment of its

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[145] Ibid., p. 37. The specific character of the Soviet Navy and, before it the Russian Navy, has to be recognized, for it is the only service which in the past has had its own ministry. Even today, even in the presence of unified agency of operational control of the services, the Ministry of Defense, there is the Main Political Directorate of the Soviet Army and the Navy. Moreover, the 1967 Universal Military Law approved by the Supreme Soviet and put into effect in January 1968 in paragraphs three and four defines the Soviet military forces as composed of the Soviet Army, the Soviet Navy, Internal troops (the Ministry of Internal Affairs), and Border troops of the KGB (the Committee for State Security)).

[146] Marshal M. Zakharov, "uroki istorii", (The Lessons of History), Kommunist No. 9, July 1971, p. 75, and Krasnaya Zvezda, May 9, 1971.

naval forces. Does this mean that the Soviets have been re-reading Mahan, and what in general has been their attitude toward the philospher of sea power, whose conclusions continue to be widely used in the West, particularly in the United States, to substantiate naval policy?

Mahan's work was well known in pre-revolutionary Russia and the Soviet Union. But Mahan's theories of sea power have never been accepted as universal and even original, owing to the following considerations: (1) the theories were viewed as being heavily biased, despite their historical basis centered around Great Britain's practices, toward unilateral national considerations; (2) prior to Mahan the main concepts of the theory were expressed in the work of Captain Colomb of the British Navy during the 1860s, and considered the problems of the protection of British commerce and the distribution of naval forces. Hence, the theories have been called "Colomb-Mahan", with full recognition of Mahan's major contribution in the development of the theory to maturity; (3) Mahan's general principles (conditions affecting the sea power of nations and strategic principles) are rooted in Jomini as well as Clausewitz, and hence, are not original. Communist ideology, at least in its propagandistic expression, being militantly anti-colonial and anti-imperialist, has also played an important

role in the official denigration of Mahan's philosophy of sea power.

While the Soviets' dislike of Mahan's theories on ideological grounds can be disregarded, the correctness of some of Mahan's conclusions and the applicability of his major tenets to the present situation is another matter. It seems that the sea power theories formulated by Mahan have not been compatible with the times for decades in either in the political-economic or the military spheres. Mahan was obviously wrong in intimating that control of Europe depended on control of the sea. Neither World War I, with the presence of the grand fleet of England and of the High Seas Fleet of Germany, nor World War II prove it. Submarines in both wars drastically changed the late 19th century equation (which in turn was based on 17th and 18th century facts). Particularly questionable on the broad scale is Mahan's concept of the control of the sea, which lies at the very heart of his theory. The concepts have been variably defined and interpreted. For example, late Fleet Admiral W. F. Halsey, USN, used to define control of the sea as a state of affairs in which "we can go wherever we want to go, on, over or under the sea, and do whatever we want to do when we get there; and we can prevent other people from going where we don't want them to go and from doing things we don't want them

to do".[147] During the decade of the 1950s the Sixth Fleet in the Mediterrnean did exercise such control to a large degree. However, there was no opposition and the environment was extremely favorable and far from being hostile. The command of the sea concept often claimed to be exercised in the waters around Vietnam (and previously in Korea) is highly questionably today. First, the U. S. ships have been treated as sanctuary for fear of retatiatory blows far outweighing the questionable outcome of attacks against the ships. Second, the major port feeding the war, Hai Phong, has never been blockaded and the supply ships of the opponent's friends continue to sail. Moreover, the navies of all major powers, particularly super powers, are being charged with the mission of conducting military actions against the land, much more than with the decisive battles at sea, whose goal would be to destroy the enemy's naval forces. Moreover, the naval forces of today are so widespread and so heterogenous that one can hardly speak of a decisive battle or even the need for unqualified control of the sea. While essential in some areas, desirable in others, and for a limited time, revision of the control of the sea concept is long overdue, and new theories of sea power or maritime power

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[147] Marine Corp Gazette, June 1969, p. 27.

reflecting changed realities are needed. The growth of Soviet military power in general and naval power in particular are among the major factors generating the need for reexamination.[148]

The development of Soviet maritime power, particularly its naval power, has been one of the major factors forcing reevaluation of old concepts and the necessity to adjust for new realities. These new realities did not appear at once, but are the result of two decades of development. Particularly important was the decade of the 1960s, foundations for which, at least, in the case of Soviet Union, were laid in the mid-1950s and were the result of a changed strategical situation which must be examined and of advances in science and technology for which the term "revolution in military affairs" was coined. Soviet military specialists distinguished three main stages in this military-technological revolution which are associated with nuclear armament, missiles, and control respectively.

Nuclear armament initially was to be employed together with conventional means of warfare. Approximately in the mid-1950s a contradiction between the potentials of nuclear warheads and the mean of delivery developed (free fall bombs

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[148] The reexamination seems to be underway, as evident from a number of articles, Congressional hearings, and some books. See for example, the Wall Street Journal, October 20, 1971; The Washington Post, 17 January 1971; The Congressional Records, Vol. 117, No. 125, 1971, and Hanson W. Baldwin, Strategy for Tomorrow, New York, Harper and Row, 1970, p. 377.

delivered by aircraft). The appearance of missiles wedded the tremendous destructive power of nuclear weaponry with a most reliable means of delivery. The new missile-nuclear armament has acquired a high degree of sophistication and reliability thanks to the wide introduction of cybernetics, which also tremendously improved command and control and communication.[149]

The post-World War II period produced a drastic shift in the nature of threat to the Soviet Union from a potential enemy. While before the war the primary threat had been posed by the continental powers, after the war the Soviet Union had to face the coalition of Western powers headed by traditional naval powers "in whose armed forces special importance had, for a long time, been attached to the navy".[150] The formation of NATO with the United States as the chief ally elevated the significance of the naval power even more. In addition to the direct maritime threat to the Soviet Union, the Atlantic Ocean communications again became the arteries through which American military power would be delivered, but in this case as reinforcement to the NATO. However, by the early 1950s except for the

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[149] Colonel V. Bondarenko, "Scientific-Technological Progress, and Strengthening the Country's Defense", Communist of Armed Forces, no. 24, December 1971, pp. 9-16.

[150] Morskoy Sbornik No. 2, 1967, p. 16.

need to increase the Soviet naval forces along the familiar quantitative line to fulfill the traditional tasks, not much seemed to have changed for the Soviet Navy.

In the early 1950s, however, when the American aircraft carriers were assigned the task of delivering nuclear strikes against the Soviet Union, the situation had changed, and quite drastically. In the eyes of the Soviet military leaders, the attack carrier became at once a ship capable of fulfilling strategic tasks and together with the Strategic Air Force of providing the Americans with the capability of a broad targeting possibility which included practically the whole country. Obviously it became the task of the Navy and the Air Defense (PVO) of the country to prevent the attacks of carrier-borne aircraft. In order to fulfill its tasks the Soviet Navy had to destroy the United States carrier strike forces before they reach launching position. If the Navy failed, it would become the task of the PVO to repel the attacks of carrier-borne aircraft. Obviously, the Navy's task to sink or even severely damage the attack carrier before she could launch the aircraft was the most important, for it was unrealistic to count on a one hundred percent success in intercepting and destroying flying aircraft, and yet it was unacceptable to let even few aircraft carrying nuclear bombs to penetrate. Thus, the problem

of how to counter the attack carrier forces acquired a very important significance. In addition, the American experiments with the REGULUS missile with a nuclear warhead and intended for the strategic delivery by submarines became known. This just reinforced the Soviet's conviction that "during the first post-war decade, the fleets of the Western coalition were built up with great intensity, far and away surpassing in their striking power the other branches of the armed forces. The tendency to assign to the naval forces the role of one of the primary strategic weapons in a future war was becoming increasingly clear".[151] For the Soviets all these meant that the threat of an attack from the maritime direction had increased sharply and the defense interest of the country "demanded a considerable increase in the combat might of the Soviet Navy".[152]

The doctrine of "massive retaliation" proclaimed by the American government in 1954 had probably reinforced Soviet convictions of the necessity not only to improve defensive measures but to speed up the development of the means of delivery for nuclear weapons. The latter, naturally, raised the question

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[151] S. Gorshkov in Morskoy Sbornik No. 2, 1967, p. 16.

[152] Ibid.

of the Navy's role in delivery, and the best means of achieving it, if the role should be assigned. In short, while the Soviet shipbuilding industry was involved in the massive production of conventionally armed ships and submarines, the urgent need for a constructive revision of naval policy had arisen. The death of Stalin in March 1953 released the Soviet naval planners from the need to follow his arbitrary rule, and produced a more favorable atmosphere for objective discussion and evaluation of naval policy. Moreover, the physical characteristics of nuclear armament (size and weight) made it possible in the mid-1950s to consider its delivery by a variety of means. This led to the problem of selecting the best carriers for nuclear armament, i.e. whether aircraft (and in what mode of operation, land based or carrier based) or submarines or surface ships; as well as the means delivering nuclear weapons to the targets, i.e. bombs or warheads for torpedoes or missiles. The progress achieved in the research and development of missilery indicated the rockets might soon become an important means for the delivery of nuclear weapons.[153] As was indicated earlier,

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[153] The progress with missile development in the mid-1950s made the Soviet Army so happy that its "influential authorities" decided to solve all problems including those associated with naval warfare, by missiles tipped with nuclear warheads. See Morskoy Sbornik No. 2, 1967, p. 11.

a further consideration was that definite progress was achieved in the development of nuclear propulsion systems for submarines.

West Germany's joining NATO and the creation of the Warsaw Pact in May 1955 further aggravated the already tense situation of confrontation between the two major opponents, the US and the USSR, and the systems of alliances under their leadership. This in general was the political, military and technological situation in the mid-1950s, when the crucial decision which changed the course of Soviet Navy development was made.

Commander-in-Chief of the Soviet Navy and Fleet Admiral of the Soviet Union S. Gorshkov described the decision-making process in the following way: "Party and government did not share efforts but devoted considerable time in studying the problem in detail, clarifying and comparing various points of view of Navy and Army specialists, scientists, and designers, analyzing experience of the war and the possibilities which had been opening in connection with accelerated progress in science and technology."[154] Consideration was given to the composition of the future Navy and what forces, i.e. surface, submarine, aviation, or any combination of them, should

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[154] Morskoy Sbornik No. 7, 1963, p. 15.

represent the "main striking forces" of the future Navy. Apparently, as to the nature of a future war, i.e, whether nuclear or conventional, there was no problem, for it was assumed that it would be nuclear. Special consideration was given to capital surface ships. The Soviets "know that sun had set on battleships as far back as the Battle of Midway in 1942", and, according to Gorshkov, "the replacement of long-range guns in surface ships with artillery using nuclear ammunition and even missiles would not make them any less vulnerable or suited for the employment in a nuclear war as a primary naval strike force."[155] The Soviets also concluded that "the process of the sun setting on aircraft carriers as well had begun, and that the process was irreversible". The Soviets became convinced that "seeking ways in which to employ them (aircraft carriers) as a primary strike force in the armed struggle at sea had no future".[156]

The rejection of the attack aircraft carriers as the main striking force of the future Soviet navy was made in the atmosphere of a strong belief that the era of the general erosion of surface naval forces has began. This, of course, does not mean the complete rejection of the surface ship's usefulness or the

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[155] Morskoy Sbornik No. 2, 1967, p. 19.

[156] Ibid.

necessity to have them. But the Soviets strongly believed that it is much easier to locate the surface ship, including the carrier, than to locate even a diesel-electric submarine, not to mention nuclear-powered submarines. Moreover, they have been convinced that any surface ship is more vulnerable to a nuclear blast than a submarine. Finally, the package of weapon systems, i.e. the variety of missiles which did not require large capital ships and could be effectively deployed aboard smaller ships, and particularly aboard submarines and long-range aircraft was selected.

Thus, in the words of S. Gorshkov, "In the mid-1950s, in connection with the revolution in military affairs, the Central Committee of our Party defined the path of Navy development, as well as the Navy's role and place in the system of Armed Forces of the country. The course taken was one which required the construction of an ocean going navy, capable of carrying out offensive strategic missions. Submarines and naval aviation, equipped with nuclear weapons, had a leading place in the program. Thus, there began a new stage in the development of the Navy and of its naval science.

The latest achievements in science and production, and the creation, on this base, of what were, in principle, new weapons for the armed struggle made it possible to bring about

in a short period a radical change in the technical base, and, in essence, to create a qualitatively new type of armed force, our ocean going navy, in which submarine forces, aviation, surface warships, and other types of forces developed harmoniously. Thus the beginning was made for the creation of a balanced Navy, capable of successfully conducting combat operations under differing circumstances."[157]

Of course, it must be realized that the decision of the mid-1950s just established a concept which gave the green light so to speak for the corresponding development of the Soviet Navy, and it would take years, more than a decade, for its final implementation. Neither the Soviet technological-industrial base was immediately ready for the concept implementation nor was the Soviet military theory, especially its naval art, adjusted to the concept. Now we shall examine the development of the Soviet Navy since the mid-1950s to the present time.

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[157] S. Gorshkov, Morskoy Sbornik No. 2, 1967, p. 20. The balanced navy was defined by Gorshkov as follows: "By well balanced navy we mean a navy which, in composition and armament, is capable of carrying out missions assigned it in a nuclear war, as well as in a war which does not make use of nuclear weapons, and is also able to support state interests at sea in peacetime."

From the Mid-1950s to the Beginning of the 1970s

At the time of mid-1950 decision the construction of light and heavy cruisers had already ceased, the construction of the last new conventional Kotlin-class Soviet destroyer was well underway, and the production of submarines, accelerated. Approximately between 1955 and 1957 the Soviet shipbuilding program was shifted partially from the construction of conventional submarines and destroyers to the construction of submarines capable of launching ballistic missiles and to destroyers equipped with cruise missiles. A prototype of a nuclear submarine was already under construction and, as stated previously, a ballistic missile of approximately 350-nautical mile range had already been tested in 1955 (surface launch). The construction of the post-war second Soviet long-range diesel-electric F-class submarines was started.

In 1956 and 1957 the situation was probably considered promising by the Soviets. They started to get the first, primitive, ballistic missile delivery system placed on their Z-V-class submarines, later to be placed on the nuclear H-1-class submarines.[158] Construction of the first surface ship armed with

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[158] Congressional Records, July 1, 1971, p. E6854

cruise missiles, a modified Kotlin-class destroyer, was well underway. Naval aviation which already had a substantial number of TU-16 (Badger) aircraft, was about to receive a longer-range TU-95 (Bear). In short, it looked as though the Soviets were acquiring forces which would be able to deal with aircraft carriers successfully. But they were not alone in enjoying the fruits of the "revolution in military affairs" they so loudly glorified.

Towards the end of the 1950s the emphasis on nuclear delivery capabilities was growing steadily in the United States. Aircraft primarily designed for nuclear strikes, the A-3 (A3D Douglas Sky Warrior), were introduced in quantity in aircraft carrier strike forces.[159] Larger planes, larger carriers and smaller nuclear weaponry made the US Navy a powerful strategic offensive force. The increased range of US carrier borne aircraft permitted launching farther from the Soviet shores and deeper penetration inside the Soviet territory, thus making defense against them of strategic significance.

The next problem which became strategic from the beginning was the Polaris program launched in the US during the second half of the 1950s. In the case of the Polaris submarines, the

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[159] U.S. Naval Institute Proceedings, November 1964, pp. 29-30.

necessity to destroy the ballistic missile carrier, the "platform" from which the nuclear missiles are launched, became even more important than the anti-carrier tasks. A carrier does not launch the weapon but only the weapon carrier, the aircraft. There was a well-developed country air defense program (PVO) disposed in depth which could intercept at least the majority of the aircraft and prevent them from delivering the nuclear weapons. In the case of the Polaris submarines, if the weapons were launched, the only defense would be an anti-ballistic missile system (ABM) defensive capability, which, even if fully developed, would have to be distributed between ICMBs and SLBMs. Because of the strong possibility that the SLBM would be launched after the ICBM, the available ABM's would be few in number at best or even lacking. The situation might be even more complicated in case of a coordinated attack by ICBMs, SLBMs, SAC (Strategic Air Command) and carrier borne aviation, when each previously launched system would considerably reduce or nullify the defense against the next offensive system. All this made the task of countering the Polaris submarines of utmost importance. However, this extremely complex task compounds an already complex ASW (anti-submarine warfare) problem and would have to be performed in the remote areas of the oceans, where all kinds of opposition to the ASW forces had to be

expected. The rapidly increasing ranges of Polaris missiles (A-1, 1,200; A-2, 1,500; A-3, 2,500 nautical miles)[160] would draw the ASW forces farther and farther into the open sea. It was also important to establish an optimum package of ASW forces, i.e. a combination of surface forces, airborne forces, and killer submarines. Thus, the announced Polaris program, even more than the increased potentials of carrier-borne aircraft, contributed to the necessity of forward deployment of the Soviet Navy.[161]

The third factor forcing the Soviet Navy's forward deployment was the necessity to assure the deployment of their own submarines. Because of the geography, the deployment of Soviet long-range submarines would often if not always have to be accompanied by protective forces which would minimize, if not eliminate, the effectiveness of enemy ASW efforts. This is a complex and very intensive operation in which a considerable portion of the Soviet fleets, primarily the Northern and Pacific, would have to participate. When a growing number of Soviet submarines armed with ballistic missiles became an integral

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[160] Jane's Weapon Systems, 1970-1971, pp. 135-137.

[161] It must be realized that any program is announced or detected by intelligence long before its practical realization, thus generating the need for counter measures.

part of the Soviet strategic forces, their deployment assumed correspondingly greater importance. Thus, the threat initiated by the opponent and the growing participation of Soviet naval forces in nuclear delivery generated a number of specific tasks which, in turn, determined the development and the mode of operation of the Soviet navy during the decade of the 1960s and the beginning of the 1970s.[162]

As previously stated, toward the end of the 1950s Soviet military theory rejected strategic defense as a predominant type of warfare, and started to emphasize the strategic offensive. Such an emphasis, however, while being treated as an important shift in the Soviet military policy, could not and did not eliminate the necessity of having various forces capable of both offensive and defensive operation. This was particularly true, more than in any other services, in the case of the Soviet navy. For this reason, considerable resources and production

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[162] An analysis of factors influencing Soviet naval development can be found in John Erickson, "Soviet Military Power", Royal United Services Institute for Defense Studies, London, 1971, pp. 52-61, and Michael McGuire, "Soviet Naval Capabilities and Intentions", Congressional Record, July 1, 1971, pp. E6850-E6865. While it would be wrong to underestimate the influence of American naval development on generating a corresponding Soviet reaction, it would be equally wrong to treat it as asole factor. The Soviets have had their own plans and programs, but the threat as they see it could not be ignored and hence, it obviously played an important role in necessitating a speedy reaction and thus interfering somewhat with what otherwise would be a much smoother, planned development.

capacities were allocated for naval development. In addition to the construction of the first ballistic missile submarines, both nuclear and conventionally powered, and the conversion of the first diesel submarine into long-range cruise-missile submarines, a search for a new type of surface ships corresponding to the newly emerged tasks was underway in 1957-1958. The new types of surface ships armed with various missiles were widely discussed during special conferences called for this purpose in late 1957 and early 1958. Commander-in-Chief of the Soviet Navy Fleet Admiral Gorshkov himself used every occasion to find different opinions and arguments concerning the type of ships needed. As a result, the basic designs of such missile ships as the Kynda and the Kashin were proposed by the Navy in the spring of 1958 and were soon approved by the Soviet government. Considerable resources were allocated for research and development, apparently in excess of what could be absorbed.[163] All the foregoing permitted Admiral Gorshkov to state, "The Navy, having always been the focus of the latest achievements in science and technology, was the first of the branches of the armed forces to see the large-scale and general introduction

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[163] In the fall of 1957 Admiral Gorshkov bitterly complained about the underutilization of allocated resources for research and development and demanded a drastic improvement in the situation.

of nuclear missiles, radio electronics equipment, and nuclear propulsion."[164]

In February 1959, addressing the 21st Party Congress, Soviet Defense Minister Marshall of the Soviet Union R. Ya Malinovskiy stated, "Our Navy has become in full a modern navy, capable of resolving any strategic mission in its area of responsibility. Overseas, they quite frequently speak and write that the U. S. Navy is capable of delivering an attack and landing at any point along our coastline. But as the saying goes, 'It is easy to boast, but it is also easy to fail.'— It seems to me that the people overseas should be thinking about the fate of their own coasts and their extended lines of communication, whose vulnerability is now monstrously bared, and about the traditional invulnerability of America which has forever been eliminated."[165]

But in spite of the gradual introduction of some new types of missile carrying surface ships, the end of the decade of the 1950s and the beginning of 1960s witnessed the main emphasis placed on submarines and naval aviation in the Soviet Navy development. For example, an editorial in the Soviet Navy

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[164] S. Gorshkov in <u>Morskoy Sbornik</u> No. 10, 1967, p. 7.

[165] <u>Izvestiya</u>, February 4, 1959.

newspaper emphasized the "profound qualitative change which have recently been made and are being made" in the composition of the Soviet Navy, stressing that "the submarine force armed with modern weapons has become the basis for the combat force" of the Navy. Naval aviation was named as a second most important arm of the Soviet Navy.[166]

That attitude was understandable, for the main stress up to the beginning of the 1960s had been placed on anti-carrier operations and the necessity of assuring the deployment of Soviet submarines in the face of opposition by those attack carriers and their supporting forces. The submarines and naval aviation were viewed as the main forces for anti-carrier operations, and the leading role of submarines armed with cruise missiles in anti-carrier operations was supplemented by the "sophistication of naval aviation".[167]

The role assigned to the naval aviation, particularly in anti-carrier operations, can be seen from the following statement by Chief of Soviet Main Navy Staff Admiral N. D. Sergeyev, "The striking power of the Soviet submarine fleet is successfully coordinated with the great combat capabilities of missile carrying

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[166] Sovetskiy Flot, July 20, 1960.

[167] S. Gorshkov in Morskoy Sbornik No. 7, 1963, p. 16.

naval aviation, which is equipped with fast, long-range aircraft and armed with long-range missiles for various purposes. Even the most modern of surface ships cannot oppose this aviation successfully, because nowadays it is not the aircraft themselves which must be repelled, as was the case previously, but rather the homing missiles they release from long ranges."

Rejecting the attack aircraft carriers as a main force for their own navy, the Soviets did not lose respect for them, and were not ignoring the threat they posed. In the middle and late 1960s they still viewed aircraft carriers as an "extremely powerful enemy at sea".[168]

The Soviet Navy's confidence in its ability to counter attack carriers force in the pre-launch zone and hence reducing the danger to the ships operating in coastal waters, was reflected in a decision to remove fighters from naval aviation and to transfer them to the PVO and the Air Force. Since 1960 the Soviet naval aviation has been divided into three major types: missile carrying (strike) aviation, reconnaisance

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[168] Morskoy Sbornik No. 3, 1965, pp. 89-93; I. M. Korotkin, Z. F. Slepenkov, B. A. Kolyzaye, "Avianostsy"(Aircraft Carriers), Voenizdat, 1964, pp. 280. In 1967 S. Gorshkov, Morskoy Sbornik No. 2, 1967, while denigrating the aircraft carrier as a main combatant, nonetheless confirmed its residual value for strategic delivery.

aviation, and anti-submarine aviation. The Soviet Long Range aviation (LRA) subordinated to the Air Force, was intended for use against naval targets since the mid 1950s. With the development of Soviet ICBMs and ballistic missile submarines, the LRA role in delivering strategic strikes was gradually diminishing while its naval role, particularly against carriers and large grouping of ships and convoys, increased. The LRA role in anti-ship operations was clearly emphasized by the authors of Military Strategy, particularly in its second, revised, edition, where they stated that "long-range bombing aviation armed with long-range missiles retains the capability to launch attacks on enemy targets, especially at sea and in the oceans, and also on those along the shore."

"Attack carrier units can also be successfully combated by both naval and long-range aviation."[169]

This role of Soviet long-range aviation was confirmed by the commander-in-chief of the Soviet Air Force: "Long range aviation armed with air-to-surface missiles can attack important strategic objects at a great distance on land and fulfill missions at sea in annihilating naval forces of the enemy . . . . Thus our aviation in close cooperation with other armed forces

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[169] Voennaya Strategiya (Military Strategy), 2nd Revised Edition, 1963, p. 312 and 398.

of the country is called upon to perform a sizeable number of tasks in modern warfare."[170]

Early in the 1960s, the Soviet military planners probably realized that the growing nuclear strike capability of the US Navy had started to shift in favor of the Polaris system. With the announced forthcoming increase in the Polaris missile ranges, it became evident that countermeasures, preferably in the form of the permanent presence of naval forces in the remote areas, were the Polaris submarines were most likely to operate, were needed. Such an awareness was clearly expressed by Admiral S. Gorshkov, when he emphasized the necessity for the Soviet Navy to have, in addition to the long range striking forces, "other forces which are necessary for the active struggle against any type of enemy". Such forces, in the opinion of admiral, should be represented by "missile ships and boats, ships and aviation to fight enemy submarines".[171]

To a certain degree, dual forces had been under development since the late 1950s. However, except for the long-range striking forces, that is, submarines and naval aviation, the

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[170] Marshal K. Vershinin, "Contemporary Aviation and War", Aviatsiya i Kosmonavtika, No. 6, 1963, p. 14. See also Lt. Gen. S. A. Gulyayev, The Role of Aviation in Combat Operations, Morskoy Sbornik No. 6, 1965, pp. 36-43.

[171] S. Gorshkov, The Party's Care of the Navy, Morskoy Sbornik No. 7, 1963, p. 16.

rest of the Soviet Navy forces, had been handicapped by the lack of air cover, and their effective operating range was limited to that of shore-based air cover plus the range of their missiles. At the beginning of the 1960s that was obviously not enough, particularly if the Soviets wanted to seek out Polaris submarines. Any forward deployment of the Soviet naval forces, even for a short period of time, would require a considerable increase in air defense armament. This is precisely the end toward which the Soviet Navy started working from the beginning of the 1960s. Not only ship constructions received drastically increased and improved air defense armament, but some older units were modernized and equipped with surface-to-air instead of surface-to-surface missiles.

Historically, the Soviet Navy approach to antisubmarine warfare (ASW) was quite specific. Up to the mid 1950s very little attention was paid to the problem, and anti-submarine defense was centered around self-protection of individual units underway and protection of convoys in the pre-coastal zone. To a certain degree, it was probably a rational approach, for there was neither a need for extensive efforts in anti-submarine defense, i.e. there were not many submarines to oppose, nor was there any requirement for protection of convoys on the high seas.

During World War II, most submarines were detected and located because they had to expose themselves at the surface (while underway to an operations area, to change or take position for an attack, to charge their batteries). Strictly speaking, the World War II and first post-war generation of submarines were merely diving boats; only nuclear propulsion made them true submarines. In addition, high speed ceased to be advantage of the surface ships. Thus, advances in science and technology clearly benefited submarines more than they did the surface ships, and made ASW an even more complex problem.

Since the first Polaris submarine started its patrol, the existing ASW forces of the Soviet Navy, mainly oriented toward the defense of the fleet operational zone, were straightway found inadequate. Built primarily around the surface search strike group (PUG-poiskovo-udarnaya gruppa) supported by mainly independent efforts of submarines and in cooperation with the shore-based ASW aviation (helicopters and not very numerous BE-6 aircraft), the Soviet Navy ASW forces were forced to operate in new zones which had become oceanic and of vast dimension. Obviously, a complete reorientation of ASW efforts, and more importantly, an accelerated build-up of forces in different proportions was needed.

Contrary to a widespread belief (mainly as a result of

Krushchev pronouncements) concerning the Soviet Union purported condemnation of surface ships, their construction and, what is more important, efforts at their improvement and sophistication never ceased. What the ASW problem did for the Soviet Navy surface fleet was to create conditions which helped accelerate its development. It was obvious that the forces needed to combat modern submarines, particularly the Polaris type, had to be a combination of submarines, aviation, surface ships, and various fixed and/or floating detection sensors. The main problem remains that of detection and classification, for as soon as a submarine is reliably tracked, the available weaponry, particularly those which would be employed in a nuclear conflict, can destroy it. In short, what was needed was a massive effort combining heterogeneous naval forces and representing "a case of assembling quantity to counter quality."[172]

Despite the considerable research and development efforts to employ the other physical fields in submarine detection such as thermal, electromagnetic, hydrodynamic, turbulent, radioactive, the acoustic field continues to be most widely used. Shore based ASW aircraft have been charged with the initial detection of submarines in most of the remote areas. The concept of the

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[172] L. Martin, p. 103

combined, systematic employment of all existing forces and means for ASW has been adopted as a major principle.[173]

Correspondingly, all three major types of ASW forces, submarines, aviation and surface ships, were improved, particularly during the second half of the 1960s when new classes of submarines, new and improved versions of long-range aircraft, and a number of new classes of surface ships entered the service. The Soviet Navy considers the new Moskva-class ASW cruiser with helicopters aboard, in commission since 1967, as "a fundamentally new ASW ship to fight submarines in the remote areas."[174]

Moskva, a sophisticated combination of detection sensors and weapons system is at present definitely the best Soviet ASW ship and probably one of the best, if not the best, ASW surface ship in the World. But this does not mean that Moskva meets the requirements imposed upon ASW by nuclear submarines, particularly the Polaris type, and it is hardly possible that any surface ship would. In certain areas, particularly in such onfined basins as Mediterranean (where the ship has been employed) oskva might have a certain marginal anti-Polaris capability. In

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[173] Morskoy Sbornik No. 10, 1970, pp. 16-23.

[174] Morskoy Sbornik No. 11, 1971, p. 24.

addition, this type of ship might be deployed to provide the ASW capability of a task force underway or during a fleet operation assuring deployment of the submarines.

As is the case with any major navy in the world, the problems associated with the anti-submarine warfare have become, during the decade of the 1960s, one of the major preoccupations of the Soviet Navy, and a combination of forces have been under development. Moreover, ASW was a factor necessitating the forward deployment of the Soviet Navy forces.[175]

The new tasks of the navy and the new armament of its forces generated the necessity for the revision of theoretical principles of the naval art. There was an initial application in the late 1950s of the first types of new armament and ships to the "provisions of the operational art and tactics", but as the latter were based on past experience, it was of relatively short duration. The Soviets most likely realized that the existing theory of the deployment of naval forces (with the exception of submarines) was a naval variant of the Maginot Line, while the capability of their opponents could produce the effect similar to Ludendorf's maneuver. But this was just

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[175] Vice-Admiral A. Sorokin and Capt. V. Krasnov, Anti-Submarine Defense, <u>Nauka i zhizn'</u> (Science and Life), No. 1, 1972, pp. 48-55.

one more proof that history teaches what should be avoided rather than what must be done, and a prolonged debate and a vigorous search for "new, original and extremely effective methods for conducting the armed struggle with a powerful enemy at sea" was needed.[176]

The debates, initiated in the early 1960s, continued for several years and resulted in a considerable revision of the naval art and a reexamination of naval missions. The content of such well known principles as concentration, cooperation, and maneuver was adjusted to the new conditions of missile-nuclear war.[177] Accordingly, it was claimed that concentration should be achieved not by concentration of weapon carriers (ships, submarines, aircraft) but by the concentration of fire through the manuever of trojectories. The power of the force should be achieved not by the number of missiles fired, but by the yield of the nuclear warheads used.

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[176] S. Gorshkov in Morskoy Sbornik No. 2, 1967, p. 17.

[177] The debates were initiated by Rear Admiral K. A. Stalbo article "On some categories of Naval Art in their Contemporary Manifestation", Morskoy Sbornik No. 1, 1961 to be followed by a number of articles. The most important were articles written by Rear Admiral V. Lisyutin, Morskoy Sbornik No: 3, 1961, pp. 14-22, Rear Admiral V. Sysoev, Morskoy Sbornik No. 4, 1961, and summarizing article by Admiral Yu. Panteleyev, "Some Questions of Fleet Actions in Contemporary War", Morskoy Sbornik No. 2, 1966, pp. 27-34.

While recognizing the desirability of cooperation between homogeneous forces at the tactical level, the cooperation of heterogeneous forces has not been considered necessarily obligatory and in certain cases not even desirable. It was claimed that the power of nuclear warheads permits the solution of various tasks independently by a limited number of homogeneous carriers. Cooperation on the operational level, under the condition that the vital principle "nobody waits for anybody" be observed, was found desirable and necessary. A high degree of operational and strategic cooperation among various Soviet fleets was found obligatory.

Under certain conditions of combat, maneuver was also found of limited value; hence, the maneuvering of forces could often be replaced by the maneuvering of trojectories thanks to the increased range of missiles. The role of the various naval missions has been also revised. For example, such a traditional mission of the Soviet Navy as the support of the maritime flank of the army has been reduced in importance and has acquired a different meaning, to include the situation when the navy has to exclude an attack from the sea by the enemy's naval forces. In short, when supporting the Army, the Navy would be involved in purely naval operations far from the shore and therefore the Army "will not see the naval units

involved in its support".[178]

The importance of action against sea lines of communications was said to be diminished, although the necessity to be ready for such action under certain conditions was stressed. A new approach was taken in regard to amphibious operations. Previous claims that the role of amphibious operations in a nuclear war has diminished was dropped, and the necessity to have specialized forces appropriately equipped and supported, emphasized. In this regard, the first edition of Military Strategy, 1962, which negated the role of amphibious operations conducted by the Navy, was strongly attacked by a leading Soviet admiral for such an oversight.[179] Admiral Alafuzov strongly critized practically the whole treatment of naval matters by the authors of Military Strategy, but he was in complete agreement withthe authors in their recognition of an "independent type of strategic operations conducted by the Navy" and the potentially decisive importance of naval forces in local wars.

The overwhelming importance of nuclear strikes launched

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[178] Yu. Panteleyev, p. 31.

[179] Admiral V. A. Alafuzov "On the Appearance of the Work, Military Strategy", Morskoy Sbornik, January 1963, pp. 88-96.

by naval forces against enemy territory has been constantly emphasized. While recognizing the diminishing role of the main force in combating the enemy naval counterpart, that rolé has been found even more important for the remaining naval forces, because of the enemy's ability to launch strategic strikes against Soviet territory and hence the necessity for the Soviet Navy to prevent it.[180] In this respect, combating enemy ballistic missile nuclear submarines and attack aircraft carriers was found to be of utmost importance for the reasons previously discussed, and the necessity for forward deployment of naval forces, recognized.

Continuing to recognize submarines and naval aviation as the main striking forces of the Navy, the Soviets developed renewed interest in surface ships equipped with new armament, particularly for air defense, and capable of operating without air cover in remote areas. It was emphasized that the new ships armed with SAM complexes and automated rapid-fire guns would shift the previously extremely unfavorable odds between the ship's PVO and attacking aircraft in favor of the former. As a matter of fact, the necessity for the air defense systems to combat enemy weapons, i.e. missiles, and not only carriers, i.e.

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[180] Admiral N. M. Kharlamov, "Trends in Naval Development", Morskoy Sbornik No. 1, 1966, pp. 31-36.

aircraft, was stressed as predominant.[181] The necessity and the possibility for even small surface ships to have a reliable air defense in the form of compact SAMs was emphasized. It is remarkable how closely these theoretical conclusions were carried on into practice by the consequent development of the Soviet Navy. On the other hand, it can be assumed that when these theoretical articles were written, the decision to build corresponding forces had already been made, and the articles were just preparing the Navy for such forces and were stimulating the development of tactics for their deployment.

Now we shall briefly examine the development of various forces of the Soviet Navy after the mid-1950 decision.

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[181] Rear Admiral V. Sysoev and Captain V. Smirnov, Anti-Air Defense of Formations of Surface Ships, Morskoy Sbornik No. 3, 1966, pp. 32-38.

Development of Forces

Submarines

As was noted previously, Soviet naval construction started in the late twenties with submarines. In spite of considerable economic and particularly industrial difficulties, the serial construction of L, Shch, M, S, P, and K classes of submarines was mastered in the decade of the 1930s. Particularly productive was the year 1936, when the Soviet shipbuilding industry delivered to the navy the largest number of submarines. The tempo of submarine construction was such that, once in the summer of 1936, the Soviet Navy commissioned a whole brigade of submarines (6 to 8 units).[182] The development and alleged construction of submarines with closed-cycle engines was started prior to World War II.[183] During the decade of the 1930s, the

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[182] G. M. Trusov, Podvodnye Lodki v Russkom i Sovetskom Flote (Submarines in the Russian and the Soviet Navy, 2nd Edition, revised and enlarged. Shipbuilding Industry Publishing House, 1963, pp. 440; See also Captain Ist Rank V. S. Bakov, "History of Soviet Submarines", Morskoy Sbornik No. 11, 1964, pp. 90-93; and Rear Admiral M. A. Rudnitskiy, "Soviet Submarines", Morskoy Sbornik, No. 7, 1967, pp. 29-34.

[183] G. M. Trusov, p. 338. Except for the source, no confirmation or denial concerning the closed-cycle Soviet submarines during pre-World War II period could be found. However, during the first three post-war years, an intensive test of closed-cycle submarine No. 401 was conducted in the Baltic. This, however, could be result of Soviet knowledge of work by the German designer Walther.

Soviet shipbuilding industry delivered 206 submarines to the Soviet Navy and 52 more were commissioned during the war.[184]

The World War II experience of foreign and Soviet submarine operations were carefully studied in the Soviet Union. As a result it became clear that submarines were in need of serious improvement in greater range and submerged speed, submerged depths and in secrecy.[185] During the second half of the 1940s, the Soviet Union constructed a considerable number of small modernized M-class submarines, while maintaining basically the submarine fleet of pre-war construction. However, starting with end of the 1940s, a new series of submarines of improved quality, the W-class (Project 613) and Z-class (Project 611), were built. The diesel-powered W-class submarine was originally produced as an attack submarine armed with torpedoes

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[184] *Morskoy Sbornik* No. 9, 1971, p. 29

[185] See for example L. M. Yeremeyev and A. P. Shergin, "The Submarines of the Foreign Fleets in World War II. Operational and Statistical Materials Based on the Experience of World War II (*Podvodnyye lodki inostrannykh flotov vo vtoroy mirovoy voyne. Operativno-statisticheskiye materialy po opytu vtoroy mirovoy voyny*) (Voyenizdat, 1962); I. S. Isakov and L. M. Yeremeyev, "Transport Operations of Submarines" (*Transportnaya deyatel'nost' podvodnykh lodok*) (Voyenizdat, 1959); S. A. Sherr, "Warships of the Sea Depths", (*Korabli morskikh glubin*) (3rd ed., revised and enlarged, Voyenizdat, 1964); The lead article of *Pravda* of 10 July 1942, "Submarine Fleet -- Pride of the Soviet People" (*Podvodniy flot--gordost' sovetskogo naroda*).

and equipped with deck-mounted guns which were later removed. Close to 200 units were built altogether; many were transferred to other countries but most, although aging, still remain in commission in the Soviet Navy. As is the case with all Soviet torpedo submarines, the W-class is capable of minelaying. Through various types of changes a true family of classes has emerged from the W-class. Apart from various conning tower shapes (of which there are at least five), the most important modifications of the W-class were in 1956 or 1957, when the first submarine of that class was converted into a guided-missile submarine. An erectable cylindrical housing for a guided missile was installed on the upper deck, and the new class received the NATO designation of W single-cylinder class.[186] In 1958-1959 several other W-class submarines were outfitted with twin launchers for guided missiles, resulting in the socalled Twin-Cylinder-class guided missile submarines. Another major conversion of W-class submarine produced the Long Bin class, a guided missile submarine carrying four missiles in its modified tower. A few units were converted to radar early waring submarines designated the Canvas Bag class.

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[186] Siegfried Breyer, Die Sowjetischen U-Boote der "W"-Klass als Typfamilie (The Soviet Submarines of the W-Class as a Family of Classes), Soldat Und Technik, No. 1, 1971, pp. 10-15.

The Z-class diesel powered submarine, of which a few dozen units were built, was originally built as an ocean going long-range torpedo attack submarine. Although several modifications of this class are known, the most important was a conversion to ballistic missile submarines known as the Z-5 class. It was undoubtedly a modified Z-class submarine from which the first surface launching of a ballistic missile occurred in September 1955, Somewhat later, between 1956 and 1957, several units, each carrying a pair of surface-launched Sark ballistic missiles with a range of 300-350 nautical miles, were produced.[187]

Starting in 1954 a few dozen diesel powered, closed-cycle propulsion system submarines, Q-class (Project 615) were built. This small (around 700 tons displacement) short-range submarine was intended primarily for anti-submarine warfare and carries four bow-mounted torpedo tubes. The closed-cycle propulsion system,at least during the first three to four years of operation, was less than satisfactory and dangerous to operate.

The second half of the 1950s and the beginning of the 1960s produced considerable changes in Soviet submarine construction. In contrast to the first post-World-War-II decade,

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[187] Lt. Com. Robert D. Wells, USN, The Soviet Submarine Force, U. S. Naval Institute Proceedings, August 1971, and S. Breyer, Neue and modernisierte Kriegsschifftypen der Sowjet-Flotte. (New and Modernized Warship Classes of the Soviet Navy), Soldat und Technik, No. 11, 1970, pp. 628-635.

when, despite considerable qualitative improvements in the W, Z, and Q classes, emphasis was still on quantity, the second generation of post-war Soviet Soviet submarines was marked by drastic qualitative changes, both in boats performance and the armament systems installed. Recognizing the considerable improvements in conventionally powered submarines, the two most important factors were the beginning of construction of nuclear powered submarines and the wide introduction of both ballistic and guided missiles. Construction of nuclear powered submarines which was initiated in 1953 on an experimental basis, was authorized sometime in late 1955 or early 1956. It was obviously part of a program which visualized the construction of nuclear powered torpedo attack N-class and ballistic missile H-class submarines. A nuclear warhead for torpedoes was successfully tested in 1957. Conventionally-powered ballistic missile G-class and torpedo attack F-class submarines were built simultaneously. Later the program was augmented and the construction of diesel-powered torpedo attack R-class submarines, nuclear powered guided missile E-class, and diesel powered guided missile J-class, submarines was authorized. It should be noted that the Soviets first built ballistic missile submarines (G and H classes), and two or three years later, they built cruise missile submarines (J and E classes), after the

concept has been tested on W-class conversions. Technological problems, possibly associated with the development of submarine launch cruise missile system, notwithstanding, the strategic importance attached to the ballistic missile submarines armed even with a short range (originally 350 n.m.) missiles is obvious.

Construction of conventionally powered oceangoing torpedo attack F-class submarines displacing over 2,000 tons (submerged) and carrying 20-24 torpedos started in 1956. The submarines of which 45 units were built have been assigned ASW and anti-shipping role.

Between 1958 and 1961 about 20 conventionally-powered medium-range R-class torpedo submarines were built. As an improved W-class design, the R-class most likely has been used primarily for ASW.[188]

Nuclear powered N-class hunter-killer and attack submarines were built about 1957 and the early 1960s. More than a dozen units were constructed, making the N-class the first Soviet nuclear powered submarine to be produced in series.

Conventionally-powered ballistic-missile G-class submarines were constructed during approximately the same period

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[188] For characteristics of Soviet submarines see Jane's Fighting Ships, 1971-1972 and earlier editions; U.S. Naval Institute Proceedings, August 1971; Soldat und Technik No. 7, 1969, pp. 376-382; Congressional Records July 1, 1971, pp. E-6860 - E6886.

as the N-class. Originally armed with three surface-launched SS-N-4 Sark ballistic missiles (350 mautical mile range), many, if not all, G-class submarines were later refitted with three underwater launched SS-N-5 Sark ballistic missiles (650 nautical mile range). Close to two dozen units were built.

Nuclear-powered ballistic-missile H-class submarines were constructed during approximately the same period as the N and G classes, and were originally outfitted with the same Sark missiles as the G-class (a variant known as the H-1). Later, H-2 class submarines carrying three Serb missiles were produced. Less than a dozen H-class units were built.

During the last two days of February 1972, a US Navy plane spotted a disabled Soviet nuclear H-class submarine surfaced about 600 miles northeast of Newfoundland. A photo appearing in the Washington Post shows an unusally long sail with five or six hatches clearly visible on the top of the sail. This would represent a third modification of the class and would be designated H-3. The type of missile carried by these submarines, conversion of which was said to have been accomplished just a few years ago, is the object of conjecture.

After the engineering feasibility of submarine launched cruise missiles had been tested and approved by the conversion of a few W-class submarines, the Soviet Union in 1960 or 1961

initiated the construction of a new type of nuclear-powered guided-missile submarine, the E-1-class, which carries six Shaddock surface-to-surface cruise missiles with a range of between 300 and 400 nautical miles In 1962, the construction of E-2-class submarines each carrying eight Shaddock missiles and a number of torpedoes was initiated. A total of about 30 E-class submarines were built.

Practically simultaneously with E-class was initiated the construction of the conventionally-powered guided-missile J-class submarine. About 16 units were built, each carrying four Shaddock missiles.

Similarities in basic designs of hulls and propulsion between nuclear powered N-class and H-class as well as between conventionally powered F-class and G-class are considerable, and testify to the Soviet utilization of basic concept designs and serial production methods to build a multi-purpose submarine fleet. Also, characteristic of Soviet naval development has been the practically simultaneous outfitting of the submarines with radically different propulsion systems with the same armament package (G and H, F and N, J and E) and with consequent modernization upon the availability of better systems. Utilization of existing submarines to test new concepts and armament systems (Z-5 for ballistic missiles, W-class for cruise

missiles) has also been characteristic.

Somewhere in the mid 1960s, possibly in 1963, a new program for the construction of at least four, and perhaps five, classes of new submarines was authorized. The submarines built under this program started to enter service toward the late 1960s, and represent a powerful addition to the Soviet submarine fleet designed for multiple tasks, ranging from strategic deliveries of nuclear weaponry to ASW and patrol in coastal waters. Three out of four new known submarines are nuclear powered and one is conventional. The most important have been the Y-class ballistic missile nuclear-powered submarines, which is somewhat similar to the US Ethan Allen SSBN. They are equipped with 16 missiles which reportedly have a range of 1500 nautical miles. The construction of Y-B-class submarines which carry 16 missiles with a 2,400 - 3,000 nautical mile range was reported.[189] The annual rate of production originally estimated at 6 to 8 units was recently corrected upward, to 8 to 10 units. By April 1971, 17 units were operational and 15 more under construction. Even with an annual rate of construction of 8 units, the Soviet Navy would have more than 40 Y-class

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[189] Soldat und Technik, No. 7, 1971, p. 415.

submarines by the beginning of 1974.[190] The submarine displacing over 8,000 tons (submerged) has somewhat greater horsepower than American Polaris submarines and its submerged speed is reportedly close to 36 knots.

Another new submarine which appeared in the late 1960s is the nuclear powered cruise missile C-class. This fast submarine is armed with eight underwater launched short-range cruise missiles of a new generation. The range of C-class missiles eliminates the necessity for target acquisition by other sources and permits quick response based on the submarine's own sensors. Both an anti-shipping and an ASW capability of C-class submarines and the possibility of a mixed package of missiles, i.e. against surface ships and submarines, have to be assumed.

The third is the V-class nuclear-powered torpedo armed submarine, the apparent successor to the aging N-class. The submarine most likely has both ASW and anti-shipping capabilities.

The fourth new submarine, the B-class, is conventionally powered and is apparently intended for operation in coastal waters. The possibility of a closed cycle propulsion plant

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[190] At the beginning of 1972, Secretary Laird stated that there are 25 operational Y-class submarines and 17 more under construction. Washington Post, February 16, 1972.

should not be excluded.

Presently there are 350-360 submarines in the Soviet order of battle of which 85-90 are nuclear powered. It is by far the largest and most diversified submarine fleet in the world. Approximately 15% of the Soviet submarines carry ballistic missiles. In spite of the growing number of the Y-class SSBN's, the majority of the operational units are still represented by the H class and G class, although the Y-class submarines are already carrying more missiles than the total of the others.

Cruise-missile submarines comprise approximately 20% of the total, and play a very important role in the Soviet concept of submarine operations, particularly against surface forces. The residual role of cruise-missile submarines against land targets located along the shore line and in support of amphibious operations should not be overlooked.

The remaining Soviet submarines, approximately 65% of the total force, are torpedo attack type. Armed with long-range homing torpedos against surface targets and anti-submarines torpedos, these submarines are also capable of minelaying. A considerable portion of this group is undoubtedly employed in ASW.

Thus, in two decades of post-war submarine fleet development, the Soviet Union has built several hundred boats of at least 14 classes (W, Z, Q, F, N, H, G, R, J, E, Y, C, V, B) of submarines.

If the numerous modifications and conversions (such as Z-5, twin cylinder, Long Bin, Canvas Bag, H-1, H-2, G-1, G-3, E-1, E-2, etc.) were added, the number of classes built would exceed 25.

The Soviet submarines are designed to perform a multiple number of tasks some of which, such as cruise-missile attacks, are capabilities which so far are unique to the Soviet Navy.

In addition to construction of new submarines with improved characteristics and armament, the Soviet Navy had to solve another problem, that of training its submarines crews. Soviet submariners had to master not only new hardware in its qualitatively different performance (speed, depths, armament) but during the decade of 1950s they had to cross the psychological barrier of cruise duration. As has been openly admitted by the Soviets, during the decade of 1950s "the technology was basically ready for long cruises, but the men turned out to be insufficiently ready psychologically".[191] Submarine commanders in making off-shore cruises light heartedly run down their batteries on a simple maneuver, navigators lost their skill in celestial navigation, and the proximity of the bases had an effect on the careless

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[191] Good examples are provided in an article by Rear Admiral A. Gontayev, "The Path to the Ocean", Morskoy Sbornik No. 10, 1971, pp. 47-52.

attitude toward fuel consumption. Such deficiencies in training were basically overcome during the decade of the 1950s when considerable emphasis was placed on not only prolonged cruises, but snorkeling technique. The task was set to stay on snorkel days and weeks and to cover thousands of miles.

Arctic and under-the-ice navigation of Soviet nuclear powered submarines assumed importance immediately after commissioning of first SSBN. During the 22nd Party Congress (23 October 1961) it was reported that Soviet missile submarines had mastered under-the-ice navigation and could reliably reach their launching position.[192] In July 1962 the nuclear powered submarine Leninskiy Komsomol made a voyage to the North Pole. On 29 September 1963 another Soviet nuclear powered submarine surfaced exactly at the North Pole and hoisted the flag of the Soviet Union and the flag of the Navy there.[193] Both were N-class submarines, and their cruises were undoubtedly generated by ASW interest. A claim was made that "underwater combat, including combat under the Arctic ice is becoming an imminently practical matter".[194]

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[192] Pravda, 24 October 1961.

[193] Morskoy Sbornik No. 2, 1964, pp. 30-31.

[194] Collection of articles, Podvodniki (Submariners), Moscow, 1962, p. 97.

During the first quarter of 1966, a group of nuclear-powered missile submarines under the command of Rear Admiral A. I. Sorokin made a submerged cruise around the world; in 45 days the submarines covered almost 25,000 miles without once surfacing.[195] Soviet submarines are now often observed at various remote areas of the world ocean, and reports on very prolonged cruises of some of them are common phenomena. It appears that the praise heaped on them by the Russian media is well deserved.

Soviet submarine development during the post World War II period, and especially since the mid 1950s, seems to testify to an acute awareness, even a conviction, of the Soviets that the balance between surface ships and submarines has shifted in favor of the latter.[196] The size of the Soviet submarine fleet, the multiplicity of missions and tasks, the variety of submarine types and armament packages all make it a major threat in practically any confrontation. Further technological progress would seem to benefit submarines even more than other naval forces, and the gap between ASW forces and submarines, despite the considerable progress of both, would be widened in the

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[195] VIZ (Military Historical Journal), No. 7, 1970, p. 31; and Morskoy Sbornik No. 9, 1971, p. 29.

[196] For an interesting discussion of this problem see Paul Cohen, "The Erosion of Surface Naval Power", Foreign Affairs, January 1971, pp. 330-341.

foreseeable future even more in favor of submarines. Even a major breakthrough in ASW, and it would to come in the problem of detection first of all, would not nullify the many advantages possessed by the submarines, which are benefitting from technological progress much more than their hunters. This fact seems to be well understood in the Soviet Union and the further development and sophistication of their submarine forces is proof to it.

Recognizing the fact that they do not possess either a monopoly on technology nor are they necessarily far ahead in its application to submarine construction, the Soviet Navy has maintained a respectable number of boats in commission, obviously utilizing the advantage of numbers. In this respect, it is interesting to note not only the Soviet Navy's maintenance of a considerable number and an even larger percentage of conventionally powered submarines, but their continued construction. For certain tasks and regions there is no pressing need for nuclear submarines. A number of tasks, including ASW in areas where enemy anti-submarine surface and air forces can be reliably excluded or their effectiveness greatly reduced, protection of convoys in restricted areas and coastal patrols can still successfully be performed by conventionally powered submarines. The moderate consumption of energy required for such tasks

coupled with the increased capacities of batteries, not to mention closed-cycle engines, permit their presence in the patrol area for a considerable time. The cost of conventional submarines compared with nuclear powered is considerably lower, several conventional boats can be constructed for the price of one nuclear powered submarine.

Greater emphasis on the forward deployment of Soviet naval forces should force them to increase the ratio of nuclear submarines, but this does not mean the gradual elimination of conventional submarines for the immediate future. The fact that the Soviet submarine construction program presently underway initiated an obvious reevaluation of their submarine force requirements for the current decade seems to warrant such a conclusion.

While it is relatively safe to predict that current and future submarines will be quieter and deeper-diving than their predecessors, speed is another matter. While certainly needed and beneficial for the attack submarines (both torpedo and cruise missiles), it might not be essential (especially under optimum selection of propulsion plants and tasks) for other types, including some hunter-killer submarines. The first generation of Soviet nuclear submarines, particularly the first mass produced N-class, is credited with a submerged speed of 25 to

30 knots. Even at 25 knots they are faster than the early US nuclear submarines.[197] However, there is a price for speed, and most Soviet nuclear submarines are reported to be noisier than their American counterparts.

The practically simultaneous construction of 3 (N, H, E) classes of nuclear submarines in the late 1950s and early 1960s and of 4 conventional (F, G, J, R) classes seems to testify to the Soviet confidence in the existing technology and that the time from 1953 to 1957-1958 had not been wasted. Soviet nuclear submarines of the second generation built since the mid 1960s have even better characteristics. In that regard Admiral Rickover stated, "From what we have been able to learn during the past year, the Soviets have attained equality in a number of these characteristics (weapons, speed, depth, sonar, quietness, and crew performance) and superiority in some".[198]

It was reported that the number of submarines launched per year with the initiation of construction of more sophisticated boats appeared to have dropped, but a one-shift annual capacity to

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[197] Norman Polmar, "Soviet Navy Pulls Even in Nuclear Sub Might", Washington Post, October 4, 1970, pp. D1 and B4; Izvestiya, October 9, 1971, claiming the existence of "quite a few" nuclear powered Soviet submarines had also called them the fastest in the world.

[198] Washington Post, October 4, 1970.

built up to 20 nuclear powered submarines exists.[199] Due to the retirement of older classes of submarines built in great number, the total Soviet submarine order of battle might decline to 250-300, but numerically they would still be far ahead of any other navy in the world and greater even than the combined submarine force of NATO. In overall balance, the present potentials of Soviet submarine force are considerably greater compared with that of a decade ago, a trend most likely to continue.

Surface Ships

At the time of fateful decision of the mid 1950s concerning the development of the Soviet Navy which emphasized the submarine - aviation nature of its main striking forces, the complex problem associated with surface ships (i.e. does the modern navy need surface ships and if so what kind; what missions should be assigned them and what place in general should they occupy in the navy) remained to a large degree unsolved. Two aspects of the problem should be emphasized. The first is connected with the role of surface ships, especially capital ships, as the main strike forces of the navy. By

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[199] Naval Institute Proceedings, August 1971, pp. 60-62.

delegating this role to the submarine and naval aviation, the decision automatically solved this aspect of the problem. The Soviets arrived at this decision through a careful examination of the past, present, and future role of capital ships in a big war. The big, world war of the future was seen only as a nuclear one. Past experience had been projected into the future, and the fate of battleships compared with the aircraft carriers. The continuing preoccupation of Western navies, particularly the American, with aircraft carriers, was compared with the outdated Japanese approach during the preparation and execution of attack on Pearl Harbor on December 7, 1941. It has been claimed by the Soviet specialists, including leading admirals, that the Pearl Harbor attack aimed mainly against American battleships, viewed by the Japanese as a main striking force, and launched not by the Japanese battleships but by aircraft carriers, which then were viewed as supporting forces, was a major mistake demonstrating an absence of foresight and dialectical considerations on the part of the Japanese naval command. It was concluded that, as the era of battleships was replaced by the era of aircraft carriers during World War II and the first post-war decade, the role of the latter as a main strike force is on the decline and the future belongs to the submarine-aviation forces armed with missiles as their main

armament. It should be repeated that all these considerations are applied by the Soviets only in respect to the large war, the nuclear war, and to attack aircraft carriers, (CVA).' In relation to the small local wars where major powers are not opposing each other and which are conducted with conventional armament, the continued role of attack aircraft carriers has never been questioned. If one separates the propagandistic rhetoric concerning the underdeveloped and small countries' lack of modern means of armed conflict to repel the attackers, the attack carrier role as the main naval force in such wars has been recognized by the Soviets. It should be also stressed that at the time of rejection of attack aircraft carriers as the main striking force, the Soviet Navy had neither a single carrier in commission nor any experience on how to build or operate them. The economic and technological feasibility to build aircraft carriers were clearly present in the mid 1950s, but it would require 7 to 8 years before the first group of those ships and the aircraft for them would be developed, built, and initial operation experience acquired. However, the early and mid 1960s were seen by the Soviets as a period when various sophisticated missiles tipped with nuclear warheads would dominate the naval armament and, coupled with greatly improved electronics and means of reconnaissance, a huge aircraft carrier

would have no chance to survive an attack against her. The tragic experience with the battleship Novorossiysk, formerly the Italian Guilio Cesare, sunk by a conventional World War II mine with the loss of over 600 men in the middle of Sevastopol Harbor in October 1955, soon after expensive modernization, was a painful example in the minds of the Soviet leadership of how easy a large ship can be sunk. The loss of Novorossiysk was a hard blow to the Soviet Navy, and it gave to its opponents one more argument on how vulnerable ships are.

The second aspect of the above problem dealing with other classes of surface ships was resolved differently. It has always been well understood in the Soviet Union, in spite of some loud pronouncements in favor of submarines and aviation, that surface ships of various displacement acting independently or in cooperation with other combat arms of the navy are irreplaceable for a variety of missions. Because of the changing conditions under which those missions would be accomplished, the problem arose of the compatibility of armament and the tasks to be solved. The majority of the surface combatants of the Soviet Navy during the second half of the 1950s were, owing to the nature of their opponent and by the type of their armament, ill suited for their assigned missions. Moreover, the missions themselves had been gradually changing, and a degree of

uncertainty about them most likely existed toward the end of the 1950s. In this respect, Khrushchev's denigrating remarks about surface ships made during his trips to England in 1956 and to the United States in 1959 were aimed at large conventionally armed ships, Svedlov-class cruisers included, and obviously did not mean the negation of the surface ship's role, particularly in the future. The construction of surface ships has never ceased in the Soviet Union. The greater or lesser intensity of construction during the second half of the 1950s and beginning of the 1960s can easily be explained by the availability of the armament, uncertainty in the regard of operational concept due to changing requirements, and the search for an optimum armament package.

What is unmistakenly clear was the Soviet decision in late 1950s to concentrate practically exclusively on the missile armament of the surface ships. This truly revolutionary concept did not compete with but rather supplemented, in a variety of ways, the Soviet main naval striking forces, submarines and naval aviation. The Soviets became convinced that missile ships of any displacement, including missile boats, can successfully engage any surface ship at sea as soon as it comes within the range of their missiles and that many advantages previously enjoyed by large-displacement ships armed with

conventional weapons have been nullified by the missile-armed ships. Not all missile ships built by the Soviets in last fifteen years turned out to be unquestionable successes.' The first few classes were built on the basis of old operational concepts and did not produce drastic qualitative improvements in the Soviet surface forces. However, the great majority of the newly created ships had been laying down the foundation for the qualitatively new surface fleet forces which started to emerge toward the end of the 1960s. Moreover, Soviet missile ships have started to produce corresponding, but unfortunately belated, reactions in the Western navies. It took a relatively minor (compared with the potential of missile ships) engagement, the sinking of the Israeli destroyer, Elath by the Egyptian Navy using Soviet built missile boats, to speed up the process of the realization that to measurethe naval strength of a country, and sea power in general, by the number of stacks above the surface and the amount of smoke they are producing is to live dangerously in the past and to overlook the present, and especially future, realities.

The immediate result of the mid 1950 decision was the cancellation of further construction of Sverdlov-class cruisers (out of 20 ships laid down only 14 were completed), and the gradual reduction of Kotlin-class destroyer construction.

The Sverdlov class was the last conventionally armed cruiser built by the Soviets. While continuing the construction of Skory-class destroyers, 71 units of which were built during the 1948-1952 period, a single unit of the first Soviet flush-deck destroyer of the Tallin-class (Neustrashimyi) was built and tested during the 1950-1952 period. The class was never put into serial production, but served as a prototype for a large family of hulls, the Kotlin, Kildin, and Krupnyi classes and their modifications. It was found necessary to correct the design by augmenting the anti-aircraft armament and reducing the displacement. The resulting Kotlin-class destroyer as put into serial production in 1952, and about two dozen nits were built. The Kotlin class turned out to be the last onventionally armed destroyer built by the Soviets.[200]

After construction of 6 to 8 units of the 1,900-ton ola-class destroyer escort, production was switched in 1952 o the somewhat reduced tonnage (1,600 tons) and armament 3 100 mm guns instead of 4) of the Riga-class, of which close o 50 units were built. The further development of this type of hip by the Soviet Navy resulted in a stronger tendency toward

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[200] Morskoy Sbornik No. 12, 1966, pp. 16-21; No. 3, 1967, p. 18-22; and Jane's, 1971-1972 edition.

SW ship. The construction of the Petya class in the late
s and early 1960s in two modifications was followed by the
truction of the Mirka class, also in two modifications,
t during the first half of 1960. Both classes are propelled
ombined diesel and gas turbine propulsion plants.[201]

The following other conventionally armed Soviet ships should
entioned: PT-boats of the P-6, P-8, and Shershen classes;
sweepers of the T-43, T-58, Yurka and Vanya classes; a
er of classes of patrol boats, auxiliary ships, and support
s. The total number of all these types and classes runs
into the many hundreds of units.[202]

Toward the spring of 1958 ~~the first~~ Soviet missile-armed
ce ship, the Kildin-class destroyer built on the basis
slightly modified Kotlin-class hull and equipped with one
her for the Strela surface-to-surface guided missile, was
. Four units were built. From 1958 to 1960, 8 units of
rupny-class surface-to-surface guided-missile destroyers
ped with two launchers were constructed. The construction
e two classes might be viewed as a classical example of
pplication of new weaponry to an old operational concept,

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[201] See Jane's, 1971-1972, p. 631.

[202] For details see latest editions of Jane's Fighting Ships.

ater denounced by Gorskhov. As both ships had only conventional uns for anti-aircraft defense, they were poorly suited for istant operations at sea requiring fighter support which could e provided only by shore-based aviation. Yet, the availability f missiles increases the striking power of surface units by 00 to 150 miles - a quite respectable distance particularly mportant in closed seas, which would include the Mediterranean. n the late 1950s the Soviet Navy developed the Komar-class issile boats armed with two short-range (about 20 miles) tyx cruise missiles. In the early sixties, Osa-class missile oats armed with four Styx missiles were built. Three odifications of the Osa are known.

During the decade of 1960, the Soviet Navy was reinforced ith variety of missile armed ships. Four Kynda-class guided issile cruisers were built between 1960 and 1964. The Kynda s the first surface ship armed with both surface-to-surface addock missiles (2quadruple launchers) and surface-to-air a missiles (one twin launcher) Additional armament includes (2 twin) 76-mm guns, 6 (2 triple) ASW torpedo tubes and 2 -barreled ASW rocket launchers. There is a helicopter platform the stern. Construction of the Kashin-class guided-missile stroyer, which the Soviets call a large ASW ship, also started the early sixties A total of sixteen units have been built

so far. The Kashin class is armed with 2 (twin GOA) surface-to-air-(SAM) missile launchers, 4 (2 twin) 76 mm guns, 4 ASW rocket launchers and ASW torpedo tubes. The Kashin was the world's first gas-turbine-propelled ship of its size.

As a result of the Soviet concern for the anti-aircraft defense of their surface units, certain classes of ships were converted during the decade of 1960s and armed with surface-to-air nissiles (SAM). Dzerzhinskiy, a Sverdlov-class cruiser, was converted around 1960-1961. The third 152-mm triple gun turret vas removed and in its place installed a twin SAM launcher for uide-line missiles, used by the Soviet air defense troops. ong-range but heavy missiles did not prove to be well suited or naval purposes, and the experiment did not continue. uring the 1962-1968 period a number of Kotlin-class destroyers ere converted into SAM ships. One surface-to-air missile auncher was installed instead of the main twin 130 mm tureet.

During the second half of the 1960s at least three rupnyi-class ships were armed with SAM launchers instead of he originally installed surface-to-surface launchers, and ere given the NATO designation of Kanin class.

In the mid 1960s a new class of Soviet guided missile ruisers, the Kresta, emerged, and a total of 4 units were ompleted. The ships' armament includes everything except

allistic missiles: 2 twin Shaddock surface-to-surface missile aunchers, 2 twin Goa SAM launchers, four 57 mm (two twin) nti-aircraft guns, 4 ASW rocket launchers (2 12-barrel and 6-barrel), and 10 torpedo tubes (2 quintuple). The ship lso has a helicopter hangar, the first Soviet ship so equipped. his 7,000-ton multi-purpose ship has no counterpart in estern navies as of the early 1970s.

Toward the end of the 1960s at least 2 modified Kresta-lass ships, designated Kresta II, were built, with the following hanges from the Kresta I: Instead of 2 twin Shaddock urface-to-surface missile launchers, two quadruple new short-ange surface-to-surface missile launchers (possible suited for ome long-range ASW weapons as well) were installed: 2 twin unchers for GOA SAMs were replaced by 2 twin launchers for ew surface-to-air missiles; 8 (four twin) highly automated 0mm guns were added. The remaining armament is the same as n Kresta I.[203]

In 1967 the existence of a large ship variously described n the West as a helicopter carrier or a combination helicopter

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[203] For the further details on the described ships, see ne's Fighting Ships, 1971-1972 ed., pp. 615-620; and earlier ditions; "New and Modernized Ships of the Soviet Navy" are so described in Soldat und Technik, No. 10, 1970, pp. 566-570.

guided missile cruiser was revealed. The Moskva class,
hich two units, Moskva and Leningrad, are presently in
ission, is designated as an anti-submarine cruiser in the
et Navy and that undoubtedly is what she is.[204] Displacing
t 18,000 tons, the ship is exceptionally well armed for its
ose and fit with extensive electronic equipment, including
e-dimensional (three-D) surveillance radar (also installed
resta II) and variable depth sonar (VDS), both firsts aboard
et ships. The ship armament includes one twin launcher for
missiles (which might be intended for surface-to-surface
iles as well), a new Soviet weapon; 2 twin launchers for new
-3 surface-to-air missiles, 2 250-mm ASW rocket launchers,
ubes each; four (2 twin) ASW torpedo tubes, 4 (2 twin)
m guns. The ship also carried about 20 KA-25 ASW helicopters.
Moskva class is the world's largest warship designed for

Towards the end of 1960s, Soviet Navy efforts to have
ip with as small displacement as possible for a given
ment and mission resulted in the development of Nanuchka-class.
lacing about 800 tons, the Nanuchka is armed with six (2 triple)
ace-to-surface missiles, which seem to represent a new-vintage

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[204] TRUD, 26 July 1969.

:apon. In addition, a photograph published in the Soviet ;ss[205] reveals provision for the installation of a SAM launcher : the existence of a retractable one) which would have to be ı small dimensions (smaller than the GOA SAM or SA-N-3). The ;p most likely is a successor to the Osa class and is considerably ;ter suited for operations in a more remote areas:

Soviet development of ships with new propulsion principles ı armament have accelerated during the decade of the 1960s. After :ensive tests in the late 1950s of hydrofoil, gas turbine, and sel propelled boats, were developed and placed in service in the 1960s. Toward the end of the 1960s, there were approximately ozen Pchela-class hydrofoil patrol boats.[206] The same approach been taken with the air-cushion ships. At least four, obviously erimental types, one of which was armedwith a Styx-like SSM, were vn.[207] One class of air-cushion boat has been used by the naval ıntry since at least the spring of 1971.[208]

A greater role for ships with new propulsion principles

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[205] Krasnaya Zuezda, 6 August 1971.

[206] ERKENNUNGSBLATTER, May 1970, p. 135.

[207] SudostroyeniyeNo. 2, 1969 and No. 8, 1969.

[208] See Chapter Shipbuilding.

d their combat employment were theoretically justified by the viet Navy in mid-1960's.[209]

In June 1971 a brand new Soviet missile ship, the Krivak-class, tered the Atlantic via the Danish Straits after tests in the Baltic. h a displacement of only 3,500 - 3,800 tons the ship's armament cludes: four surface-to-surface (and probably long-range ASW apons as well) missile launchers; reserve space (or concealed ow the deck) for two installations of new SAM launchers similar the Nanuchka class; 4 76-mm automatic guns (2 twin turrets); ASW rocket launchers, 8 ASW torpedo tubes (in 2 4-tube installations). Krivak-class is equipped with sophisticated electronics and has . It is obviously a multipurpose ship with a strong ASW inclination. is possible that after extensive tests this class of ship will produced in considerable number. With no counterpart among the rest the world's navies, the ship surprises with a variety of armament alled on a platform of such a modest displacement.[210]

Thus, the decade of the 1960s witnessed a gradual increase oviet Navy interest in surface ships, sophistication of their ment, with practically exclusive emphasis on missiles as the

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[209] Rear Admiral D. Tuz, "Surface Ships Are Really Becoming ace Ships", *Morskoy Sbornik* No. 10, 1966, pp. 22-25.

[210] *Soldat und Technik* No. 7, 1971, p. 373; and No. 10, 1971, 584-589; *ERKENNUNGSBLATTER*, October 1971, p. 152.

hip's main weaponry. A number of classes of Soviet built ships so ar have no equals among the major naval powers. Many newly-built urface ships were equipped with gas turbines, thereby eliminating oiler rooms, providing more space and provisions for the automation, nd reducing maintenance requirements. Other navies of the world tarted to emphasize the advantages of gas turbine propulsion towards e end of the 1960s; in fact, all new British surface ships will be o equipped.[211]

Starting with the 1957 installation of an after helicopter atform aboard a Kotlin-class destroyer, the Soviet Navy has ontinued this practice which resulted in a permanent hangar for one two helicopters aboard Kresta-class ships. The employment of licopters by many Soviet surface ships for ASW, extended over the rizon target detection and classification, cruise missile course rrection, relay stations and perhaps future anti-ship missile fense has represented to a large degree the light airborne lti-purpose system (LAMPS) presently being evaluated by the US Navy.[212]

Toward the end of the 1950s, when they started to arm their rface units first with surface-to-surface missiles and to employ em within the framework of an already outdated operational concept,

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[211] Naval Institute Proceedings, October 1971, pp. 111-112.

[212] US Naval Institute Proceedings, December 1971, pp. 27-29.

ts realized the need for improved anti-aircraft defense of le ships and undertook appropriate remedial action, equipping units, starting with the Kynda, with SAM missiles as well. uch as the Kashin-class) were built with predominantly missile armament and more were converted into SAM ships. a class and probably the Krivak class represent the ships balanced armament, the ships which so far have not been by any other navy.[213] Admiral S. Gorskhov words about issile ships being the pride of the Navy" seem to be y justified.[214]

Naval Aviation

The birth of Russian naval aviation dates back to the year n the first seaplanes arrived in the Black Sea Fleet. Up he naval aviation units were equipped primarily with foreign- planes. During World War I most of the aircraft were Russian he M-5 and M-9 designed by D. Grigorovich, the Sikorskiy-10 l'ya Moromets designed by I. Sikorskiy, who after the n left Russia and continued his work in the United States. Muromets, which was the first multi-engined aircraft was

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[213] See Admiral Kharlamov, "Ships and Their Armament", Nedelya 968, p. 8.

[214] S. Gorshkov in Pravda, 14 February 1968.

icularly well suited to meet the requirements of naval nnaissance. In 1915 the Baltic and Black Sea fleets acquired raft carriers. They served as a base for 6 to 10 seaplanes, which lowered to the water by special cranes. At the beginning of , 10 seaplanes from two Black Sea Fleet aircraft carriers made a essful attack against the Turkish port of Zonguldak. Dropping ombs, the planes sank one steamship and several small vessels.[215] e the October 1917 revolution, the Soviet Navy has always had an grated naval aviation. By the mid 1930s, aircraft designed by rigorovich (flying boats M-24, ROM) and Tupolev (MDR-2, MK-1,) design bureaus were delivered. During the secondhalf of 1930 tly modified aircraft built for the Soviet Air Force, P-5, TB-1, DB-3, reinforced naval aviation. When the war started (June , the Soviet Navy had 2,581 aircraft distributed among its fleets of which 10% were torpedo carriers, 14%, bombers, 45%, ers, 25%, reconnaisance, and 6% miscellaneous. During the war the aviation received considerable number of fighter aircraft and rs (particularly PE-2 and TU-2).[216]

The post-World-War-II period witnessed the steady growth val aviation. But this growth up to 1955 followed the familiar ar and wartime pattern, exclusively land-based aircraft with

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[215] S. Berdnikov, "How Naval Aviation was Born", Morskoy ik No. 10, 1970, pp. 59-65.

[216] Morskoy Sbornik No. 8, 1971, pp. 18-23.

avy emphasis upon fighters and the virtual absence (with the ception of a few TU-4s) of long-range aircraft. In addition to rious types of MIGs, IL-28s in light bomber, torpedo carrier, and connaisance versions were delivered. In 1955 the first regiments TU-16 Badger medium-range bombers were transferred to the Navy om Long Range Aviation. During the second half of the 1950s, the vy received a number of long-range TU-95, Bears. In 1960 all ghters were taken away from naval aviation and transferred to the ntry air defense (PVO), which became the sole provider of air er for Soviet naval units in the coastal zone. This step reduced numerical strength of Soviet naval aviation from about 3,500 craft to 800.[217]

The removal of fighters from the Navy simplified the ining and maintenance problem and did not handicap the effectiveness ship and convoy protection in the coastal zone. The Soviet Navy a well developed system of shipboard fighter control (KPUNIA), ch, in close cooperation with the shore based units of the PVO, has n charged with the responsiblity of providing fighter cover for p units and convoys at sea.[218]

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[217] S. Breyer, *Guide to the Soviet Navy*, United States Naval titute, 1970, p. 181.

[218] See for example, D. Fomin, "Covering Single Ships at Sea inst Enemy Air Strikes", *Morskoy Sbornik*, No. 5, 1967, pp. 29-32.

The decade of the 1960s represented the most interesting nd important period in the development of Soviet naval aviation, hich, organizationally is divided among the 4 Soviet fleets. t is also centrally controlled from Moscow by the Office of the ommander of Soviet Naval Aviation. There are three major combat ranches: Reconnaissance, Missile-Carrying (Strike), and nti-Submarine.[219] The number of aircraft incorporated into hese three branches exceeds 1,000 (including helicopters). here are also naval transport and training aviation, which total everal hundreds of aircraft.[220]

Also of extreme importance in any consideration of the le of Soviet aviation at sea is the close cooperation between e Navy and Long Range Aviation (LRA) discussed previously. ch cooperation provides the Navy with a considerable number of ng-range aircraft under the <u>operational</u> <u>control</u> of the Navy for connaissance and strike missions. The principal aircraft of e LRA participating in the maritime role, are: the 4-engine rboprop TU-95 Bear; the 4-engine jet Miasishchev Bison; and e 2-engine supersonic jet TU-22 Blinder. All can be refueled the air. The aircraft of the naval missile carrying aviation

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[219] <u>Morskoy Sbornik</u> No. 10, 1966, p. 18.

[220] <u>Jane's Fighting Ships</u>, 1971-1972, p. 593.

include the 2-engine jet TU-16, Badger; the TU-95, TU-22, and perhaps the Bison. During the first half of the 1960s all Navy Badgers were modified for in-flight refueling.

Naval reconnaissance aviation employs the TU-95, TU-16 and possibly a M-4 modification. A small number of AN-12 Cub, a modified version of a 2-engine turboprop transport aircraft, and the IL-18 May, a 4-engine turboprop commercial aircraft modified for patrol and ASW are also employed. The anti-submarine aircraft are: The BE-6 Madge, which are being rapidly replaced by 2-engine turboprop flying boats; the BE-12, Mail; MIL-4 Hound helicopters; and KA-25 Hormone helicopters. The old IL-28 Beagle twin-jet has been used to carry ASW torpedoes. It was reported that some TU-95 and Bisons (M-4A) were converted to the ASW role.[221] Modified Bisons and TU-16 aircraft are used as tankers for air refueling. The TU-16 tankers are an integral part of missile carrying aircraft units. For example, an air regiment has two squadrons of strike aircraft and one squadron of tankers.[222]

The TU-95 Bear is known in several modifications from Bear-A

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[221] Armee Rundshau, No. 1, 1971, pp. 29-31. For characteristics of aircraft see also Jane's All the World's Aircraft, 1969-1970 and 1971-1972 editions.

[222] OKEAN - Manuevers of the USSR Navy Conducted in April - May, 1970, Moscow, Military Publishing House, 1970, pp. 203.

to Bear-D. It is the longest range Soviet aircraft and is widely used for various naval roles. The TU-22 Blinder so far has been the only supersonic aircraft in naval aviation delivered during the second half of 1960. After its first showing in the 1961 Soviet Air Show, the aircraft electronics was considerably mproved and an in-flight refueling capability, added. A portion of the Blinders in naval aviation, however, are still ithout an air refueling capability. The Blinder is the most ogical aircraft to replace the aging Badger. If the development f wing-wing Backfire is as advanced as has been claimed, delivery o naval aviation should be expected.[223]

The Soviet practice of the last 15 years of concentrating n heavier, long-range aircraft in the development of their aval aviation can be only partically explained by the absence f aircraft carriers. That absence was definitely a factor uring the post-World-War-II period up to the end of the 1950s. uring the decade of the 1960s, however, the development was ictated by the conscious rejection of the attack carrier concept r the reason discussed earlier, and in turn, the conscious cognition of the great maneuverability and striking power of avy aircraft armed with missiles in naval warfare. At least

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[223] US News and World Report, September 27, 1971, p. 13.

initially, the combination of missiles with nuclear warheads played an important role in the development.

The Soviet Navy fully recognized the potential of surface formations, especially those with carriers for anti-aircraft defense. They had also were aware of difficulties for bombers using free-fall bombs, even those armed with a nuclear charge, to penetrate the defense and to hit a maneuverable target. As result, missile carrying aviation, which is immeasurably more aneuverable than any surface formation, including a carrier trike force, employing weapon systems based on air-to-surface issiles which can hit surface and shore targets without even ntering the anti-aircraft defense zone, was born and developed. hen Commander of Baltic Fleet Aviation wrote in 1965; "Naval ssile - carrying aviation armed with missiles with nuclear rheads can use its powerful weapon outside the operational nge of shipboard surface-to-air missiles and almost beyond e potential range of fighters directed against these aircraft. s permits missile carrying aviation to effectively carry out mission of destroying enemy warships and transports at sea, ardless of their anti-aircraft defense systems. Modern al aviation has great possibilities for conducting successful bat operations not only against large surface warships but against submarines, including nuclear-powered ones . . . and

in many instances aircraft have advantages over surface combatant ships and even over modern submarines. With their great range and speed they can strike quickly against enemy forces found at sea. Aviation units and forces can be transferred to other operational areas quickly (for example, large groups of aircraft can be redeployed from one continent to another in less than a day, without any loss in combat capability)."[224]

Air refueling, widely practiced since the mid 1960s gave Long Range Aviation and many types of naval aircraft a practically unlimited range within the framework of naval tasks. During the large-scale Soviet naval maneuvers Sever-1968 and particularly Okean - April-May 1970, it was claimed that air refueling resulted in "substantial qualitative change converting long-range aviation into global range aviation which mastered all the world's oceans". During the Okean maneuvers alone, more than 500 Soviet long and medium-range aircraft were observed in the Atlantic and Pacific. In a period of 24 hours alone, 200 sorties were recorded.[225]

Close cooperation between ASW aviation and other ASW forces have been widely practiced. Of great interest is a Soviet claim

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[224] Lieutenant General S. A. Gulyayev, "The Role of Aviation in Combat Operations at Sea Under Contemporary Conditions", Morskoy Sbornik No. 6, 1965, pp. 36-43.

[225] Soldat und Technik No. 8, 1970, pp. 428-431.

that cooperation not only between ASW aviation and submarines, ut between long-range reconnaissance aviation and submarines, as been established in action against various kinds of enemy aval forces.[226]

It appears that all three combat branches of land-based oviet naval aviation have been developed into a well-organized, ooperative and effective arm of the Soviet Navy. The development Soviet shipborne aviation is an interesting subject. While is safe to claim that no *attack aircraft carriers* will be uilt, that Soviets have no great need for them, and hence, no ircraft for such ships are required, the need for other types shipborne aviation is another matter. There has been a owing number of tasks which might be assigned to either -wing aircraft or helicopters. The most attractive type of rcraft for shipborne aviation seems to be the VTOL (vertical e off and landing). Among possible tasks assigned to such e of shipborne aviation are participation in air defense of surface units, primarily in anti-cruise missile defense; get acquisition, classification and, if necessary, mid-course rection of cruise missiles; support of an amphibious landing; ticipation in anti-submarine defense of surface force. The

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[226] *Morskoy Sbornik* No. 10, 1966; and *Okean-Maneuvers of et Navy*, Military Publishing House, 1970.

possibility of such future use of shipborne aviation by the Soviet Navy should not be excluded.

The development of reliable VTOL aircraft and further sophistication of helicopters might serve that purpose. The experimental VTOL aircraft Freehand shown at Demodedovo in 1967 was the beginning, and the work has undoubtedly been continued since that time. During the celebration of Soviet Army-Navy Day, February 23, 1972, it was claimed that VTOL aircraft had been developed and there is no reason to doubt the Soviet technological capability to do so. Assuming, however, the availability of VTOL aircraft, their most probably employment at sea would be from a relatively small carrier, accommodating just a dozen or so VTOL alone or together with helicopters. It seems that the possibility of development of shipborne aviation by the Soviet Navy along this line should not be excluded, but again this is far from the attack-carrier concept for which Soviet skepticism, if viewed within the framework of a military conflict involving major naval power, seems to be largely justified. Some specialists in the West share the Soviet skepticism concerning the aircraft carrier, and see its declining role. The importance of shore-based maritime aircraft, particularly in reconnaissance and missile

striking roles, is viewed as growing.[227]

Secretary Laird in his annual defense report to Congress in February 1972 mentioned the possible use of the B-52 to help the U.S. Navy control the sea lanes, for minelaying, ocean surveillance, or for dropping listening devices to detect submarines.[228] Whether this is an attempt to utilize surplus heavy aircraft or the beginning of something similar to what the Soviet Navy has been doing for over 15 years remains to be seen.

Shore Defense Forces and Naval Infantry

The Russian Navy and later the Soviet Navy have traditionally had sizable and well-organized shore defense forces. The major element of this force was represented by gunnery units deployed along the extensive Soviet shore line with heavier concentrations around naval bases. Some areas, particularly the approaches to Leningrad, Vladivostok, and Sevastopol, had been protected by the system of forts with heavy caliber long-range guns since long before the Revolution. The Soviet Navy, while improving the hardware, changed little up to the late 1950s, when the gradual

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[227] An interesting book analyzing the problem and claiming the shift turn of naval aviation to the shore-based long-range maritime aircraft was written by Vice Admiral Sir Arthur Hezler, Aircraft and Sea Power", New York: Stein and Day, 1970, 370pp.

[228] Washington Post, February 24, 1972.

introduction of shore-based fixed and mobile surface-to-surface missiles started. At present, the Missile-Gunnery Troops, as they are called, are still in existence, although the majority of naval heavy guns were replaced by the missiles and the total umber of conventional medium and small caliber guns were reduced.

Another major element of the shore defense force had een the infantry. Historically, there have been 3 distinct ypes of units often simplistically grouped under the term aval infantry (Morskaya Pekhota):

(1) rifle units, incorporated in to the shore defense orce and used often together with units of the army in defense f naval bases and shore installations, on land fronts and nti-amphibious defense;

(2) units formed only during a war from the crews of sunk r damaged ships and naval shore installations (like training enters, armament test grounds, etc.) and called naval battalions, aval brigades, or just naval rifle units;

(3) Naval Infantry proper, the exact equivalent to the U S. Marines, specially organized and trained units whose rimarily missions are amphibious landings, defense of naval ases and other special assignments.

The Naval Infantry has a long history interrupted by ertain periods when it was either reduced in importance or even

deactivated in the Russian or Soviet navies. It was born in 1705 when, on the order of Peter the Great of 16 November, the first naval infantry regiment was formed.[229] At the time of Peter's death in 1725, there were 50,000 troops of naval infantry in the Baltic. During the reigns of Peter's successors the strength and importance of naval infantry fluctuated. However, it was extensively and quite often successfully used in numerous wars, particularly against Turkey in Mediterrnean.

Some students of Russian naval history have found that "Tsarist Russia conducted a respectable number of assaults nd landings from the sea against fortified positions. For mphibious operations the Tsarist government developed a suitable ehicle, a lead force and a functioning doctrine."[230]

After the Revolution, a considerable number of rifle nits were incorporated into shore defense forces. The first nit of naval infantry, however, the Independent Special Rifle rigade, was formed in the summer of 1939 on the basis of the ronstadt Rifle Regiment. In June 1940 the brigade was renamed s First Special Brigade of Naval Infantry, thus reactivating hese special troops in the Soviet Navy.[231]

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[229] Kh. Kamalov and others, Morskaya Pekhota (Naval Infantry), ilitary P. H., Moscow, 1957, p. 7.

[230] See for example, Dr. R. W. Daly, "Russian Combat Landings", arine Corp Gazette, June 1969, pp. 39-42.

[231] Kh. Kamalov, p. 58.

During World War II, the total number of personnel engaged in the land fronts was close to half a million, but only a small part of this was represented by actual naval infantry. The others were units organized from ship's personnel, coastal defense units, and other naval establishments. They were formed into naval infantry brigades, special regiments, battalions and detachments, subordinated to the respective army commanders in the area of operations. Most of these units were called naval rifle units as distinguished from naval infantry units, but the term commonly used in reference to them by army commanders and the press was "naval infantry". This fact was probably responsible for the widespread belief of the existence of a large Soviet naval infantry corps. All these naval units were extensively used in most critical battles of World War II, and took part in the defense of Moscow, Leningrad, and Stalingrad.

Towards the end of the war, all naval infantry units and most naval rifle units were given the guards designation. During the course of the war, the Soviet Navy conducted four amphibious operations and 110 tactical landings. The distribution of landings among Soviet fleets can be seen from the following table:

	North	Baltic	Black Sea	Pacific	Volga and Dnepr
Nmber of landings	13	36	38	21	6
Lnded troops (thousands)	16.5	89.5	200	21	3.5
Nmber of participating ombatant ships	196	340	1700	260	70
Nmber of participating ransports and landing raft	50	300	1000	50	-

Surce: Rear Admiral K. A. Stalbo, "Naval Art in Amphibious Landings of Great Patriotic War", Morskoy Sbornik No. 3, 1970, pp. 23-30.

lose to quarter of all Soviet amphibious landings were under e command of Admiral Gorshkov.[232] Soon after the World War II, e Soviet naval infantry was abolished.[233]

The period of Soviet Navy development since the mid 950s produced a new interest in the naval infantry. A number f published works refer to the uneven development of naval nfantry throughout history and its abolition during certain eriods in peace time, necessitating its reactivation during war. mphasizing the specialized nature of these troops, the need for

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[232] Rear Admiral K. A. Stalbo, "Naval Art in Amphibious Landings f Great Patriotic War", Morskoy Sbornik No. 3, 1970, pp. 23-30.

[233] Morskoy Slovar (Naval Dictionary), Military P.H., oscow, 1959, Vol. II, p. 6.

rolonged training and special landing equipment, these works ndirectly indicated that the army alone would not be able o conduct successful amphibious landing.[234] In the fall of 957, the final Baltic Fleet exercises were joined with a rge amphibious training exercise conducted by the units of Sviet Army. A number of top military men, including Admiral rshkov and Marshall Bagramyan, were present. Analyses of tose exercises have shown that army units could not sccessfully conduct such operations, and that particular dfficulties were observed in the advanced party and in the frst waves. It is probably from that time that the Soviet mlitary began to consider reactivation of the naval infantry. Bfore the decade of the 1950s was over, the first two classes o amphibious landings ships, the MP-2 and MP-4 were built. O course, the Soviet military was not alone in its skepticism aout the importance and even the possibility of amphibious lndings in the nuclear age. However, after the initial "nthusiasm" over nuclear weapons as a panacea to all military tsks disippated and the discovery was made that the Soviet Army culd not do everything alone with the help of missile-nuclear waponry, the attitude towards the naval infantry changed. It

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[234] See for example, KH. Kamalov, pp. 106-109.

as quietly reactivated somewhere in 1962 or 1963 and, starting ith 1964, after its existence was officially revealed, the lorification campaign was begun. Soviet naval specialized iterature produced a number of important articles theoretically ustifying the need for naval infantry and the importance of mphibious operations.[235]

During the decade of the 1960s a number of classes of mphibious ships were built and placed in service. The MP-6, olnochny, Vydra, and Alligator classes of amphibious ships ere produced in considerable number. The largest of them, the lligator class, has a full load displacement of close to ,000 tons and has been used in all major Soviet naval exercises f the late 1960s and 1970s, and is often seen in Mediterrnean nd other areas.[236]

In spite of the frequent claims by the Soviet leading dmirals that the naval infantry is armed with specially created

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[235] The existence of Soviet naval infantry for the first ime was reported in the July 24, 1964 issue of *Krasnaya Zuezda*. he Soviet Navy periodical, *Morskoy Sbornik*, has devoted increased ttention to the problem, printing in September 1963 "Modern mphibious Operations" by Captain Vyunenko; March 1964, "Special eatures of Contemporary Amphibious Operations" by Captain Svetlov nd Skimkevich; and the June 1964 "Role of Amphibious Operations in a Nuclear War", by Rear Admiral Tuz.

[236] For the characteristic of Soviet amphibious ships see *Jane's* 1969-1970 to 1971-1972 editions; and *Soldat und Technik* No. 12, 1971, pp. 696-699.

mment, with the exception of a slightly modified PT-76 pibious tank, nothing different from the standard army mment can be found in the material published by the Soviet es. Recently the supplying of the naval infantry with r-cushioned vehicles (ACV) started, and during the Navy Day ade in Moscow one such vehicle with naval infantry men aboard ticipated in the landings. A claim was also made that there e more in the Baltic Fleet.[237]

The naval infantry basic landing tactics, which is a ditional first wave assault, seems to be quite similar to e tactics used by Western navies, including the US Marine ps. The absence of carrier-borne aviation in the Soviet y is definitely a limiting factor, for the air assault port in most cases has to be provided and is being provided shore-based Soviet Air Force aircraft. However, the Soviets e convinced that aviation alone supporting landings cannot ent missile strikes by the beach defenders, and thus "it is, efore, expedient to include submarines, aviation, surface ps, and even land missile units, in the attempt to destroy and ralize missile installations, air defense means, and airfields,

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[237] Sotsialisticheskaya Industriya (Socialist Industry), July, 1970. It is still impossible to say either ACVs are ng used on an experimental basis or have become a standard pment.

i the beach defense zone."[238]

The wide use of missile firing submarines and surface sips in preparing a beachhead for an amphibious landing, as dscussed previously, has been viewed as essential. Usually, te amphibious landing by Soviet naval infantry is accompanied b parachute and helicopter landings of Soviet airborne or amy units in the rear of the landing areas to capture key psitions on the avenues of approach of enemy reserves, and to evelop the defenders.

All present naval infantry units are guard's units ad most likely maintain their traditional brigade organizations. brigade consists of 3 to 4 battalions, one of which is tank httalion. The basic assault unit is the battalion reinforced ith tanks (most likely a tank company). There probably are 7 to brigades distributed among four Soviet fleets: 2 or 3 in he Baltic, about 2 in the Black Sea, one or 2 in the Pacific, nd one or 2 in the North. The total strength of the naval nfantry is 13-15,000 men.

The Soviet naval infantry is an elite, highly specialized orce with high espirit. The mottoes, "Remember, the fundamental aw of him who makes the assault is advance, advance, advance. here is your victory.", is printed in the walls of naval infantry

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[238] *Morskoy Sbornik* No. 8, 1966, pp. 92-94.

arracks and recreation rooms. There is even a Ballad of the lack Beret, an official song, of the naval infantry.[239] Major eneral P. Mel'nikov, in charge of the combat training of the aval infantry, emphasized that future naval infantry officers re selected from among "best graduates from the army military chools (academies)".[240] Another general from the main naval eadquarters, after being asked "What kind of troops are our aval infantry men?", andwered, "They are a special kind of roops. Emphasize this! Our marines can do everything. They an blow up bridges and remove mines from harbors. If necessary, ust two of them can disrupt an entire platoon in the rear of he enemy. They can also jump from parachutes. They can climb ountains like mountaineers. And they make excellent snipers."[241]

Obviously offensive-oriented, the Soviet naval infantry s certainly capable of conducting small-scale landing operations y themselves and assuring small to medium landings of army units y seizing the beachhead and holding it until the army units ave landed. There is strong emphasis on the high degree of

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[239] See Lt. Col. F. C. Turner, USMC, "The Resurgent oviet Marines", *Marine Corp Gazette*, June 1969, pp. 29-32.

[240] *Nedelya*, No. 46, 1968.

[241] *Komsomol'skaya Pravda*, 18 September 1966.

obility of naval infantry and the necessity for the wide ntroduction of new means of transportation. Air-cushion ehicles and skimmers have been mentioned in particular.[242] n addition to its employment in a classical amphibious role, he Soviet Navy capability to use naval infantry as a reaction rce or in the role of interposition should not be excluded. e rapid growth of this relatively small force in the immediate ture is unlikely because it has to be in conjunction with a rresponding development of the Navy's surface forces, and rticularly its landing ships. A gradual increase in the rength of the Soviet naval infantry up to a level of -30,000 men during the decade of 1970s is quite possible.[243]

Science and Armament

The close dependence of armament, especially its quality d modernity, upon the science, technology, and general level f industrial development is well known. However, traditionally, n Russia and the Soviet Union, at least up to the recent past n maybe even up to the present, there has been a gap between h achievements of science in the field of basic and applied

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[242] Morskoy Sbornik No. 3, 1971, p. 29.

[243] For a detailed analyses of the subject see Charles G. rtchard "The Soviet Marines", US Naval Institute Proceedings, ach 1972, pp. 19-30.

research, inventions or discoveries, and the ability of the existing technology, industrial base, to implement them. It is not to say that the Soviet Union has been unique in this aspect, but that gap has been wider, compared with e.g., the United States, because of the lower Soviet technological level. The number of Soviet scientists employed in defense work and correspondingly their role in the development of Soviet armament have been substantial, and probably proportionally have exceeded those in most other countries. Defense research and development and allocation of industrial capacities for the production of armament have always been items of first priority in the minds of the Soviet leadership, and that attitude goes back to the first years of Soviet power. The Soviet Navy has been receiving its share of both.

In 1923 and later, the naval research and development efforts were directed by the Scientific Technical Committee of the Navy (NTKM) created by a special decree of the Revolutionary Military Council. In 1932 the departments and sections of the NTKM were organized into independent Scientific Research Institutes of the Navy (gunnery, mine-torpedo, navigation, communications, etc.). The Soviet Academy of Sciences and its numerous institutes have been working in close cooperation with the naval scientific research organizations. For example, welding

methods for ships and particularly submarine construction were developed at the beginning 1930s in the welding institute now named after the then head Professor Patton. A crucial role was played in the development of defense measures against magnetic mines, including degaussing methods by the institute headed by academicians V. S. Kulebakin and A. P. Aleksandrov in the late 1920s and the decade of the 1930s. Later I.V. Kurchatov, a future leading Soviet nuclear scientist, actively articipated in this work and headed a special group working ith the Black Sea Fleet.

Since 1925 the development of scientific-technological atters associated with radio electronics, including tele- echanics (remote control) and later cybernetics, was led by ademician, later Engineer-Admiral, and Assistant Minister of fense A. I. Berg. It was Berg who as far back as 1928 veloped a theoretical analysis of the problem associated with dio communications with submerged submarines, emphasizing necessity of developing longer-wave transmitters to increase range and depth of underwater reception. Since the late 0s the scientific group headed by Professor A. F. Shorin rted to develop remote-controlled aircraft-torpedo boat tem. After successful research during 1930-1935, the first ups of remote-controlled torpedo boats and aircraft (one

aircraft per pair of boats) were delivered to the Baltic and the Pacific Fleets.

The mathematical apparatus has been widely employed by the Soviet scientists, and, in a number of cases, they were literally ahead of their time in its application. For example, the works of L. V. Kantorovich "Mathematical Methods of Organizing and Planning Production" (1939) and "Further Development of Mathematical Methods and Prospects of Their Application in Planning and Economics" (1943) actually already contained the basic ideas of the mathematical theory now widely known as linear programming. Methods for the approximate solution of non-linear problems were developed in the works of Academicians N. M. Krylov and N. N. Bogolyubov. A leading contribution to the development of the theory of random processes was made by Academician A. N. Kolmogorov.

The application of the mathematical apparatus to the naval art has been considerable. The work of Professor Vice Admiral L. G. Goncharov, "The Beginning of the Theory of Probability in an Application to Questions of Naval Tactics" published in 1921, expounded on certain methods of operational research.

When World War II broke out, special defense committees headed by leading scientists were organized in the Soviet Academy of Sciences. The Naval Scientific Technical Committee, headed by

cademician A. F. Ioffe, made substantial contributions to the olution of various problems, and the organization served as an mportant coordinating body between the Navy and the scientific ommunity.

The theoretical works of Nobel Prize winners N. G. Basov nd A. M. Prokhorov were important to the development of lasers. oth scientists were named as participants in the solution of arious radioelectronics and communications problems.[244]

The story of Soviet naval armament starts in 1921, when he Special Technical Bureau (Ostekhbyuro) charged with the evelopment ofnaval weapons was established. Following the ussian tradition and the dictates of a purely defensive naval olicy, considerable attention was devoted to the development of ines and torpedos. Special decisions of the Soviet Government ssued in 1937, 1938, and 1940 called for the accelerated

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[244] For more on the subject of Soviet scientists and the avy, see (1) Vice Admiral G. G. Tolstolutskiy, "50 Years of ommunications in the Navy", Morskoy Sbornik No. 5, 1967, pp. 5-22, and "Communications in the Okean Maneuvers", No. 11, 1970, p. 22-25; (2) Rear Admiral B. V. Nikitin, From the History of elemechanics Development in the Navy", Morskoy Sbornik No. 4, 969, pp. 80-83; (3) V. Volodkovskiy, "Scientific Technical rogress and the Navy", Morskoy Sbornik No. 3, 1971, pp. 68-73; 4) Yu. Skorokhod, "The Soviet Navy and Cybernetics", Morskoy bornik No. 7, 1965, pp. 62-68; (5) Rear Admiral N. Boravenkov, Scientific Organizations for the Development of Naval Armament", orskoy Sbornik No. 5, 1969, pp. 69-73; (6) Professor Engineer - ice-Admiral M. A. Krupskiy, "The Development of Communication n the Navy", Morskoy Sbornik No. 5, 1971, pp. 81-85.

development of mine and torpedo armament and considerably increased the production base. Prolonged research and development initiated in the 1920s resulted in the successful development of the first Soviet influence mine, which entered service in 1939. When the war started, the Navy had in service the following 5 types of mine: M-26, KB-1, Mirab, R-1, M 08/39. During the war the following 6 types were added: AGSB, PLT-G, AMD-500, AMD-1000, KPAB, EP-G.[245]

In the post War period, the Soviet Navy continued to make its mine armament more sophisticated. Particular attention was devoted to the development of influence mines, both bottom and moored, and, according to principle on which the mines operated, whether magnetic, acoustic, or pressure. Various combinations such as magnetic-acoustic mines, as well as multi-channel mines were also developed. From the predominantly defensive employment of mines, a gradual shift toward utilization of the offensive characteristics of the weapon has been observed, and submarines and aircraft started to be considered as the main mine carriers. The development of a deep-water mining capability has been a long time preoccupation of the Soviet Navy.

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[245] A. B. Geyro, "Naval Mines", Morskoy Sbornik No. 5, 1971, pp. 86-91; and Vice Admiral B. D. Kostygov, "Mine-Torpedo Weapons during the Years of Soviet Power", Morskoy Sbornik No. 9, 1967, pp. 34-38.

The importance of mine weaponry was clearly demonstrated during the Korean War, when the North Koreans, using mainly obsolete Soviet mines as well as Soviet technical and tactical supervision, laid a few minefields off Wonsan. Those fields not only delayed the American landing for eight days and caused the loss of a few minesweepers, but were responsible for a message received in the Pentagon stating, "The US Navy has lost command of the sea in Korean waters".[246]

A continuously exercised fleet and an all-Navy competition for minelaying in the combat training of the Soviet Navy are evidence of the importance attached to the mine warfare. Advances in science and engineering have already resulted in new models of mines which can be planted very deep and are made of non-magnetic materials, of self-propelled mines, and rapid propelled surfacing mines. Mines with fuzing mechanisms utilizing ultrasonic, optical, thermal, and other physical fields have definitely attracted the attention of the Soviet Navy, and their appearance can be expected.

Prior to the war, a variety of 45 cm and 53 cm torpedos for surface ships, submarines, and aircraft were developed. All

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[246] O. V. Shulman and B. A. Stlimanyuk, "The Mine as a Weapon under Contemporary Conditions", Morskoy Sbornik No. 12, 1967, pp. 39-43; and Cagle and Manson, The Sea War in Korea, 1957, p. 142 ;Soldat und Technik No. 4, 1972, pp. 191-195.

were gas-steam torpedos and particularly commonly used were 53-38 and 53-39 models. The wakeless electric torpedo, ET-80, successfully used by the Northern Fleet, was introduced in 1942. A number of aviation torpedos for both parachute and free fall were also developed.

Work on the torpedo self-guidance (homing) system interrupted by the war was resumed in 1944. The sinking in July 1944 of the erman submarine U-250 by a Soviet submarine chaser provided the oviet Navy with a rare opportunity to learn about three new erman torpedos, the T-V, G7A, and G7E. Particularly important ere the homing systems of torpedos and two previously unknown aneuvering devices, FAT and LUT.[247] After the German capitalation, ractically all her existing arsenal and research work on torpedos ecame known to the Soviet Navy and made a sizeable contribution o the further sophistication of Soviet torpedos. Better electric orpedos, new jet RT torpedos and improved guidance systems were eveloped soon after the War.

The improved anti-submarine defense and the arming of orpedoes with nuclear warheads forced the Soviet Navy to ccelerate work on long-range torpedos. In the second half of e 1950s and the beginning of the 1960s, a few types of long-

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[247] "The End of the U-250", Morskoy Sbornik No. 5, 971, pp. 67-74

range homing torpedos were developed. During approximately the same period, the Soviet Navy concentrated on the development of better ASW torpedos, in which it definitely lagged behind the Western navies. It now appears as though a number of ASW torpedos for submarines, surface ships, and aircraft were developed and are presently in the armament of the Soviet Navy.

In the missile field the Soviet Navy approach turned out o be different from that of the rest of the navies. A comparison etween the Soviet Navy and the US Navy in their approach to the evelopment of three different missiles - ballistic, surface-to-urface (cruise), and surface-to-air (SAM) - is very revealing.

The development of a naval ballistic missile system, or ather the adaption of available land ballistic system to be aunched from submarines started quite early in the Soviet Union, ad in September of 1955 a ballistic missile was launched from surfaced submarine. Either for lack of an innovative approach for reasons of technological difficulties, the first Soviet bmarine-launched ballistic missile system with which both nventional and nuclear submarines were armed in the late 1950s, had o shortcomings: it was of short range and had to be launched om the surface. The American goal from the beginning was fferent, and the Polaris system developed over a short period time has been of much greater range and with a submerged launch

capability. Through three successful modifications (A-2, A-3, Poseidon) the initial range of the Polaris system was more than doubled, and was finally made suitable for MIRV (Multiple Independent Reentry Vehicle). Moreover, all Polaris missile submarines carried 16 missiles, while the Soviet submarines carried only three, until the Yankee class made its appearance. Starting in the early sixties, the original Soviet ballistic missile SS-N-4 Sark was replaced with the SS-N-5 Serb. The Serb system has double the range of the Sark and can be launched from the submerged position. During the second half of the 1960s, a new submarine-launched ballistic missile, the SS-N-6, with a submerged launch capability and more than double the range of the Serb, was developed for the Yankee-class submarines. It was also reported that another new ballistic missile, the SS-NX-8, with a range of close to 3,500 miles, has been under development and may be presently already operational.[248]

The shorter range of Soviet submarine-launched ballistic missiles compared with those of the US has not necessarily been as much of a drawback as might appear at first glance. The great concentration of important targets along both US coasts, the

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[248] Characteristics of Missiles can be found in Jane's All World Aircraft, 1970-1971 ed., pp. 565-571; and Weapon Systems, 1970-1971. See also International Defense Review v.5 No. 1, February 1972, p. 20 and Washington Post, March 22, 1972, "US Analysts Puzzled by Soviet Sub Missile".

Atlantic and the Pacific, and the great difficulties encountered in anti-submarine warfare have presented the Soviet's ballistic missile submarines with the opportunity to inflict no less damage than the more numerous US submarines armed with greater number of missiles (prior to MIRV introduction to Poseidon) would on the Soviet Union.

The surface-to-surface cruise missiles are a different story. The start of the program in both navies was either close in time or perhaps the US Navy was even ahead. The first Regulus missile was launched from a submarine in 1953 and in mid-1954 the system became operational. Two submarines, ten aircraft carriers, and four cruisers were capable of firing the Regulus I by 1957. Towards mid-1958 a bigger and faster missile, Regulus II, was developed, but after a single operational test, the whole program was terminated in late 1958. It should be emphasized that the Regulus system was intended to be fired against land targets, i.e. for strategic delivery, and the successful development of the Polaris system, initially tested in spring of 1959, quite logically replaced the Regulus.

The Soviet development of surface-to-surface missiles has been taking a different approach. From the beginning, it was oriented toward the development of a primarily anti-ship, and originally anti-aircraft carrier, surface-to-surface cruise

isile. Obviously a system designed to operate from a moving ltform against another moving platform can, if the necessity rses, be used against land targets within its range. Three yes of firing platforms have been adopted for a variety of oiet cruise missiles, the submarine, surface ships, and icraft.

The first to be equipped with air-to-surface cruise missiles e aircraft of Soviet naval aviation (early 1950s Kennel). In 5-1957 two cruise-missile systems were developed, Strela for surface ships and the long-range Shaddock for submarines. ela used to be a universal system employed by aircraft, ace ships, and shore missile units. Shaddock, originally oyed by the submarines, found its first application on surface s in the Kynda-class cruiser. Also during the second half he 1950s, Shchuka, an extremely low-altitude guided missile ched from aircraft against surface targets, was developed. he late 1950s the Styx, a missile system for the Komar and nissile boats, was developed.

Such widespread application of cruise missiles by the et Navy introduced a qualitatively significant change into l warfare. From the point of view of naval combat (ships nst ships, particularly) the missiles erased the advantages large-displacement conventionally-armed, armored ships,

making them to a large degree obsolete (with the exception of for shore bombardment tasks under certain condition). The possibility of delivering a multi-missile salvo, particularly one fired from various directions with the missile approaching at different altitudes and homed in by various guidance systems employing various frequencies, made the defense of major ship formations an extremely difficult task, even when a considerable number of aircraft and ECM devices are employed. Multi-missile launch systems of Soviet surface ships and submarines and the group attack pattern of missile carrying aircraft bear testimony to a possible saturation technique by the Soviet Navy.

The original Soviet concentration on a long-range missiles dictated by the requirement to counter aircraft carriers certainly imposed some limitations, as it demanded target cquisition by the support forces and occasional mid-course orrection, and reduced the space available for the defensive rmament. Moreover, the long ranges of the early Soviet cruise issiles imposed a certain limitation on their speed, for most f them have been subsonic. Gradually the above shortcomings ere overcome, and shorter, horizon-range missiles with supersonic peed were developed. In the case of the C-class submarines, submerged launch system has been added. The altitude skimming rajectories of most Soviet cruise missiles added to the armament

during the decade of 1960s have further improved the missile penetration capability and further complicated the already difficult problem of defending against them. Early warning for launched and approaching surface-skimming missiles can, in most cases, come only from the air, and hence the role of shipborne aviation in the anti-cruise missile defense. If a missile carrier has not been detected and destroyed - not an easy task in case of a submarine and even a small surface missile carrier and low flying aircraft - the only defensive means available are those against the missiles themselves, i.e. disruption, principally by jamming; deception, by jamming and decoys; destruction, by anti-missiles and highly automated rapid-fire coventional guns.

The SAM systems presently available to Western as well as Soviet navies are poorly suited for the anti-cruise missile defense.[249] Smaller faster SAMs, a sort of "mini SAM", are needed.

The Soviet Navy, after a decade of employing PVO SAMs (mainly GOA), appeared to be turning toward more compact SAM system which, in addition to an anti-cruise missile capability, can be installed aboard smaller ships, and/or makes it possible

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[249] For elaborate discussion of the problem, see Desmond Scrivener, "Defense Against Anti-Ship Missiles", International Defense Review No. 6, 1971, pp. 539-543; and US Naval Institute Proceedings, March 1971, pp. 45-58.

to carry more missiles aboard.[250] The Soviet Navy's preoccupation with anti-missile defense has been evident since the summer of 1971, when a number of such exercises was reported.[251]

The development of Soviet naval guns indicates a trend toward highly automated lighter-caliber systems. Not a single surface ship built during the decade of the 1960s has been equipped with guns larger than 76 millimeters. Most of them have 57 millimeter rapid-fire guns, and recently, starting with Kresta, even larger ships have been equipped with 30-millimeter guns in twin automatic mounts, a trend indicating an increased awareness of the threat from the air.[252] Unquestionably the small-caliber guns are installed more for defense against the cruise missile in the terminal stage than for the anti-aircraft defense. Even recognizing that the angular error increases rapidly at the ranges where the kill probability builds up sharply, the guns can still deliver something against missiles in their final stage of approach which is better than no defense at all.

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[250] The demand for such systems was expressed in the mid 1960s. See for example, Vice Admiral V. Syehev, "Missiles - The Armament of Ship", _Krasnaya Zvezda_, April 20, 1966; and _Morskoy Sbornik_ No. 3, 1966, pp. 32-38.

[251] _Krasnaya Zvezda_, 15 June 1971.

[252] _Krasnaya Zvezda_, 9 October 1971.

The wide introduction of cruise missiles by the Soviet avy undoubtedly aggravated even more the already complex problems f anti-submarine and anti-aircraft defenses with their often onflicting requirements. Submarines again gained most from the ruise missile armament, for they received the capability to ttack surface ships and formations from a 360° circle, while in he case of torpedo attacks, their firing positions had been much ore restrictive.

It may be surprising, but almost a decade and the sinking f the Israeli destroyer Elath was needed before the potentials f cruise missiles were recognized by the West. Not until 967 did the defense ministries of Germany and France started crash program to develop a medium-range ship and air-launched nti-ship missile. The French company has developed the Exocet "Flying Fish") missile while the German company has concentrated n the air-launched version of the same weapon, named Cormoran. number of short-range cruise missiles were developed in the ate 1960s by other countries (Norway, Israel).

It can be concluded that out of three types of missiles - allistic, surface-to-air, and cruise missiles - only in the latter as the Soviet Navy had almost a monopoly for an over a decade. f course, ballistic missiles are a part of a strategic delivery ystem, and no navy is going to use them except during a nuclear

war, in which case the value of combat at sea could hardly be called important. Of course, any navy having ballistic armed submarines is responsible for their successful deployment. However, the execution of the task or its failure would depend upon the more conventionally understood naval power, where the employment of cruise and surface-to-air missiles, as well as torpedos, mines, and guns, are crucial. Concentrating on the development of various cruise missiles deliverable by submarines, surface ships, and aircraft, the Soviet Union built a qualitatively ew navy, powerful enough to leave its traditional, mainly oastal, zones of operations and to enter the areas of the world cean where it had not been seen until the recent past. This ecame possible thanks to the coordinated efforts of Soviet cientists, industry, and the Navy. The recent testimony of efense research head Dr. John S. Foster before the House Appropriations Committee indicated that the Soviet Union presently hs a research effort larger than that of the United States, is spending more and in the future may gain technological superiority ver the U.S. military.[253] How accurate the estimates have been s an open question, but the innovative nature of the Soviet aval armament and its employment are beyond any doubt.

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[253] *Washington Post*, 28 August 1971.

Party Control and Personnel Policy

Party control of the Soviet armed forces was established during the first days of their existence. In the summer of 1918, political departments started to be organized in the army units. The Eighth Party Congress in March 1919 ordered the creation of a Political Department headed by a Central Committee member as a part of the Revolutionary Council. In May 1919 the department became the Political Administration (PUR), and the unified system of the political organs of the armed forces was established.

The naval department of the PUR was organized in March 1922 by a decision of the Party Central Committee. In 1938 the Military Council of the Navy and the Political Administration of the Navy were organized.[254]

Throughout their history the political organs have undergone the traditional Soviet shake-ups and reorganizations, but have invariably maintained their importance and general structure. The Main Political Administration of the Soviet Army and the Navy, having rights of the Party Central Committee Department, is in charge of all political activity in the armed forces. The Political Administration of the Navy, subordinated to the Main

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[254] *Communist of Military Forces* No. 7, 1969, pp. 9-22; and *Morskoy Sbornik* No. 3, 1971, p. 11.

Political Administration, is charged with political work in the Navy. In addition, there is the Military Council of the Navy. The Chief of Political Administration of the Navy is a member of the council. Hence, the official title of Admiral Grishanov is Member of Military Council of the Navy, Chief of Political Administration.

Each fleet in its turn has a Fleet Military Council and Fleet Political Directorate, and the chief of the latter is also a member of the former. In addition, the local republic, region, or district First Party Secretary also serves as a member of the Fleet Military Council. At the top, one of the leading members of the Party Central Committee, and often a member of Politboro is a member of the Navy Military Council (historically, such important figures as Zhdanov were either members of the Military Council of the Navy or, like Brezhnev in 1955, chiefs of its Political Administration). Sub-divisions and units of fleets such as flotillas, fleet aviation, and naval bases have political departments. Commanders of ships starting at destroyer escort and larger have a deputy commander for political affairs (Zampolit). In the case of smaller ships, such as minesweepers, missile and torpedo boats, the Zampolit is assigned to each division or aircraft squadron. Commanding officers of large departments of major ships, such as missile-gunnery and engineering departments

of cruisers, also have deputies for political affairs.

The Political Administration of the Navy, Political Directorates of theFleets, and Political Departments are in effect staffs with their own units and sub-units and are manned by a considerable number of professional political officers, or political workers in official Soviet terminology. The political organs of the Navy are in charge of the activity of the Party and Komsomol (Young Communist League) organizations from the top to the bottom. The organizations are created if there are three or more Party or Komsomol members. Because about 90% of the naval personnel are either members or candidate-members of the Communist Party or members of Komsomol, such organizations exist practically in all navy units down to the smallest. The crews of the nuclear submarines which made the submerged round-the-world voyage in 1966 consisted completely of members of the Communist Party or of Komsomol.[255]

In a like manner, Navy leaders, admirals and officers, are elected to the bureaus of local civilian Party organizations, republican Party central committees and even the Central Committee of CPSU. Thus, a sort of interweaving of military and party leaders is taking place where, of course, the Party leadership is preserved.

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[255] _Sovetskiy Voin_ No. 13, 1966.

The Party leadership considers the moral-political and spiritual potential as being the most important element of the state military power, and its significance has grown immeasurably under contemporary conditions. The Marxist-Leninist ideology is being viewed as the foundation of thispotential, and the Party leadership directly and through political organs of the Army and the Navy is trying to increase the political awareness and a communist world outlook of the servicemen. The indoctrination of the armed forces personnel in a spirit of patriotism and preparedness for the defense of the fatherland under the condition of modern warfare is among the major goals of political ork in the Soviet armed forces. The Party obviously considers ell presented Party and political work as one of the most mportant ways to influence the development of the Army and Navy. he daily activities of the military councils, political organs, ommanders, and party organizations are concrete examples of the arty control of the armed forces, but the bulk of the political ork is performed by the political workers, those numerous chiefs f the political departments, instructors, propagandists, and articularly the Zampolits, and Party and Komsomol secretaries. hey have been labeled "true engineers of the sailors' souls".[256]

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[256] Admiral M. N. Sakharov, The Autority of the Ship's Political orker, *Morskoy Sbornik* No. 1, January 1970, pp. 41-46; and Army eneral A. A. Yepishev, The Indispensable Foundation of the Soviet ilitary Structure, *Krasnaya Zvezda*, November 30, 1967.

Of all these "engineers" the Zampolit is, of course, the most important figure. Strictly speaking, even Army General Yepishev is the Zampolit of Minister of Defense Marshall Grechko and Admiral Grishanov is the Zampolit of Navy Commander-in Chief Fleet Admiral Gorshkov.

These so called Institute of Zampolits has a complex history in the development of the Soviet armed forces and even more so in the development of the Navy. Before the Institute of Zampolit was finally established, there were three periods during which the Institute of Political Commissars existed. When the Soviet armed forces were organized, and the need for political control arose, trusted Party members were assigned as political commissars to each unit. They were responsible not only for political work, but were required to countersign each order given by the commanders. If a commissar considered an order counter-revolutionary, he had the right to negate it. Thus, in effect, a duel command system existed. The first introduction of system of one-man command (Edinonachaliye) occurred during the second half of the 1920s. In the Navy, the introduction of the system was delayed for the reasons discussed previously by at least two or three years. Under the Edinonachaliye system, the Zampolit (Deputy Commander for Political Affairs) was introduced, and replaced the commissar. But if the commissar had equal rights with the

commander, the Zampolit was his subordinate, and the commander was fully responsible for the units condition, including its socalled moral-political and spiritual potential, not to mention combat readiness. The Institute of Political Commissars, however, was introduced twice again, first during Stalin's purges in 1938, to be replaced again by the Institute of Zampolit in 1940 right after Finnish - Soviet War; and in 1941, right after the German attack on the Soviet Union, to be replaced, this time definitely in 1942, when it proved to be unworkable.

While officially proclaimed, the Edinonachaliye was not immediately exercised in all services and units. In the Navy, particularly in submarines, the commissars survived longer than in any other service or branch. However, the post-war period witnessed a genuine strengthing of the system of Edinonachaliye without weakening neither party control nor the intensity of party-political work. Marshall Zhukov, while Minister of Defense, went a step further in the implementation of the Edinonachaliye system. The number of political workers in the units was reduced, criticism of military commanders during the Party meetings, prohibited, and the political workers were made responsible not only for the state of affairs in the area of their immediate responsibility, i.e. party-political work, but for the state of discipline and even combat readiness of the units. When removed

from his post in October 1957, Marshall Zhukov was particularly severely criticized for the above steps and accused of attempting to undermine Party political work in the armed forces.

Until recently, and to some degree even today, the gap between line naval officers and political officers in general education, professional knowledge and popularity among enlisted personnel was considerable and in favor of the line officers. Even in the ability to explain purely political and ideological matters, the line officers often have been more capable and effective than the political officers, who frequently had to limit themselves to dogmatic repetition of slogans and citations. Moreover, contemporary Soviet professional naval officers, who represent a privileged group in Soviet society and are a sort of elite compared with other services, having been brought up under the Communist form of government and being themselves members of the Communist Party or of Komsomol (junior officers), have accepted the regime and are unquestionably devoted to the fatherland. Party and Komsomol membership are necessary prerequisites for advancement in the ranks and for promotions. In the Soviet Navy, command of a unit cannot be given to an officer who is not a Party member. Moreover, all naval officers know that fitness report includes considerations of his participation in party-political work, ideological maturity in

arxism-Leninism and the political-moral state of the unit he ommands. Thus, the commanders themselves, under the system of dinonachaliye, at least in part, represent those channels through hich Party control is being exercised.

Although recognizing the loyalty of the officers, the Party till finds it necessary to maintain the separate channel of ommunication represented by the political organs, via which any eviation from the "True line" can be reported up to the Central ommittee. The importance of political organs of the Navy is een by the Party leaders also in the necessity to improve the ffectiveness and increase the intensity of party-political work nder conditions of the socalled intensified ideological struggle etween two opposing systems. The expanded scope of navy operations, hereby its personnel are more exposed to possible subversive nfluences of alien ideology and non-Soviet ways of life, create dditional demands upon political work which are openly recognized y the Soviets. As was recently emphasized by member of the ilitary Council and Chief of the Political Administration of the avy Admiral Grishanov, the situation "makes it incumbent upon ll Communists to be tireless carriers of our Party's line. Not inging phrases but business-like work is needed so that every arty organization and every Party member fulfills to the fullest egree the duties outlined in the CPSU Rules, in the Instructions

the CPSU Organizations in the Soviet Army and Navy, and in the cree of the CPSU Central Committee of 21 January 1967 "On proving the Party-political work in the Soviet Army and Navy."[257]

The 1967 decision was an important one for the political rans. First, the position of company and equivalent Zampolits, lminated under Zhukov, was restored thus increasing considerably number of political officers in the units. Second, the stature fall schools training political officers has been elevated higher schools with a four-year period of training. The viously unsuccessful efforts to elevate the prestige of the itical officers, to improve the quality of their work were ensified. Army General Yepishev wrote, "In accordance with Central Committee demands steps were taken recently to further rove Party work in all sectors of the armed forces, to raise activeness and militancy of party organizations and to rease their influence in all aspects of troop life and ining."[258]

The necessity for the political officers in the Navy to naval matters was emphasized by Admiral Zakharov in the lowing way: "It is unthinkable today that a political worker have authority without deep knowledge of the equipment and

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[257] Morskoy Sbornik, No. 9, 1971, p. 7.

[258] Krasnaya Zvezda, November 30, 1967.

aponry with which our submarines, modern surface ships and eet air units are outfitted. This is well understood by deputy mmanders for political affairs. Many of them are qualified to mmand a ship. They stand underway watches and fly in the pacity of pilots and navigators in combat aircraft. Constant litary training permits them to work better with the men, and influence them more effectively."

The Admiral, however, warned political officers against o much involvement with professional naval work: "While sistently raising the level of their military-technical owledge, political officers must not under any circumstances rget about their basic duty. They need first-rate military ining in order to better educate the men more concretely, be able to speak out together with party bureaus, committees, the bureaus of the Komsomol as military organizers of Party itical work. It is necessary to speak about this because, ortunately, certain deputy commanders for political affairs nsider the standing of underway watches or good qualifications of paramount importance and forget about their primary sponsibilities. Usually party political work suffers in such ses, sometimes even becoming a mere formality."[259]

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[259] _Morskoy Sbornik_ No. 1, 1970, pp. 44-45.

On the other hand, the political training of Soviet line fcers is never completed, and the political officers must sre that standards are met. Groups of Marxists-Leninist uation are organized, and lectures and seminars, conducted. tndance is obligatory, although the officer may decide for melf which group he prefers. Each officer must attend 50 us of service time each year for Marxist-Leninist studies alone. se studies are supplemented by theoretical conferences, otes, and lectures conducted after regular duty hours. isted personnel must attend three hours of political instruction d week in addition to two or three socalled "political rmations" of 20 minutes duration each.

Thus, the Party's desire for a sort of conversion in the a of ideology, knowledge, and professionalism between the tical and line officers while they maintain their main efforts he areas of primary responsiblity is being gradually exercised. e political officers and line officers may disagree over the nt of political control, as was evident in the past, there is vidence that the latter are seeking disengagement from it, nder the Soviet regime, they could not even if they wished. riction between the two revolves around the large amount ime party-political work consumes, often to the detriment ombat training. Many line officers see the positive results

f indoctrination produced by party-political work upon ship ompanies; good morale and stronger discipline can and do result rom skillful indoctrination, and the occasional disputes over mplementation of party-political work methods and time allocated o it do not testify either against the loyalty of the Soviet avy or the firmness of the Party control. Along the line of ommand, the top military leadership have constantly stressed he necessity for effective political indoctrination. Marshall rechko stated recently that "one of the most important onditions for successfully solving the tasks confronting the rmed forces is to raisethe ideological maturity and Marxist-eninist conviction of all our servicemen."[260] It may be oncluded that in general Party control is accepted, and many ine officers even might find it beneficial for their career and, eing themselves Communists, skillfully use it in command.

While Party control and ideological indoctrination of ervicemen by a system of political organs, may keep the Navy n a desirable political track, they will not, however, maintain he Navy as a combat entity, for regardless of Communist claims of ts universality, Marxism-Leninism will not control propulsion ystems, navigate the ships, or keep the armament ready for the

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[260] Marshall Grechko "On Guard for Peace and the Building of ommunism", Military Publishing House, 1971, p. 109.

mbat use. To that end are needed professionally trained and perienced personnel, and first of all the officers corps, the dre, appropriately educated and trained, a fact recognized the early years of Soviet power. The Revolution destroyed ny things in Russia, but not the naval officer educational stem, which, after the years of revolutionary and civil war rmoil, resumed its functions with the majority of teaching rsonnel, buildings, and laboratories inherited from the perial Navy.

The contingent of cadets had obviously changed. While e former Naval Cadet Corps, presently the Frunze Higher Naval hool (the equivalent of the United States Naval Academy at napolis), accepted only sons of nobility, the Soviet version itially accepted only workers and peasants. The education Soviet naval officers started in September 1918 with accelerated urses for the fleet command personnel. In July 1919 the urses were converted into the Fleet Command School with a ree-year course of training. In 1922, the Fleet Command School s renamed the Naval School (present Frunze Higher Naval School), d the Naval Engineering School (present Dzerzhinskiy Higher val Engineering School) was opened. The leaders and professors both naval schools were former Imperial naval officers and ch a counterrevolutionary term of address as "Gentlemen" instead

of "Tovarishch" (Comrade) was common to the great confusion of the cadets.[261] In 1939 by decree of the Council of People's Commissars of the USSR both naval schools were elevated to institutions of higher learning.

The accelerated expansion of the Soviet Navy prior to World War II and the growing demand for officers produced a corresponding expansion of naval schools. The Pacific Higher Naval School, the Baku Higher Naval School, the Naval Communications Schools, and the Gunnery School were established. The curriculum in all naval schools was extended to four years.[262]

After graduation from higher naval schools, officers received one year of additional training in higher special officer classes, to which they were sent after having completed from two to three years in their first assignments. Graduates of the classes were assigned as heads of departments. Thus, training of shipboard officers took five years (four years in school and one year in the classes), but there was a break of from two to three years in that training.

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[261] Kuznetsov, Nakanune, pp. 10-12.

[262] For the details of Naval Training Development, see Admiral N. I. Vinogradov, Training Officers Cadres for the Navy, Morskoy Sbornik No. 8, 1967, pp. 25-31; Vice Admiral V. A. Krenov, Forge of Naval Officer Cadres, Morskoy Sbornik No. 1, 1971, pp. 17-24; and KPSS i stroitel'stvo Sovetskikh Vooruzhennykh Sil (The CPSU and Development of the Soviet Armed Forces), Second Revised Edition, Moscow, Voyenizdat, 1967, 464 pp.

Also in 1939 several Special Naval Schools were organized which served as preparatory schools, graduating cadets at the igh school level. In the summer of 1944 these Special Naval chools were merged into the newly organized Leningrad Naval reparatory School with a three-year high school curriculum. he special and preparatory schools were similar to Valley Forge ilitary Academy with the significant difference that the raduates of the Soviet Naval Special and Preparatory Schools ere guaranteed continuation of their studies in higher naval chools. Also, in 1944, the Nakhomov School, an extended type f preparatory naval school with up to a seven-year curriculum, as organized.

The post-war Soviet naval construction generated an additional emand for naval officers and a number of new naval schools were rganized in Leningrad, Sevastopol, and Kaliningrad. In 1967 ll of the higher naval command schools as well as some of the ngineering schools (ordinance and radio-engineering) were onverted into higher naval command and engineering schools with ive and five and a half years curriculum. Today's young Soviet aval officers in the shipboard complements are graduates of hese schools. They all hold diplomas as engineers with full nion qualifications. The longer duration of training has been xplained by the sharp increase in the volume of information in

general scientific, technical, and special fields and the necessity not only to maintain, but to improve, the quality of naval and command training.[263] Under the present system, significantly more time has been set aside for the practical training of midshipmen. During his five years of training the cadet spends almost ten months on board ships and in units of the Navy.

The Soviet Navy has at least ten higher naval schools, five of them in Leningrad, two in Sevastopol, one in Kaliningrad, one in Baku, and one in Vladivostok. In addition, there is a Naval Higher Political School in Kiev, an Auxiliary Fleet Maritime School in Lomonosov, a Naval Department in Volk'sk, Rear and Supplies School, a Naval Department of the Medical cademy, and the Nakhimov Preparatory School. The curriculum of Nakhimov school was reduced to two years of study. Selected senior officers (line officers, engineers, and naval aviators) receive advance training in the Naval Academy. A small percentage of naval officers from the positions of commanding officers of estroyers, submarines, and their equivalent and higher are ppointed to the Academy. Senior political officers are trained y the Naval Department of the Lenin Political Academy.

The officers for naval aviation are educated in the Air

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[263] Morskoy Sbornik No. 1, 1971, pp. 17-24.

orce higher schools and appointed to the Navy, where, after dditional training in special centers, they are assigned to the nits of naval aviation. Officers for the Naval Infantry are elected from the best graduates of the ground forces higher chools.[264]

All Soviet naval officers are volunteers. Since the id-1950s preference in admission to the higher naval schools, ithin the framework of competitive entrance examinations, have een given to qualified servicemen. Civilian candidates and raduates of high schools, after satisfying academic requirements or admission, are sent for extensive shipboard training, where inal judgment on their fitness to be naval officers is made. he third source of naval school enrollment is the Nakhimov chool, graduates of which are assured entrance to one of the igher naval schools, often of their choice, without an entrance xamination.

The quality of education in naval schools is generally ood. The cadets receive broad knowledge in mathematics, physics, hemistry, and a large dose of engineering, ordnance, and lectronics. Despite all efforts to graduate well trained rofessional naval officers, while the graduates of Soviet naval

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[264] *Krasnaya Zvezda*, 16 February 1972; *Morskoy Sbornik* No. 3, 969, pp. 69-72; and *Komsomolskaya Pravda*, March 1, 1972.

chools possess a good academic knowledge, they are obviously acking in practical experience This shortcoming is well ecognized, and corresponding measures are provided for the peediest training of young officers aboard ships Accelerated cientific-technical progress, which produces the most rapid hanges in armament and equipment, probably justifies the Soviet vy's accent on broad academic knowledge for young officers hich provides with relatively fast mastering of practical equirements of the billets they are assigned. The important ct is that the great majority of Soviet naval officers are aduates of naval schools and holders of professional diplomas.

Practically all graduates of Soviet naval schools are ssigned to shipboard duty, and, in general, sea duty is phasized and encouraged. The natural selection process s been the standard practice, whereby the best fitted are rovided with a continuous opportunity to serve in fleet operational its, and cases of an officer spending twenty out of thirty ears of service aboard a ship are quite common A recent Pravda ticle stated that in spite of all hardships of sea duty it s difficult to find enough naval officers for the shore duty, cause prevailing desire to be assigned to ship billets.[265]

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[265] Pravda, March 30, 1972.

Moreover, sea duty provides the Soviet naval officer with better promotion opportunities and faster advancement in rank in addition to considerable higher pay than in shore billets. For example, all personnel aboard operational ships receive a 30% bonus above basic pay; submariners receive 20% more, for a total of 50% above basic pay The pay of e.g. an average Soviet lieutenant commander is four to five times greater than that of the average worker. In addition, they are supplied with free uniforms, free food, paid transportation during their leave, rest homes and sanitoriums. The retirement system is quite similar to the United States Navy system. However, quite often sea duty and service in the remote areas provide officers with a bonus calculation for retirement; for example one calendar year is counted as a year and a half, or even two.

Shipboard duty billets, particularly for the leading officers, represent a relatively prolonged assignment. For example, the recommended duration of a tour for the head of the department of a destroyer or a cruiser is three years, the commanding officer of third rank ships (destroyer escort, large minesweepers, etc.), three years, the commanding officer of second-rank ships (destroyers, most submarines), four years, and the commanding officer of first-rank ships (cruisers and nuclear submarines), five years. The billet an officer occupies and not

the rank is more important in the Soviet Navy. Cases where a commanding officer is a lieutenant commander and his executive officer a commander, or a vice-admiral commands a fleet where a member of the Military Council is a full admiral, or both, a commanding officer and his subordinates are equal in rank are quite common. The position of commanding officer in the Soviet Navy is the most respected. Considerable attention is devoted to the selection of future commanding officers and to their training.

The total number of young naval officers graduating annually from the Soviet naval schools probably exceed the sum total of all graduates from naval academies of NATO countries, including the United States. For the greatest majority of the graduates the naval service becomes a lifetime career and there is practically no officer retention problem. The naval reserve has been in existence for a long time in the Soviet Navy. Graduates from the maritime schools of the Soviet merchant marine, fishing and river fleets, certain engineers and scientists, are kept in the naval reserve with occasional short tours of active duty for training. However, since 1968, when the new Universal Military Service Law became effective, young naval reservists who were formerly excused from military service while in school are now obligated to serve two years. The present policy is to select best and to

prsuade them to enter the regular navy. Judging from the material pblished in the Soviet press an unknown number of reserve officers d just that. Article 61B of the Universal Military Service Lw, which entered into effect on January 1, 1968, provides that te Council of Ministers can call up reserve officers to active dty in peacetime for periods of 2 or 3 years if the officer's secialty is required. In short, it seems that while the Soviet Nvy educational system is capable of providing the Navy with rasonably well trained professional officers capable of employing te latest in naval weapons and equipment, the service itself povides the officer with substantial material and other benefits t create not only a privileged group in the Soviet society, wich the naval officers definitely are, but an elite within te framework of the Soviet armed forces.

All enlisted personnel of the Soviet Navy, sailors as well a petty officers, are draftees. Up to the mid-1950s, the dration of service was for 5 years, and between January 1956 and 968, 4 years. In compliance with Article 132 of the Soviet Onstitution, Article I of the Universal Military Service Law secifies that "military service in the Soviet armed forces is he honorable duty of citizens of the USSR." Further, Article II states, "All male citizens of the U.S.S.R., irrespective of nce or nationality, religion, education, domicile, social and

operty status must undergo active service in the ranks of the ned Forces of the U.S.S.R." The new law reduced the draft age om 19 to 18, and established new terms for active service, i.e. years for navy personnel, with the exception of naval aviation, ere service is for 2 years.[266]

Pre-draft training requirements for all young men has been stablished. That training begins at age 15 at school and special urs are reserved for it. The law also obligates the leaders enterprises, educational establishments, collective farms, c. to create conditions for such pre-draft training and be sponsible for its quality. One-year pre-draft training of ecialists for the armed forces is provided by the Voluntary ciety for Assisting the Army, Air Force, and Navy (DOSAAF). e DOSAAF is assisted by the corresponding services of the viet armed forces in this training, which starts at age 17.

After completion of service, all service men are placed the reserve. After completion of active duty, qualified listed men, upon passing a special examination, can be promoted reserve officer status. A twice-a-year draft has been tablished by the new law.

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[266] For a comprehensive analysis of new law see, Capt. orge Grkovic, USN, Soviet Universal Military Service, US Naval stitute Proceedings, April 1969, pp. 55-63.

The shortened duration of service forced the Soviet Navy to reexamine and reduce from 9 to approximately 6 months the training of Navy specialists in a number of training detachments. There are two types of training centers, one is Moscow controlled, and the second, controlled by the fleets. Future Navy specialists trained in such centers, under revised programs which place greater emphasis upon practical training and programmed teaching methods, are sent upon graduation to shipboard duties, where, after one or two months, they have to pass an examination and are then appointed to the billets. It has been claimed that the higher educational level of draftees, the good quality of pre-draft training and improved methods of navy training have made it possible to obtain good specialists even with the shorter term of service. The Soviet Navy has traditionally received better quality draftees, and continues to be selective in accepting personnel. An article in the official Soviet Navy magazine, Morskoy Sbornik, opened with the following statement: "Even a person who holds to the opinion that 'even hares can be taught to light matches' will hardly deny that not every person can become a good navyman."[267]

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[267] Capt. First Rank R. B. Radushkevich, The Selection of Specialists in the Navy - On A Scientific Basis, Morskoy Sbornik, No. 8, 1970, pp 53-55; see also Capt. First Rank O. L. Kufarev, Under New Conditions - A New Training Method, Morskoy Sbornik No. 8, 1970, pp. 34-37; and Rear Admiral A. F. Nadezhdin, Results of Work Under New Conditions, Morskoy Sbornik No 2, 1971, pp 13-19 .

Petty officers of the Soviet Navy used to be represented by two categories of servicemen, petty officers promoted from the enlisted ranks and reenlisted petty officers. As a matter of fact, practically all reenlisted personnel of the Soviet Navy had petty-officer rank. Two methods of training petty officers, on duty and in special schools, have been widely exercised.

The November 1971 decree of the Supreme Soviet abolished the Institute of Reenlisted Personnel and, accordingly, there will no longer be any reenlisted petty officers in the Soviet Navy after completion of their present terms. The same decree introduced the Institute of Michman, a grade practically exactly equivalent to US warrant officers.[268] Thus, in the future all Soviet petty officers will be from enlisted personnel selected from the best sailors and will serve the same three years of active duty.

Judging from the numerous articles in Soviet military press, which even seems to try to highlight the shortcomings, as well as from the extensive operations of the Soviet Navy, it appears that the personnel problem has found a satisfactory solution, and a degree of professionalism has been achieved. Moreover, through an increased number of calls at foreign ports

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[268] Izvestiya, December 1, 1971; and Trud, December 1, 1971

and official visits of Soviet ships to foreign countries, the Soviet Navy can demonstrate not only its advance hardware, but the good behavior and disclipine of its crews which, in the final analysis, are no small asset to the Soviet government's foreign policy in the area concerned.

Forward Deployment

As indicated previously, the initial forward deployment was literally imposed upon the Soviet Navy by the nature and character of potential opponent forces, and the strategic situation therefor existed at the end of the 1950s and beginning of the 1960s. It was necessary to go forward, to the high seas in the areas of the most probable combat employment of aircraft carriers and later of the original Polaris submarines in order to strike the former before they reached their launching positions and at least try to handicap, if not prevent the latter from the unopposed launching of ballistic missiles. With the further sophistication of Soviet naval hardware and considerable revision of naval theory, including the strategic use of the Navy, in the framework of the latest versions of Soviet military doctrine and strategy, the meaning and nature of forward deployment has been changing and acquiring more important significance far exceeding the original, generally defensive, measures. Starting in the

Norweigan and Mediterranean Seas and selected areas in the Pacific, Soviet naval units later appeared in the Indian Ocean. Prolonged cruises and foreign visits have become a common phenomenon. The logistic supply of the Soviet Navy, a must for sustained operations in the remote areas, initially primitive, has been improving. Sophisticated combat training and large scale naval exercises in the remote areas of world ocean are becoming routine in Soviet Navy life. Both the Sever and Okean naval exercises, during which the Navy demonstrated its muscle, are quite illustrative.

Mediterranean

In 1948 Stalin reportedly demanded that the Yugoslav Communists stop their support of the Communist led uprising in Greece on the basis "that Great Britain and the United States, the United States the most powerful state in the world, will not permit a break of their line of communication in the Mediterranean Sea, and the Soviet Union has no navy".[269] The first deployment of Soviet naval forces in the Mediterranean on a permanent basis took place in 1958, when a brigade of W-class submarines was transferred to a newly established submarine base in Vlone, Albania.

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[269] Milovan Djilas, Conversations with Stalin (New York: Harcourt, Brace and World, 1962), p. 181-182.

The permanent presence in the Mediterranean of Soviet intelligence collection ships started approximately at the same time. The submarines were based in Vlone until 1961, when the Soviet break with Albania occurred. Since 1963-1964 Soviet navy surface units have been deployed primarily from the Black Sea Fleet, and the submarines, from the Northern Fleet. Thus, the newly formed Mediterraneanean eskadra[270] whose strength was gradually built up has become an important element in the Mediterranean, particularly in the eastern part. Originally, the Soviet Navy used to withdraw a considerable portion of its forces from the editerranean during winter months, reinforcing them again in he spring. While the seasonal fluctuation of forces seems to e continuing, after the Sixth Day War a considerable higher inimum level of forces was established, and the average strength f the eskadra, increased. An improved system of logistic supply oupled with the availability of ports in some Arab countries have ade it easier to maintain the increased number of Soviet ships. he Soviet Mediterranean eskadra does not make extensive use of hore bases. Instead, a supply train of oilers, tenders, and ther auxiliary ships have been replenishing the combatants. The ption of using Soviet merchant ships in addition to the Navy's

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[270] Eskadra - a combined naval forces unit, just a step below a fleet: The common translation, squadron, is not accurate.

auxiliaries is available and occasionally has been exercised.

The present average strength of the Soviet Mediterranean eskadra is about 50-60 ships, including 12-14 submarines, of which 2 or 3 are nuclear. Not only submarines, but surface ships as well from the Northern Fleet and the Baltic Fleet are deployed together with the Black Sea units.[271]

While the defensive role of the Soviet Mediterranean eskadra, i.e. ASW and anti-carrier, which has been particularly strongly emphasized by the Western specialists, has definitely remained, the composition of the eskadra and the nature of its employment have clearly indicated the eskadra role in support of Soviet foreign policy. Since the Six Day War of 1967 the Soviet Union has been demonstrating to its Arab clients that it could offer more than moral support, and the Soviet ships in Egyptian ports during the conflict were definitely an inhibiting factor against the continuation of Israeli air strikes The Soviets themselves like to emphasize this point. For example, Admiral Sysoyev, the Commander of the Black Sea Fleet, in his recent speech to the Ukranian Communist Party Congress discussing the growing role of the Soviet

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[271] Captain F. M. Murphy, USN, The Soviet Navy in the Mediterranean, (Naval Institute Proceedings, March 1967); Admiral Isaac C. Kidd, Jr., USN, View from the Bridge of the 6th Fleet Flagship, (U.S. Naval Institute Proceedings, February 1972, pp. 18-28); and Washington Post, November 30, 1970.

Navy in international events and repeating a Soviet standard claim that "imperialist domination of the high seas has ended forever", stated that "Israeli aggression in the Middle East initiated and supported by the USA could be even more impudent if there were no Soviet combat ships present in the Mediterranean".[272]

When the Western press emphasized the growth of Soviet naval power in the Mediterranean and its maturity from a presence to a challenge, the challenge directed first of all toward reducing the influence of the US 6th Fleet and to ending the predominance of American power in the area, Soviet propaganda answered with an array of articles. It was emphasized that the Soviet Union as "a Black Sea power and consequently a Mediterranean power is closely connected with all problems" in the area, and has an "irrefutable right" to keep naval forces there, "to promote stability and peace in the area which is in direct proximity to the Soviet southern borders", and "not allow the American 6th Fleet to carry out the aggressive ideas of the Pentagon with impunity".[273]

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[272] *Pravda Ukrainy*, March 20, 1971.

[273] L. Kolosov, *Mediterranean Problems*, (Izvestiya, November 1, 1968); Vice Admiral N. I. Smirnov, *Soviet Fleet in the Mediterranean*, (Krasnaya Zvezda, November 12, 1968); V. Ermakov in *Pravda*, November 27, 1968; and V. Kudryavtsev in *Pravda*, December 2 1968.

The Soviets obviously were irritated by the NATO decision o establish coordinated aerial surveillance of the Soviet fleet n the Mediterranean and the creation of a new NATO command, aritime Air Forces Mediterranean, effective November 21, 1968. he permament deployment of the *eskadra* produced the emergence f the Soviet Union as a true Mediterranean power, producing the ituation where since the late 1960's there can be no single laimant to the control of the Mediterranean. By maintaining an npressive number of missile armed ships which can be rapidly einforced from the Black Sea Fleet, and with numerical uperiority of submarines over the 6th Fleet, all that the Soviets ack is the carrier-borne air power which is the backbone of the th Fleet. With no point in the Mediterranean more than 200 iles from land and the availability of air bases in a number of rab countries for the Soviet aircraft, the overwhelming dependence f the 16th Fleet upon its carrier aviation for its "combat tability" are not very convincing. The rapid redeployment of oviet aircraft to the network of air bases in Arab countries as ell as direct employment of Soviet aviation from the south-estern regions of the Soviet Union and Warsaw Pact members, at east to the eastern part of the Mediterranean, has to be viewed

s a distinct Soviet capability.[274] Admiral Kidd, former ommander of the 6th Fleet, recently wrote that "the growing oviet naval strength in this area has caused many to question he capability of the US 6th Fleet to perform its stated mission". he admiral continued, "the fact is that under existing pressures, e are walking a tightrope of adequacy; at some points, the rope s beginning to fray. Our still formidable fleet is being forced o accommodate to a new environment far different from the one hich it dominated for almost a quarter century."[275] The dmiral also described the Soviet naval forces in the Mediterranean s "a have fleet" which has new ships, modern weapon systems, ell trained and highly motivated personnel. Stating "that there s no longer a permissive enviroment where once the 6th Fleet oved at will" the admiral described the situation during the ordan crisis in October, 1970, during which the Soviet naval orces in Mediterranean were quickly reinforced and appropriately ositioned. From the chart accompanying the article showing istribution of forces of both fleets, it is impossible to tell ho surrounded whom. Soviet ships followed all major 6th Fleet

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[274] John Marriot, The Air Situation in the Mediterranean, International Defensive View, Vol. 4, No. 5, October 1971, p. 429-432); also see the New York Times, May 13, 1970, "US 6th leet Concerned Over Soviet Navy in the Med", and Time, June 8, 1971, "Soviet Thrust in the Mediterranean.

[275] US Naval Institute Proceedings, February 1972, p. 19.

ips and as the 6th Fleet watched and waited, the Soviets
lso watched and waited, giving no evidence of stress, but a
rmal and restrained behavior which Admiral Kidd described
follows: "There was none of the nonsense of their ships
nning in and around our men-of-war at close range. It was
ident the Soviets were under the direction of a seasoned
aman who not only knew well the capabilities and limitations
his equipment, but also was sensitive to the potential
iousness of the situation."[276]

When King Idris of Libya was overthrown in a coup in
tember of 1969 the behavior of the Soviet Mediterranean
adra was very similar to that during Jordan crisis. While some
iet ships took positions along the Libyan Coast, others
dowed the 6th Fleet units. It was a sort of indirect warning
to attempt a repetition of 1958 Lebanon landing, which for
practical purposes cannot now be repeated. Such actions are
ing political capital for the Soviets and the new Libyan
ernment publicly expressed gratitude to the Soviet navy for
s support". The reported presence of amphibious ships and
ts of naval infantry with the Soviet naval forces in the
terranean and occasional landing exercises performed under the
r of submarines, surface ships, and aircraft "as a buffer

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[276] *Ibid.*, p. 27.

gainst any attempt at intervention from outside" raises the uestion as to whether the Soviet forces themselves might not one ay be involved in the situation similar to the 1958 Lebanon ole of the US 6th Fleet.

As a significant commercial and maritime power, the Soviet nterest in the Mediterranean and the Suez Canal is understandable. The closure of the Canal seriously hurt Soviet merchant hipping, including its supply routes to North Vietnam. The mportance of the Middle East and Mediterranean region as a route o the Indian Ocean and Far East is obvious. Most of the Soviet nti-Chinese moves in Asia should be supported by maritime power, nd the Mediterranean-Suez Canal route is most convenient.

Emphasizing the Soviet naval presence in the Mediterranean a a "necessity" because of the presence of the US 6th Fleet here, theSoviet Union expressed its readiness to consider the rmoval of these forces. A widely propagandized June 1971 speech b Brezhnev during the Soviet election campaign emphasized the anormality of the situation when great powers keep their navies fr from their shores, and expressed the readiness "to solve the problem but on the equal basis", i.e. the mutual withdrawal.[277] Manwhile, the Soviet Union is very sensitive to any change in

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[277] See Krasnaya Zvezda, July 25, 1971, <u>Mediterranean Eskadra</u>.

he status quo in the Mediterranean. A recent US-Greek agreement n the new naval base for the 6th Fleet produced a sharp reaction. n addition to the Soviet government statement with the warning f "appropriate counter-action", a number of articles sharply riticizing "Pentagon bases strategy" and the US and NATO efforts to widen and strengthen their position" in the Mediterranean, ere published.[278]

In the realm of international politics, the Soviet naval resence in the Mediterranean definitely altered the balance f forces in the region and increased Soviet influence in many editerranean countries. By projecting a major military, olitical, and economic presence ~~into the~~ Mediterranean basin, the present Soviet leadership has accomplished what the Czars and Stalin failed to do.

Indian Ocean

In the spring of 1968 the first detachment of Soviet Navy, headed by the cruiser Dmitriy Pozharskiy, appeared in the Indian Ocean. The cruise lasted 80 days, and the Soviet ships visited ports in India, Somalia, Iraq, Pakistan, Iran and Ceylon. In addition to interest of combat training, the stated purpose of the

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[278] See for example, an article by Deputy Chief of Staff of the Soviet Navy, Admiral Alekseyev, in Izvestiya, March 8, 1972; and Krasnaya Zvezda, International Military Review.

cuise was to make "friendly contacts" and to produce "favorable ipressions".[279] Since that time, the frequency of Soviet naval uits appearing in the Indian Ocean increased, and at the beginning o the 1970s the more or less permanent presence of rather modest frce has been established.

The vacuum and balance of power theories originally tied u the Soviet appearance in the area with the British government's dcision to withdraw from east of the Suez. It looked as though te Soviet Navy was just waiting for such a withdrawal, and soon te decision was announced to fill "the vacuum". Such arguments d not warrant a lengthy analysis, and the British might in the scond half of 1960 could hardly be given such a deterrent role. Wdely rumored Soviet attempts to acquire bases in the Indian Oean were categorically denied by the local governments allegedly ivolved in such deals, and at the present, there is no Soviet bse in the Indian Ocean. Soviet naval units in the area have teir own supply ships, and the use of local facilities has aparently been minimal.

The previous absence of Soviet naval forces in the Indian Oean could probably be explained not by the lack of interest, wich was strong even in pre-revolutionary Russia (allegedly one

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[279] Admiral V. Alekseyev in <u>TRUD</u>, June 17, 1968.

of the naval projects of Peter the Great involved the annexation of Madagascar),[280] but by the luck of opportunity and, more important, the means. Post-war political development in the area and disintegration of the colonial system, resulting in the creation of numerous newly formed independent states, many with unstable regimes, presented the opportunity. The economic development of the Soviet Union, the growth of its foreign trade, economic and military aid, intensified development of its merchant marine paralleled by the naval development, produced the means and elevated the importance of the Indian Ocean to the Soviet Union. A sizeable Soviet fishing fleet has been operating in the Indian Ocean since the decade of the 1950s and the annual catch toward the end of the 1960s was about 2 million tons. Soviet commercial shipping via the Cape in 1970 was represented by 3,900 transits or more than 25% of the total. In addition to a permanent presence of alarge fishing fleet, there are approximately 100 Soviet merchant ships in the Indian Ocean at any given time.[281] Soviet oceanographic and space support activities in the Indian Ocean have been considerable. Thus, the Soviet Union is simultaneously involved in a multiplicity

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[280] Orbis, V. XIV, No. 1, Spring 1970. These alleged Russian ambitions were recently "massaged" by the Chinese - see <u>Washington Post</u>, December 30, 1971.

[281] Geoffrey Jukes, The Soviet Union and the Indian Ocean, Survival, November 1971, pp. 370-375).

f maritime activities in the Indian Ocean: in showing the flag hich, at least chronologically, confirms a case of the flag ollowing trade; it is involved in active shipping, fishing, ilitary assistance, political support, and economic aid to the on-allied nations of the area.[282]

Military, particularly naval, aspects of the situation in ne Indian Ocean are still in the embroyonic stage of development nd in spite of the fact that during last couple of years, a number f new steps have been initiated by both the United States and he Soviet Union, the outcome is not clear. When an agreement etween the US and Australia concerning the installation of a Vry Low Frequency (VLF) station on Northwest Cape was disclosed i the mid-1960s, the Soviets probably concluded that the Indian Ocean would become an area of operations for Polaris submarines.[283] Een before A-3 Polaris and Poseidon missiles became operational, te Arabian Sea could already provide Polaris submarines with god coverage of targets in the southern part of the Soviet Uion. The introduction of longer-range (2,500 n.m.) missiles ito US submarines brought target areas from the Soviet western borders to Central Siberia and as far as Moscow within range.

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[282] For a view on the Soviet activity in the Indian Ocean, se T. B. Millar, *Soviet Policies, South and East of Suez*, (Foreign Affairs, October 1970, pp. 70-81.)

[283] *Marine Rundschau*, Vol. V, October 1969, pp. 312-316.

Whether US Polaris submarines are deployed at present in the Indian Ocean or not makes no difference to the Soviet Union, for the major factor to be considered in the Soviet naval plans is <u>the possibility</u> of Polaris missile submarine deployment.

Regardless of what type of ASW forces are selected by the Soviet Navy (major emphasis on submarines supported by the surface forces seems to be obvious) a standing naval force for the Indian Ocean would be required. The degree of effectiveness of ASW forces against Polaris missiles submarines is to a certain degree irrelevant here, for the choice has to be made between unopposed and opposed operations.

The rejection of the Soviet proposal of December 1964 to make the Indian Ocean a nuclear - free zone probably made the Soviets even more convinced that the deployment of Polaris submarines was under consideration. Of course, the Soviet proposal represented an attempt to get something for nothing, i.e. to close an area for the U.S. strategic employment which has no value to the Soviet Union. The deployment of Soviet naval units in the Indian Ocean might be viewed also as an attempt to show Soviet determination to meet the potential threat by force, and to create pressure for the reconsideration of the Soviet proposal which, together with vaguely defined security measures for Asia, continues to be mentioned by the Soviet press. It was reported

hat, at the end of April 1971, a committee of the US National ecurity Council was considering proposing an agreement with the oviet Union to neutralize the Indian Ocean by abstaining from aval deployment there.[284]

Meanwhile, the Soviet naval presence in the Indian Ocean as continued, and the US has stepped up its naval activities in he area as well. In addition to the construction of a naval ommunication center and air strip on the strategically located sland of Diego Garcia and the agreement of December 1971 to take ver from the British the naval base at Kahrain in the Persian ulf, a Pentagon spokesman emphasized the 7th Fleet capability operate more in the Indian Ocean, particularly as the ietnamese War is being wound down.[285]

When the Indian-Pakistani War broke out, the Soviet naval orces in the Indian Ocean which comprised approximately 10 nits were quickly reinforced to about 15 ships. The US sent task force headed by the nuclear carrier Enterprise to the Bay Bengal. Thus, a variant of a Mediterranean situation was epeated in the Indian Ocean, although on a smaller scale.

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[284] Survival, November 1971, p. 372.

[285] Navy Extends Operation in Indian Ocean, Washington Post, January 7, 1972.

Prolonged cruises and foreign visits of the Soviet Navy during the decade of 1960s have become a common phenomenon. The Atlantic cruises, particularly in the Caribbean area, have been of special interest and have produced controversial publicity. It was reported that the Soviet naval detachment which visited Cuba in the summer of 1969 conducted unprecedented ASW exercises in the Gulf of Mexico with the participation of one N-class submarine.[286] At the end of 1970 Defense Secretary Laird emphasized the Soviet Navy's continuous operation in or near the Caribbean. He added "I think that this is further evidence of the Soviet's determination to expand their naval interests into the Western Hemisphere, just as they have in other parts of the world".[287] The U.S. Defense Department announcement concerning the construction of new Soviet naval facilities at Cienfuegos and the Soviet government's denial of this by Tass, October 12, 1970, were generated by the presence of a submarine tender and the suspicion that the Soviets may be developing facilities similar to those the United States has at Holy Loch, Scotland, and Rota, Spain, to service the submarines.[288] While the alarm generated

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[286] *US Naval Institute Proceedings Review*, May 1970.

[287] *Washington Post*, December 6, 1970.

[288] *Washington Post*, September 26, 1971, Cuba Soccer Field Scared US in '70; and the *Reader's Digest*, Soviet Submarines: New Challenge From Cuba, May, 1971.

bout a possible base for submarines in Cuba seems to be nfounded, the Soviet Navy's familiarization with the area is gnificant. From July 1969 to July 1970, the Soviet Navy visited 3 countries.[289]

The visits provide the Soviet Navy with an opportunity not ly for combat training while underway in often unfamiliar eas and for showing the flag, but they are extensively used r propaganda purposes. The detachment of ships conducting he visit is as a rule accompanied by a fleet theatrical group r orchestra, selected performers, a team of athletes which ccasionally includes a complete soccer team. During the visit, he activities of the crews are planned accordingly. As a result n most cases visits of Soviet ships to foreign ports have roduced favorable reactions.[290]

<u>Logistics</u> did not represent a serious problem in the Soviet avy up to the late 1950s due to a nature of employment of the aval forces. The ships at that time represented forces which ere occasionally employed from the basesfor a short period of ime and returned to them to be replenished and repaired. Forward eployment of the Soviet Navy units, however, in the absence of

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[289] US Naval Institute Proceedings, Naval Review, 1971, p. 290.

[290] See for example an article in Krasnaya Zvezda, October , 1970, Norway, Our Neighbor, describing a recent visit of a etachment of the Soviet Northern Fleet to Oslo.

oviet bases in the area of their operations, presented another roblem. It should be emphasized that Soviet combatants were eady for forward deployment long before the Soviet Navy' ogistic system could cope with it. The main problem was the bsence of suitable support ships; tankers were very small nd not fitted for side refueling, and supply and depot ships ere practically non-existent. Gradually, during the decade of he 1960s a considerable number of support ships of the Don, Lama, skol, and Ugra classes were built. Larger tankers and supply hips were introduced, permitting a gradual switch to the side efueling and supply method, which is definitely more productive nd expedient. The Boris Chilikin-class support ship, which ecently entered service, is a good illustration of the progress eing achieved by the Soviet Navy in the solution of logistic roblems.[291] In addition to the Soviet Navy's own support nits, the ships of the Soviet merchant marine can be, and are ften, used. When docking facilities are available in a number f friendly countries, the use of the merchant ships to bring supplies to those ports where Navy support ships can be replenished provides the Soviet Navy with additional advantages and permits the number of support ships required to be reduced.

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[291] Erkennungsblatter, FRG Ministry of Defense, No. 154, December 1971.

By developing a supply procedure similar to the US Navy leet train system, the Soviet Navy has reduced the requirement or naval bases. Of course, the fleet train system is vulnerable o enemy attack and requires considerable protection. Naval ases on the other hand also have become one of the most preferred argets, and are very vulnerable. Naval bases on foreign erritories, in addition, can cost dearly in material and olitical terms, and depend to a considerable degree upon the evelopment of a political situation in a host country. Despite he marked improvement in the Soviet Navy logistics, it is an xtremely difficult task to supply a number of naval units with odern armament far away from the bases. This matter is openly ecognized in the Soviet specialized press, where the great ifficulties associated with the process are discussed.[292]

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[292] Admiral G. G. Oleynik, Excellent Support to the Sea Cruises, Rear and Supply of Soviet Armed Forces, No. 7, July 1971, pp. 26-30; Rear and Combat Readiness of the Navy, No. 5, May 1971, pp. 69-71; The Navy Rear Services Today, (Morskoy Sbornik No. 12, 1970, pp. 3-8); Krasnaya Zvezda, July 25, 1971.

Naval Exercises

The recent large-scale Soviet naval exercises, on one ocasion involving all four Soviet fleets, on the one hand represent a new phenomenon in the Soviet naval development, but on the other is a logical consequence of the process.

The joint command and staff exercise, code named SEVER (North), took place during the period of 11-19 July 1968. The participants in the exercise were the Soviet Baltic and Northern Fleets and the Polish and East Germany navies. Involving areas in the Northern Atlantic, the Baltic, the Norweigan nd the Barents Seas, Sever was at once the first major naval ercise of the Warsaw Pact and the biggest naval maneuvers to that time in Soviet history. While the Polish and East rman navies played a significant role with the Soviet force the Baltic, including participation in a joint amphibious nding, only Soviet forces were involved in the major events ich took place in the North. The East Germans, however, ose to emphasize a much greater scale of cooperation stating at "the Sever exercise represented a new level of cooperation etween the combined (i.e. Soviet Baltic Fleet, Polish and ast German navies) Baltic sea fleet and the Northern Fleet of

he Soviet Union."[293]

Admiral Gorshkov emphasized that it was an "exercise of he ocean navy which has everything necessary to conduct uccessful combat activities far from its bases". While all types f Soviet naval forces participated in the exercise, the submarines nd naval infantry were particularly glorified. In addition to he submarine's role in strategic delivery, demonstrated by an nderwater launch of missiles, the ASW role of the submarines as highlighted: "Battles of submarines with submarines is not iction or the imagination of a visionary, but is actual eality".[294] The importance of a second amphibious landing in he North, on Rybachiy Peninsula, executed exclusively by the oviet Naval Infantry and being larger than the Baltic landing, as an obvious desire of the Soviet Navy to demonstrate mobility pparently over a considerable distance, for it is most likely that the naval infantry force participating in the landing came

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[293] An interview with the Commander of the East German Navy, Vice Admiral Ehm, published in Ostsee Zestung, 29 July 1968. The same interview emphasized Kosygin's evaluation of the political significance of the exercise. In his 13 July press conference in Stockholm, published in Pravda on 15 July 1968, Kosygin noted that "the exercise was an emphatic answer to the intensified policy of aggression on NATO's northern flank clearly demonstrated by the Polar Express maneuvers".

[294] Izvestiya, July 14, and July 19, 1968.

from the Baltic.[295] However, as later became evident, the Sever exercise was a rehearsal for the Okean (Ocean) maneuvers, during which the major events of the Sever exercise were repeated on a larger scale.

The Okean maneuvers were held from 14 April to 5 May 1970 under very adverse weather conditions, particularly in the North Atlantic. The area of the maneuvers included two oceans, the Atlantic and Pacific, and several seas including the Barents, Norwegian, North, Okhotsk, Japan, Phillipine, Mediterranean, Black, and Baltic. A detachment of Soviet ships headed by the missile cruiser *Admiral Fokin* was in the Indian Ocean. All four Soviet fleets participated in those world-wide maneuvers, which were called unprecedented by a Pentagon spokesman, "a first for anyone in the history of the naval art" with the emphasis that "no navy has had anything like this on this scale and this scope".[296] Even the maneuvers code name Okean was depicted as symbolic not only in referenceto the scale, but also in that it related to a former Tsarist yacht, renamed Okean during Lenin's time. The name was seen as an omen and an expression of Lenin's

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[295] In addition to the hints in the Soviet press, the independent *Norwegian Journal of Commerce and Shipping* on 19 July 1968 emphasized that a sizeable unit of amphibious forces moved from the Baltic in two groups, one of which followed the Norwegian Coast north during the period of the exercise.

[296] *Washington Post*, April 24, 1970.

esire to have a strong ocean-going navy in the future.[297]

Hundreds of Soviet naval ships and aircraft participating n the maneuvers were employed in a seemingly realistic scenerio isualizing a strong experienced enemy in a number of episodes situations) in which the readiness of the Soviet Navy to fulfill he tasks assigned to it was checked. The following tasks were emonstrated in the maneuvers:

the deployment of submarines, the main striking force f the Soviet Navy, and the creation of combat conditions ssuring their most effective combat use;

extensive ASW against Polaris submarines, and for the rotection of Soviet's own naval forces, including missile-arrying submarines;

anti-carrier operations in order to prevent carrier ircraft from attacking naval and shore installations, and to educe enemy "combat stability" by eliminating carriers from rious (including ASW) formations;

operations against enemy lines of communication, including

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[297] All important Soviet newspapers assigned their special orrespondents to cover the maneuvers and extensive information, bviously on a selective basis, covering major events of the neuvers was published between 14 April and 12 May 1970 in *ravda*, *Izvestiya*, *Krasnaya Zvezda*, and others. Following the neuvers a special book, *Okean-Maneuvers of the USSR Navy Conducted* n April - May 1970, 208 pp. was published in Moscow by the ilitary Publishing House.

attacks against its shipping;

to assist the Soviet Army on its maritime flanks, including use of amphibious landing and missile strikes from submarines and surface ships.

Not all these tasks are of equal importance to the all Soviet fleets, and they vary in the individual theaters. The major events during the maneuvers took place in the Atlantic Ocean and the adjoining seas, where more than half of episodes were played. The Northern Fleet as well as the Baltic and the Black Sea Fleets were more actively involved in the maneuvers than the Pacific Fleet.

The maneuvers were conducted in a nuclear enviroment, and the use of the missile armament of the Soviet Navy included combined missile strikes of naval aviation, submarines and surface ships, the launching of ballistic missiles and underwater and surface launching of cruise missiles by the submarines, and combat employment of SAMs against both individual and group air targets. The extensive use of in-flight refueling and the long duration and long distance of the flights were special characteristics of the air operations. Very extensive air reconnaissance was conducted and close cooperation of naval aviation with Longe Range Aviation was evident.

Amphibious landings were conducted by all four Soviet feets. The Baltic landing against an area "strongly fortified i-depth" clearly imitated an operation against the Danish Straits. Te landing in the north on the Rybachiy Peninsula by forces of Nval Infantry from the Mediterrnean (Black Sea), Baltic, and the Nrthern Fleet was of a considerably larger scale and was oserved by the Minister of Defense and Commander-in-Chief of the Nvy. The Naval Infantry demonstrated improved skill and sphistication by landing on difficult terrain after a relatively lng voyage under adverse weather conditions.

The two newest ships of the Soviet navy, the ASW cruiser Mskva and the sister ship Leningrad, ~~were active~~ participants i the maneuvers together with many classes of missile and cnventionally armed ships. The ability of the surface forces t defend themselves against air attacks was emphasized.

The time of the exercise, the early spring months when a cnsiderable number of young sailors trained according to provisions o the new Universal Military Law were aboard Soviet ships, and the etremely unfavorable weather conditions, can be viewed as testimony t the satisfactory solution of the personnel problem and the mturity of the Soviet Navy. In the command and control field, te wide use of computers in the decision-making process, the efective and reliable communications during all phases of

neuvers (labeled "fantastic"), and the effective work of the rious staffs were emphasized. Satellites were most likely ed in communications.

The high degree of combat readiness of the Soviet Navy d its alleged ability "to go into action at any moment, even der the most unfavorable conditions and circumstances" were ressed. Soviet Navy leaders emphasizedthat the preceeding cade of combat training was "a process designed to master the can" and the Okean maneuvers "the final stage of the process, h Navy's final exam, which it passed successfully" demonstrating t readiness "to execute strategic missions and to counteract trong naval foe" in defense of the "national interests of the viet Union and other Socialist countries".[298]

To explain the Soviet Navy's forward deployment as dictated ny by the necessity to counter the strategic nuclear threat m the Western, mainly US, naval forces would be an over-mplification. Initially this threat played an overwhelming, en singular, role and is still important. But, during the second lf of the 1960's, when the Soviets started to speak about the cessity of its navy to protect the "spreading interests" of the viet Union, a new and important element which may be crucial in

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[298] *Morskoy Sbornik* No. 6, 1970, p. 4; and Marshall aharov in *Sovetskaya Rossiya*, 19 June 1971.

the future was added. This new mission of the Soviet Navy required its constant presence in the "remote areas of the world's oceans previously considered the zone of control" of Western maritime powers. The presence of substantial Soviet naval forces does not exclude the support for a friendly regime threatened either by internal turmoil or foreign intervention or in direct assistance to newly born regimes more favorable to Soviet interests, as for example the 1969 Libya revolution illustrates.

What was exercised by the Soviet Navy during the 1968 seizure of the Pueblo by North Korea might be classified as an attempt to employ the strategy of interposition.[299] When it was unclear what the US would do, and a carrier task force was heading toward North Korea, a detachment of Soviet ships appeared in the vicinity. The Jordan Crisis of September-October 1971 provides an example of another situation, discussed previously, when the presence of Soviet naval forces in the proximity of the US forces could be viewed as a restraining factor.

Finally, showing the flag through frequent foreign visits and

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[299] The strategy of interposition is employed for the purpose of denying an objective to an opponent and usually without actual use of force. Interposition does not necessarily require superior forces of interposer. By placing his forces between the opponent and the opponent's object the interposer increases the opponent's risks and presents him with choice to drop or change the objective or escalate.

and displaying muscles by large-scale maneuvers and exercises in remote areas are a demonstration of power and maritime mobility. At least in their statements, the Soviet military leadership appear to be confident that their navy has "mastered the spaciousness of the world ocean and possesses everything which is required for the simultaneous and prolonged conduct of combat activity on several oceans and seas."[300]

Today, the Soviet navy order of battle includes the following:

about 360 submarines, nearly 90 of which are nuclear-powered;

two ASW cruisers, each with about 20 helicopters;

26 cruisers, including at least 9 armed with missiles;

about 100 destroyers and equivalent ships, many of which are missile armed;

about 130 escorts;

about 270 coastal escorts;

about 320 minesweepers;

about 130 missile boats;

over 300 torpedo boats;

about 200 amphibious ships and landing crafts.

Support ships, auxiliaries, and service craft according to *Jane's* "run into the thousands". Naval aviation has about 800 combat

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[300] Marshall Grechko in *Pravda*, 23 February 1971.

aircraft. Numerically, it is the largest navy in the world. Its personnel strength is about 500,000 officers and men.

Most ships are of recent construction, are fully manned and operational. The percentage of ships, primarily older ones, in reserve is small.

The main strength of the Soviet Navy, however, is not in number of ships it possesses or in the total displacement, but in the armament. In addition to the ballistic missile submarine's contribution to the Soviet strategic delivery, which is close to 600 missiles, there are a variety of surface-to-surface, air-to-surface, and surface-to-air missiles which constitute the main armament of the Soviet navy's forces, submarines, naval aviation, surface ships, and shore defense units. At the present, no one navy in the world approaches the Soviet Navy in total number of such missiles, the variety of their carriers, the scope of ranges they cover (long and horizon range) and methods of launching (surface, air and submerged) and perhaps even in quality (propulsion systems and various guidance methods employed). The latest edition of Jane's Fighting Ships started its remarks on the Soviet Navy with a statement that "by any standards, the Soviet fleets now represent the super-navy of the super-power". The continuous appearances of new classes of missile armed ships, submarines and boats which are impressing observers by their sophistication and

novelty has been emphasized.[301]

Soviet naval power is divided among four fleets, the Northern, Baltic, Black Sea, and Pacific and one flotilla; the Caspian. In addition, the deployment of naval forces in the Mediterranean, a main responsibility of the Black Sea Fleet, but also utilizing ships and particularly submarines from the Northern and Baltic Fleets, constitute in effect a fifth Soviet fleet, although it continues to be called an eskadra. The further build-up in the Indian Ocean might in the future produce a situation similar to the Mediterranean, with the bulk of the naval forces coming from the Pacific Fleet. The size of the Pacific Fleet, in addition, will also be influenced by general developments in relations with China and Japan and in turn the subsequent development of their naval forces. The bulk of ballistic missile and cruise missile submarines are based in the two most powerful fleets, the Northern and the Pacific, in order to have easier access to the oceans.[302]

In addition to a continuing intensive submarine building program, the construction of new surface ships with an improved

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[301] Jane's Fighting Ships, 1971-1972 ed., pp. 80-82, 590-593; The Military Balance, 1971-1972, The International Institute for Strategic Studies, London.

[302] For the details of the distribution of forces see Erickson, op. cit., pp. 55-57 and WEHR, Politishe Information No. 37, September 16, 1971.

ense, mainly anti-aircraft capability, the improved ASW ability and horizon-range missiles (not requiring target quisition and mid-course correction from an outside source) is ing on. These submarines and surface ships will gradually place the remaining conventionally armed and aging units built large series in the 1950's. Although modernization involved me classes of submarines and surface ships, it does not appear be among the most favored measures of the Soviet Navy.

The fleet of support ships is being reinforced with larger ips equipped for side replenishment. It is probably still adequate in size, but with the help of the Soviet Merchant rine, it has managed to supply Soviet Navy operational units with ll the essentials. The system of naval bases on Soviet territory ppears to be under expansion. It was reported that one of the iggest complexes of naval and air force bases in the world is nder development in the Soviet North, including Novaya Zemlya.[303] lthough not a balanced navy in the Western sense, primarily because f a lack of aircraft carriers, the Soviet Navy appears to be not uch disturbed by the fact.[304] After the mid-1950's, Soviet naval

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[303] Washington Post, October 16, 1971.

[304] The term "balanced navy" appears to be used so indiscriminately, without any attempt to define what a balanced navy should be in the composition of its forces, that often the "balance" seems to be considered achieved when an 80,000-ton carrier is surrounded by a protective screen of ships, including those armed with five-inch guns of World War II vintage, with a total displacement of another 80,000 tons.

theory did not embrace either a traditional employment of naval power in a quite non-traditional international situation or adherence to the established hardware with the emergence of qualitatively new military technology. What is seen today in the various areas of the world ocean is an innovatively developing navy which appears to be well aware of its limitations and strength and which is trying "in different situations to perfect the methods of combating a strong enemy under the most adverse conditions".[305]

The role of maritime power in general and naval power in particular continued to be debated and analyzed in the Soviet Union. An essay "Navies in Wars and Peace" by Commander-in-Chief o the Soviet Navy Fleet Admiral of the Soviet Union S. Gorshkov ay turn to be a modern Soviet version of "the influence of sea power upon history".[306] Emphasizing the increased importance of ceans and naval combat, the admiral gives a comprehensive conomic, political, and military analysis of the role of the sea n historical development and recalls Peter the Great's statement hich compared a state with only an army to a person with one hand

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[305] Deputy Commander-in-Chief of the Soviet Navy, Fleet dmiral V. Kasatonov in Soviet Military Review No. 7, July 1971, p. 4.

[306] At this writing, only three installments of what appear o be a sizeable work have been published in the Soviet Navy agazine, Morskoy Sbornik No. 2, 1972, pp. 20-29; No. 3, pp. 20-32; nd No. 3, pp. 9-23.

ad a state with both an army and a navy, to a person with two hnds. The historical peacetime use of the navy as an instrument foreign policy, which can demonstrate the "economic and military ght of a state beyond its borders" and the fact that "navies r many centuries have been a single service of armed forces apable of defending the interests of a country far away from its orders" were viewed as important features of the naval forces. nalyzing "Russia's uneasy path to the sea", the Admiral attacks alien propaganda inspired and actively conducted by England" which, llegedly, had been concerned by Russia's drive to the sea nitiated by Peter the Great. Strong attacks are made against igh Tsarist officials, who on the eve of the Russo-Japanese War tried to persuade the Tsar that there was no need for the navy n the Pacific". Modern foreign propaganda allegedly inspired by he US was said to be using the old British argument that the oviet Union is a land power and, hence, its military requirements re different. As an example, President Nixon's speech of August 1, 1970, was cited.

Russia's unfavorable maritime geography, which historically complicated the development of the navy, is fully recognized. The Admiral's treatment of "Russians in the Mediterranean Sea" is of great interest. Analyzing the long history of Russia's naval appearances and occasional presence in the Mediterranean, the

Amiral draws several conclusions. Accordingly, historically, wen the threat of attack against Russia's southwestern borders eerged, the Russian Navy appeared in the sea and "demonstrated t the whole world that the Mediterranean is not somebody's forbidden sace or closed lake and that Russia is a Mediterranean power". Te current presence of Soviet ships in the Mediterranean in Grshkov's view is substantiated not only by the geography, but b many centuries of the presence there of the Russian Navy; it i playing an especially important role in the defense of the cuntry and "blocks the violation of the peaceful atmosphere there ad plays a role of containment". If nothing else, this work emonstrates that Soviet naval thought is not merely working, ht is quite active.

Conclusions

Soviet naval development initiated a half century ago s initially accompanied by loud revolutionary slogans on the e hand and conservative, unrealistic attempts to promote lassical naval theories on the other. Such dichatomous views ere interpreted by some Western students of Soviet naval ffairs as testimony to the existence of two opposing schools n the Soviet Navy involved in a perpetual struggle to influence oviet leadership. In reality, however, without seriously ojecting to debates, and occasionally even encouraging them, ne Soviet leadership was quite pragmatic in its approach to aval construction. It could not be otherwise, for the economic onditions of the country and the defense requirements as seen y the Soviet leaders for all practical reasons excluded any ther approach. This is not to say that the Soviet leadership xpressed a deep understanding of naval power and skillfully mplemented it, but the available options were very limited.

While World War I, the Revolution and the Civil War nflicted severe losses on the Russian Navy, resulting in its isintegration, and produced economic dislocation in the country, number of factors favored the rehabilitation of the Navy:

The Russian naval heritage, which, with the notable

eception of the Tsusima disaster, was generally glorious;

the remaining ships and personnel, particularly a considerable umber of former Imperial Navy officers, who, without necessarily ccepting the Communist ideals, joined the Soviet Navy and, oved by patriotic feelings, worked hard;

rather extensive naval shipbuilding experience and onsiderable shipbuilding capacities, which could be and were estored; the Soviet leadership's preoccupation with the defense f the country. Long before the first Soviet tractor was uilt, the Soviet shipbuilding industry was gradually restored nd the construction of naval ships, and first of all submarines, tarted.

The accelerated industrialization of the country, strongly iased toward the defense sector, permitted the initiation of a number of shipbuilding programs, including the 1937 program isualizing the construction of a "mighty high sea navy worthy f the Soviet Union". This program was far exceeded what the ountry could afford. A continuous shortage of metal, of machine uilding, and of other industrial capacities created the onditions wherein the implementation of the program was to the etriment of the other services, particularly the army. As a onsequence, a minor war with Finland revealed the backwardness nd unpreparedness of the Soviet armed forces, and generated the

need for urgent measures to correct the situation. The 1937 program was sharply curtailed and the construction of large surface ships, stopped. However, reallocated capacities and resources did not affect either the submarine or small surface combatant construction. Considering the condition of the Soviet economy before World War II, the variety of ships, and particularly submarines, built and under construction at the beginning of the war was substantial and negate the notion of the Soviet leadership's neglect of the navy.

The employment of the Soviet Navy during the war was neither brilliant nor disastrous. The land war threatened the existence of the Soviet Union as a state. The composition of the enemy forces neither created conditions for the application of classical tenets of naval warfare nor was the Soviet Navy ready for it or was there any need for it. On the other hand, the employment of Soviet naval forces, particularly during the initial period of war, was often marked by not very imaginative tactics and was handicapped by the lack of forces, a considerable portion of which were involved in the land struggle. The war revealed a number of serious mistakes made in the process of naval development. The Northern Fleet was the weakest, and its reinforcement was slow. The Soviet Navy had no amphibious ships, and the formation of naval infantry was delayed. The Soviet Navy

was lagging behind in the development of influence mines and the means to combat them. The anti-aircraft defense of the Soviet ships was inadequate due to an insufficient number of automated and multi-purpose guns. The top echelon of the Soviet naval command, eliminated during the 1937-1938 Stalin purges, was replaced by young officers who did not have chance to gain experience. Moreover, the atmosphere of terror had to produce suppression of initiative and fear of bold action, resulting in a reluctance to commit important fleet units to combat, as was particularly evident in the Black Sea Fleet.

After the war ended, the Soviet Union wasted no time in resuming naval construction, despite the considerable destruction to the economy inflicted by the war. At first, ship designs of the pre-war and late 1940 periods were built in considerable umber, repeating the practice of the second half of the 1930's. he orientation of Soviet naval theory and practice in both he pre-war period and first post-war decade was clearly efensive, although a considerable number of submarines and elatively well developed naval aviation provided the Soviet avy with a limited offensive capability in the peripheral waters. olitical, and particularly economic, realities for all practical urposes prevented the Soviet Navy from obtaining any other pabilities. Even geography, although improved as a result of

orld War II, has continued to be unfavorable, and the centuries-old problem of the Straits remained. With the exception of an nnecessarily large number of conventional cruisers and destroyers uilt up to the mid-1950's, the remaining naval forces developed ithin the means of the Soviet Union did correspond to the role ssigned to the Soviet Navy.

For a few years after Stalin death, overwhelmed by the ictories of World War II and particularly by the consequent evelopment of nuclear weaponry and missilery, some influential oviet military leaders, represented by the marshalls whose xperience and outlook was limited by army operations, clearly nderevaluated, and to a certain degree, neglected the role of he navy. Soviet naval theory, on the contrary, even under the ondition of severe limitations on the available hardware imposed ainly by the weakness of the economy and availability of llocated resources, continued to be quite active and modern. arious theoretical groups on the fleets, the academy, and naval schools encouraged and supported by a more imaginative navy leadership worked out a number of original and innovative proposals concerning the further development of the navy under new strategic and technological conditions. Strategically, in the post-war period, the Soviet Union has been facing opponents of which the majority have been traditional maritime nations

eaded by the US and which have possessed strong navies. oreover, military geography has changed, elevating the importance f naval warfare.

On the technological side, it was claimed that the evelopment of nuclear weaponry, particularly coupled with the ew means for its delivery -- missiles and the progress in ectronics, all of which the Soviets have termed the "scientific-echnological revolution in military affairs", made the avy particularly suitable for the application of these new eans of warfare. The mid-1950's decision of the Soviet eadership to drastically alter the course of naval development s testimony to the success of the Soviet Navy's persuasion nd probably of the military-political leadership's understanding f the problem.

A far looking approach taken in the course of the ecision-making process, which rejected any plans to construct ttack aircraft carriers and to fight the opponent with its own eapons, approved the orientation of further naval development oward the missile armament and emphasized the prevailing role f the submarines and naval aviation, seems to have been the est possible under the circumstances for the Soviet Navy. The elatively rapid adjustment of both the Soviet Navy and the efense industry to the new course has produced a qualitatively ew navy.

The first stage of the development of the new navy, lasting little past the mid-1960's, revealed its orientation toward a uclear war. The tasks of the Navy's main striking forces, uclear delivery, anti-carrier operations, and anti-Polaris ASW, learly required the employment of nuclear weaponry and to a arge degree were directed against it.

While it is safe to assume that a nuclear war has been uled out as an instrument of Soviet policy, a number of factors ave contributed to the nuclear orientation in the Soviet ilitary, including the naval build-up. First, with the ppearance of new weapon system, any military establishment would ave a tendency to increase its stockpile, and often up to an nreasonable level. The notion of deterrence has implied a endency to promote the armament spiral. Mutual suspicion and fear of "inferiority" (real, implied, or imagined), particularly in the atmosphere of occasional pronouncements of "strategic superiority" by the adversary, have definitely played an important role. The fact that, above a certain level, superiority in numbers ceased to produce strategic superiority, but is capable only of maintaining a deterrence balance, seems never to bother either side. The socalled theoretical field has not been very helpful, for a myriad of academic bachelors, masters, and doctors in the US and lieutenant-colonels, colonels (candidates

nd doctors of philosophy) of the Soviet military-political pparatus contributed heavily to the confusion of the still ittle understood nature of nuclear warfare and the associated trategy.

The naval contribution to the strategic delivery, originally n possession of only the US Navy in the form of the attack ircraft carriers, was first supplemented and later practically isplaced by ballistic missile submarines. The original Soviet ystem with surface launch and a 350-mile range was gradually mproved, and it required almost a decade of effort to produce a submerged-launched 1,500-mile range system. A longer-range ubmarine-launched ballistic missile system, whose range has een variously estimated at from 2,500 to over 3,000 miles, has portedly been under development. Correspondingly, the launch atform was improved also, from the 2 to 3 missles carried by e original Z-class and H-class submarines to 16 on the Y-class bmarines.

Paralleling the growth of the naval strategic delivery stem, a rather sizeable construction of more conventional rces, but quite unconventionally armed, has been observed roughout the decade of 1960's. Besides continuing the ployment of forces and the conduct of exercises in the interest anti-carrier operations and ASW in remote areas, the enlarged

orces of the Soviet Navy and first of all, its surface forces ave permitted the Soviet Union to initiate the second stage f forward deployment which, while explained originally by the ecessity of defending against the same aircraft carriers and olaris submarines, in effect was the application of Soviet naval ower to "protect the interests of the Soviet Union" and to upport its foreign policy. The nuclear balance of the mid-1960's lready had all the essential elements which led to parity, ufficiency, equality, or whatever term is preferred over mutual verkill capability.

Such a state of affairs originally permitted the Soviet nion to deploy her naval forces in the area where the opposing orces were stronger and still have a credible instrument to upport her policy. The Mediterranean deployment during the irst 3 or 4 years was a classical example of this. Gradually, articularly after the crisis in the area had sharpened and ore and better units were built and became operational, the size f the permanently present forces has been increased, creating he condition where neither side could claim superiority (with he exception perhaps of some naval pilots, who, as soon as they re airborne and feel the three-dimensional freedom of skies, ave a tendency to project that feeling into the notion of uperiority). In areas such as the Mediterranean, Soviet naval

orces can receive substantial reinforcement on rather short otice, including land-based air power. The oft repeated oviet dependence on the good will of the nations controlling he Straits seems to be more wishful thinking than an objective valuation of the situation, for it is doubtful that, short of major conflict in which both NATO and the Warsaw Pact would e involved, the Straits would be closed. The ability to have superior forces in the area of confrontation, while not necessarily leading to an ability to control the sea, can certainly provide its possessor with a number of advantages and considerably increased chances for the favorable resolution of the conflict.

The presence of Soviet naval units in the Indian Ocean has appeared to be an embryonic variant of the Mediterrnean situation. The behavior of the Soviet detachment during the India-Pakistan War in a sense was not much different from that in the Mediterranean during the Jordan and Libya Crises or during the Pueblo incident in the Sea of Japan.[307] It appears that the employment of the Soviet Navy for what might be termed selective containment of the US Navy, still in restricted situations and carefully selected times and places, is being progressively intensified.

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[307] For an evaluation see R.D.M. Furlong "Strategic Power In The Indian Ocean", International Defense Review No. 2, April 1972, pp. 133-140.

It can be assumed that technically the Soviet Navy can be employed in gunboat diplomacy. If one accepts Mr. Cable's definition of gunboat diplomacy: "the use or threat of limited naval forces, otherwise than as an act of war, in order to secure advantage, or to avert loss, either in the furtherance of an international dispute or else against foreign nationals within the territory or the jurisdiction of their own state",[308] it might be concluded that the Soviet Navy has all the necessary elements for its application on a selective basis. The political validity of such an assumption is another matter, and, in most cases, the Soviets are bound to lose more than they gain. Soviet Navy support for an established friendly and legitimate government, threatened internally and particularly under circumstances where the blame for the turmoil can be placed upon the "intrigues of the imperialists", is another matter, and its possibility should by no means be excluded.

If the concept of an "all-out war at sea" seems to be questionable, at least for the foreseeable future, a controlled war on sea communications under certain circumstances cannot be ruled out. However, it would not be in the form of unidentified submarines sinking ships, but in the form of mutual retaliatory

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[308] John Cable, *Gunboat Diplomacy*: Political Applications of Limited Naval Force (Institute for Stratotic Studies - Studies in International Security: 16). New York: Praeger Publishers, 251 pp., 1971, p. 21.

trikes. Possessing the world's largest submarine fleet, a onsiderable portion of which is well suited for the attack ole, the Soviet Navy technically and operationally is capable f conducting such a war. However, it would inevitably bear he fruits of growing into a general war and, hence, is extremely emote.

No picture of the Soviet Navy, even such a sketchy one as presented in this paper, should be considered complete if viewed in isolation, for in the final analysis, showing the flag is only one profitable side effect of navies, which are built and maintained to be engaged in naval warfare. An obvious choice, and a singular one, for general comparison might be only the US Navy. Only the most general type of comparison of trends in the development of the two navies can be made here. If, for the sake of analysis as well as for the practical matters of naval warfare, one isolated ballistic missile submarines, what remains in the two navies would be a composition of forces which have been built for naval warfare and which are navies as they have always been understood.

The Soviet Union's decision of the mid-1950's not to build attack aircraft carriers was a correct one, considering the peculiar nature of the Soviet Navy at the time of the decision, the trend in the development of naval warfare, and

Soviet policy. The US navy, on the contrary, has for a long time considered aircraft carriers as the nucleus of its naval forces, which, to a large degree, have been developed to support carriers. The Soviet Union's rejection of the idea to fight carriers with carriers for a while denied their navy a number of options. This probably still holds true in relation to a number of situations in which, however, the Soviets do not likely want to be involved. A diversified anti-carrier force developed by the Soviet Union includes attack submarines, both cruise-missiles and torpedo, land-based missile carrying aviation, and, marginally, missile armed surface ships. While capable of fighting carriers, they are by no means a complete substitute for them, although in the attack role at sea they might be more effective.

The Soviet striking forces, as platforms for weaponry, have a higher utilization of offensive armament. Aircraft carriers, being high value targets, have to share a considerable portion of their weapon capacity with the needs for ASW and anti-aircraft defense, and many of them in effect become multi-purpose platforms. The question naturally arises whether a package of diversified forces which may even cost less, can perform the same tasks and be less vulnerable? While it is logical to apply the CV concept to the existing carriers, one

should remember that the concept itself was born in order to increase the survivability of the CVA portion of it. Moreover, the size and large tonnage of ships have ceased to play any significant role in the age of missiles and sophisticated control systems, "compressed" in size and "inflated" in performance by the power of explosives and microelectronics. While ship-borne aviation's role in combat at sea will not only survive, but might be even elevated, the attack carrier concept, particularly in relation to the Soviet Navy, is not very impressive. In the decade of the 1970's the advocates of 80,000-ton mammoths, particularly when they demand an increase of their number, bring to mind Santayana's remark about fanatics who redoubled their efforts as they lost sight of their goals. So, in relation to the US Navy, the Soviet Navy is not much worse off at the present without attack aircraft carriers.

The appearance in the future of carrier-like ships not exceeding 20,000-30,000 tons displacement and serving as a platform for VTOL aircraft in the Soviet Navy should not be excluded. In general, both type of naval aviation, shipborne and land-based, seem to be needed and will be developed. Heavy land-based maritime aircraft are extremely maneuverable, requiring less defense than any surface ship, and are capable of carrying a considerable load in flights of prolonged duration, they will

ontinue to be employed in a variety of missions. The Soviet Nvy's emphasis on such aviation was initiated by necessity, bt turned out to be beneficial.

The Soviet lead in submarines today is overwhelming. A least numerically they have held this lead since the second hlf of the 1930's. But only during the post-war period, when te Soviet Union built close to 600 submarines, were the majority o them designed for long-range operations. Submarines with pactically every known type of propulsion systems and armament, sme unique to Soviet submarines, were produced. Ballistic-ssile submarines in both the United States and the Soviet Nvy augment both countries strategic delivery systems prticularly the second - strike capability. Many of the rmaining submarines, particularly in the Soviet Navy, are lti-purpose boats whose role in the future would probably be epanded. At the present, submarines represent the main striking frce of the Soviet Navy, the role they undoubtedly will retain i the foreseeable future. The long nurtured idea that the sbmarine is a weapon of the "have-not" navy is archaic, if it any time was valid. In spite of the US Navy's long and, in e limits of technological possibilities, somewhat productive forts to have an effective anti-submarine defense system, the ture of the problem, the budgetary limitations imposed upon the

size of the ASW forces, and the size of the Soviet submarine force, which under certain circumstances can afford even saturation tactics, seems to create a situation where it would be extremely difficult to cope with Soviet submarines.

Besides, ASW is a two-way game, and the hunter quite often himself can be attacked, not only by the object of the hunt, the submarine, but by the forces supporting the submarine or cooperating with it. This is why just installing sophisticated search equipment aboard ASW ships is not enough. Modern weapons to defend the ASW forces from various types of attacks are needed. It seems that the submarine at the present is the best ASW platform, and a considerable number of them are needed. Whether the Soviet Navy has enough submarines for a variety of missions is hard to tell, but it has considerably more than the US Navy.

The size of the Soviet surface force, which is capable of being deployed in remote areas, is obviously smaller and less diversified than that of the US navy. However, there is a growing number of Soviet Navy surface ships armed with a modern missiles presently absent in the armament of the US Navy ships. Certain classes of Soviet surface ships have no counterparts in the US Navy, and a unit-by-unit comparison is meaningless. Today, there is no reason to consider the Soviet Navy either as a

"ne-shot navy" or a "first-strike navy", because, for the freseeable types of conflict, it seems to have more than one sot, each one with a high degree of probability of hitting an asigned target, and its defense of surface units is no worse than oher navies, the US Navy included. The vulnerability of Soviet srface units varies from area to area. Considering the cordinated system of naval warfare, however, other forces can waken the opponent's ability to strike, (at the present mainly wth carrier-borne aircraft) thus, making the defense ability c Soviet surface units more effective.

The amphibious capability of the Soviet Navy is very marginal ompared with that of the US Navy with respect to the size of te force and the size and range of operations. The important ict is the emergence of such a capability coupled with the pid growth during the 1960's of Soviet airborne troops, which s testimony of the Soviet military orientation toward mobility, ncluding that at sea. While a rapid increase in size of Soviet aphibious forces in the near future seems to be unlikely, it is gical to expect the sophistication of landing means, including btter amphibious tanks, air-cushion armored personnel carrier, ne employment of helicopters, and appearance of specially designed ire support ships armed with long-range guns and missiles.

In the field of tactical armament, the Soviet Navy scored

onsiderable success by emphasizing the development of cruise issiles since the mid 1950's. For some reason which is difficult o explain satisfactorily the US Navy apparently neglected this ype of armament. The traditional preoccupation with carrier-orne airpower, which in the words of US Navy Captain Smith previously cited), put "too many eggs in too few baskets" and ater the budgetary limitations imposed by the Vietnam war, bviously do not explain the whole story. There should be no uestion that the US is technologically capable of building ine cruise missiles, and thus avoid the situation where in the ords of Vice Admiral H. G. Rickover, "our gun-equipped surface hips are considerably outranged by Soviet surface-to-surface ruise missiles and would suffer severe attrition in an ngagement".[309] Some anti-ship capability of certain US Navy AMs can hardly be compared with the capability of the Soviet ruise missiles. The wide adaptation of cruise missiles permitted he Soviets to increase the range of an engagement by many imes, and to change the nature of defense, so that instead of ighting the weapon systems carrier (ships, submarines, planes), t became necessary to fight the weapon itself. In the early 960's Soviet Academician Admiral-Engineer Berg advanced the

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[309] *Washington Post,* May 31, 1971.

ica that the task in the scientific and technical competition of to systems is not to try to catch up, but to outdistance, ave behind, without catching (peregnat' nye dogonyaya). I seems that in relation to a naval engagement and the role of atack aircraft carriers in it, the Soviet Navy followed that avice and leapfrogged the traditional carrier stage in its dvelopment, and, by concentrating on cruise missiles, created is own "carriers". To a certain degree, E, C and other classes o cruise missile submarines and Kynda, Kresta, Krivak, and Nnuchka-class surface ships are carriers of robot-kamikaze.

The effective deployment of naval forces is presently iconceivable without reliable ocean surveillance to assure the umost effective employment of missile armament and to minimize a opponent reaction time. The intensive activity of Soviet rconnaisance aviation above the oceans, demonstrated particularly dring the <u>Okean</u> maneuvers and the reported launching of aditional satellites during the India-Pakistan war are evidence o Soviet recognition of the importance of surveillance. The Sviets emphasized the necessity for a wider application of mcro-electronics and laser technology and the creation of dfensive means, not against already operational offensive sstems, but against potentially possible ones, "the appearance o which are most likely to be expected in the armed forces of

countries of the opposing camp".[310] The recent assurance by Marshall Grechko that "the Navy will be supplied with more sophisticated technology and powerful armament" demonstrated the Soviet Union's determination to keep its navy apace with technological progress.

The prime mover behind the rapid and quite sizeable advance of the Soviet Navy during the last fifteen years, however, was not Soviet technology, which, in spite of the heavy emphasis on the defense sector and obvious advances in certain fields, is no better than US technology, and most likely behind it. The imaginative thinking of the Soviet naval circles which did not hesitate to break with established concepts, but worked out and applied new ones has to be given major credit. In the United States Navy, apparently, there are a number of people justifying US Navy Captain Smith's statement that "out-of-date thinking even more than our publicized over-age ships is our problem". Often heard references to Mahan's basic concept, command of the sea, which, as it is well known, is supposed to be gained by a decisive battle won by a superior navy, can hardly be called valid in the nuclear age, and its advocates seem to continue to live in "a dim religious world in which Neptune was God, Mahan

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[310] G. A. Kadomtsev, "On the Leninist principles of scientific foresight", *Morskoy Sbornik* No. 11, 1960, p. 5.

hs prophet, and the United States Navy the only true church". Tis way of thinking leads to overenthusiastic comments concerning hdrofoil patrol ships as "able to take anything that floats", srface-effect (air cushion) ships employed in up to small crrier size and changing "the whole power relationship at sea", ad small carriers labeled "sea control ships". While indicating he propulsion modes of the visualized ships, most of which re still in the drawing board stage of development or at best re being tested in boat-size prototypes, very little is said bout the armament packages which, in the final analysis, together ith tactics are the main thing, and the ships are only platforms o carry them. Surprisingly, there is not much talk about surface skimmers, and yet the Soviet Navy seems to be interested in them.[8]

Recently the Commander-in-Chief of the Soviet ground forces concluded his Navy Day greetings with the assertion that the Navy "can count on the efficient and the effective *support* of ground forces", which represented a considerable change from the not so old view of the Soviet Navy as "a reliable helper of the Soviet Army." The independent nature of Soviet Navy operations, its alleged ability "to solve strategical tasks directly" and, by its presence in remote areas "to contain aggressive actions" claimed by the Soviets, cannot any longer be rejected off-handedly or lightly. How efficient the Soviet

Navy would be in the claimed capability might be debatable, but their firm understanding of the effective use of the Navy seems to be beyond any doubt.[311]

The overall capability of the Soviet Navy and, more so, its intentions, might be debatable as are conclusions concerning the Soviet naval policy and the nature of strategic employment of the Soviet Navy. However, the Soviet Union's determination to break away from her recent naval inferiority, to go beyond the customary closed seas and coastal waters, to employ a considerable portion of its imaginatively renovated navy in the world's oceans for the "protection of state interests" and to exclude the mistakes and misfortunes of the past, is obvious. The following quotation illustrates: "For many decades almost continuously warring among themselves, the European colonial plunderers unanimously aspired to deny Russia access to the ocean -- by force, by diplomacy, and even by 'scientific' argumentation. A "theory" was devised and circulated to the effect that historically Russia was a purely continental state, and that therefore it was neither necessary nor possible for it to have a powerful navy. Influential mercenary supporters of this theory

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[311] It was reported that during India-Pakistan War, the Soviet ambassador to India, N. M. Pegov, assured Indian officials "that a Soviet fleet is now in the Indian Ocean, and that the Soviet Union will not allow the US Seventh Fleet to intervene". Parade, February 13,1972, p. 8.

were found in the Tsarist government, the consequences are well known -- it is enough to recall the Tsushima tradegy."[312]

One wonders if the political goals of the Tsarist government which led to Tsushima are not shared and pursued by the Soviet government.

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[312] Okean-Maneuvers of the Soviet Navy in April-May 1970, Voenizdat, 1970, pp. 26-27.

CHAPTER II

MERCHANT MARINE

History of Development, Plans and their Implementation

At the beginning of World War I, the Russian mercantile leet numbered 1,040 ships with a total cargo carrying capacity f 912,000 tons; many were old, slow, technically obsolete teamships and sailing vessels. Although three quarters of ussia's foreign trade was carried by sea, only 7% of it was arried on Russian ships.[1]

Foreign (German, French, British) interests owned a onsiderable percentage of the joint stock companies.

As a result of World War I, the chaos of the Revolution nd particularly the civil war, many merchant ships were ost-sunk, taken overseas by the White Guards, or confiscated y foreign states. The total loss amounted to over 400,000 tons, or more than 40%. For example, in the Black Sea-Sea of zov basin in addition to combat losses, 204 ships with a total cargo capacity of 206,000 register tons were taken away in

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[1] _Vodnyy Transport_, 20 June 1970.

920 by the retreating White Guards. The majority of the emaining ships were in poor technical condition, and many were ailing ships.

The February 1917 Revolution generated alarm among foreign tockholders of Russian steamship companies. There were attempts o hold Russian ships in foreign ports under various pretexts. he October Revolution just accelerated the process. In order to revent it, the Soviet government issued the decree of 24 ovember 1917 concerning "prohibition of the sale, hypothecation nd chartering of Russian merchant ships by foreign citizens nd organizations". All transactions concerning the transfer f ships abroad conducted prior to November 24, 1917 were declared oid, and the sailing of ships to foreign ports prohibited.[2] he socalled "workers control" of steamship lines through pecially organized committees was established. The decree y the Council of People's Commissars on the 23rd of January (February 5) 1918 nationalized the whole Russian mercantile fleet. The newly organized Baltic company, Transbalt, in 1918 andled 160 Soviet and foreign ships in the Port of Petrograd, ut the Civil War interrupted even such modest activity.

On March 15, 1920, Lenin stated: "I repeat that our destiny depends on the forthcoming water transport campaign

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[2] *Morskoy Flot* No. 1, 1967, pp. 5-7.

rhaps more than on the forthcoming war with Poland".[3] In ay 1920 the decree signed by Lenin gave the Sovnarkom (Council People's Commissars) exclusive right to permit the sale of ips and to enter into charter party agreements.[4]

The resumption of foreign trade was badly needed to ease he economic dislocation of the country and to start the estoration of industry, and at least a small number of perational ships was required for that purpose. Because of the vil war, the only area from which the ships could operate ad carry foreign cargo was the North. In May 1920 three sunken ips and, during the summer of 1920, several more were raised n the White Sea. The newly organized Directorate of Sea ransport for White Sea - Murmansk (Belomortran) collected 23 eamships (some with the ice-reinforced hulls) and 23 sailing essels. Because of the shortage of coal, the latter were onsidered of a special importance.[5] The first Belomortran ship, bbotnik, left Archangel on the 16th of August 1920 with foreign rade cargo. In 1921 the Belomortran was reorganized into the ite Sea District of Sea Communications (BOMPS), and in 1922 the rthern State Steamship Line Company was formed.

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[3] V. I. Lenin, Complete Works, Fifth Edition, Vol. 40, p. 218.

[4] Morskoy Flot No. 11, 1967, pp. 2-3.

[5] Morskoy Flot No. 3, 1963, pp. 8-10.

In the Black Sea, the salvage of ships started in the second half of 1920. After one year of salvage and extensive rpair work, the Black Sea Steamship Line Company resumed peration.

In the Baltic, the Baltic State Steamship Line was organized i 1922. The company immediately started to carry foreign cargo. Money earned by charter permitted the Baltic Company to repair ships and thus to increase their number and total tonnage. After one year the company had 30 ships with a total tonnage of 9,590 tons.[6] After 1922, the shipbuilding industry speeded up hip repair and soon began the construction of new ships.

With the introduction of the NEP (New Economic Policy) in 921, all steamship companies started to operate on a self-upporting basis; they were no longer financed by the state. n order to attract private capital, the joint stock shipping ompanies Dobroflot and Sovtorgflot were organized.[7] In addition, oreign capital was attracted through a number of mixed companies. or example, in May 1921 the Russian-German company, Derutra, and n 1923 the Norwegian-Russian Steamship Company were organized. he mixed companies, besides bringing in needed foreign capital, ere viewed as a device for avoiding the blockade of Soviet foreign

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[6] Morskoy Flot No. 1, 1967, pp. 5-7.

[7] TsNIIMF, Transactions, Vol. 133, 1970, p. 37.

rade cargo and for gaining experience in operating steamship ines. There was a strict "division of labor" between joint tock and mixed companies; the former were allowed to carry argo between Soviet ports in coastal navigation and the latter ere used for the transportation of foreign trade cargo xclusively.[8] With the growth of the Soviet Merchant Marine nd improved relations with many foreign states, both types f company were liquidated.[9]

In 1925 the restoration of the majority of ships was ompleted. The Soviet yards started to build new ships and, n addition, ship procurement abroad was initiated. The merchant arine program visualizing the construction of 698,000 tons of hips was approved by the Counsel of Labor and Defense in 1925.[10] In 1928, prior to the first Five Year Plan, about 80% of Soviet Merchant Marine ships were more than 20 years old. According to the first Five Year Plan (1928-1929/1932-1933), 10 billion rubles of capital investment were planned for Soviet transport, 3.6 times more than the 2.7 billion rubles for the previous five years. It was further planned to complete the restoration of Soviet Merchant Marine and to increase cargo sea transportation

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[8] Morskoy Flot No. 11, 1967, pp. 2-3.

[9] March 1930 Decision of the Soviet Government, see Morskoy Flot No. 1, 1967.

[10] For details, see Chapter entitled "Shipbuilding".

re than four times, port cargo turnover two times, and total nnage of ships more than two times.[11]

During December of 1930 and the first few months of 1931, e Soviet transportation system, which was lagging considerably hind the increasing demand, became the object of the special onsideration of the Party and the government, which led to a mber of decisions to improve the situation. The decision to ganize the People's Commissariat for Water Transport was made n January 30, 1931.[12] On April 14, 1931 another decision "on ea transport" demanded an improvement in the efficiency of the ranch and approved the organization of six merchant marine irectorates: The Azov, Baltic, Caspian, Northern, Pacific, and lack Sea.

Although the first Five Year Plan was not fulfilled, the erchant marine received 136 new ships with a total cargo capacity f close to 500,000 tons (more than half were Soviet built). In 932 the total cargo turnover of the Soviet Merchant Marine eached the pre-revolution level.[13]

The Party directives for the second Five Year Plan

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[11] Morskoy Flot No. 2, 1968, p. 3.

[12] Up to that time the Soviet Merchant Marine was subordinated o the Commissariat of Railroads. The new Commissariat of Water ransport included the merchant marine and the river fleet.

[13] Morskoy Flot No. 1, 1967, pp. 5-7.

(1933-1937) visualized an accelerated development of Soviet Merchant Marine. A total of 26.3 billion rubles were planned for the development of Soviet transport. Although the figures for the merchant marine were not published, judging from previous practice, 6 to 8 billion rubles would be a fair assumption. In reality, however, the merchant marine received only 23 new ships during 1933-1934, with a total cargo capacity of 130,000 tons. The remaining three years of the second Five Year Plan witnessed a sharp reorientation of Soviet industry toward military production. "In shipbuilding, Navy orders became predominat, and construction of merchant ships practically stopped. Partial reinforcement of the merchant marine was conducted through the purchase of ships abroad."[14]

Instead of ships and port modernization, the Soviet Merchant Marine was fed with decisions. According to a decision of the CPSU Central Committee in 1934 the political directorate of Water Transport and political departments in steamship companies were organized. Their functions were defined as "to assure fulfillment of Party directives for the improvement of all activities of water transport, to increase political education and training of personnel, to elevate vigilance".[15]

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[14] Morskoy Flot No. 2, 1967, p. 4.

[15] Morskoy Flot No. 2, 1967, p. 5.

anwhile, the shortage of Soviet tonnage forced the greater use o the chartering of foreign ships.

The Spanish Civil War presented the Soviet Merchant Marine with an additional burden. The Soviet supply to the Republicans could be delivered only by sea, directly to the Spanish ports, o through France. A number of Soviet ships were detained by Franco forces, and three, the Komsomol, the Timiryazev, and the Bagoev, were sunk. The weak Soviet Navy could not provide the Soviet Merchant Marine with effective protection.

The 18th Party Congress (March 1939) directives for the hird Five Year Plan for 1939-1943, visualized the acceleration o the merchant marine development. According to the plan, the erchant marine role in the country's transportation system was o be increased, new types of ship were to be built, ports mproved, and the Northern Sea Route mastered. A considerable ncrease in capital investment was planned.[16] In reality, however, espite a modest increase in civilian shipbuilding, little was one to improve the merchant marine prior to World War II. By 940 the tonnage of the USSR Merchant Fleet approached 2 million ons, but qualitatively the majority of ships were obsolete and n no way able to satisfy the needs of sea transportation, either n peacetime or during the war.

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[16] _Morskoy Flot_ No. 3, 1967, p. 7.

When the war started on June 22, 1941, a number of merchant ships were taken over by the Soviet Navy. The activity of all steam-ship companies was immediately subordinated to the needs of the military command, and firm military control over them was established. In the Baltic the merchant fleet was used to evacuate retreating troops, military hardware, some industrial machinery and civilian personnel from the Riga, Tallin, and later the Khanko. In the fall of 1941 the whole remaining fleet was blocked in Leningrad, where it remained to the end of the war. In the Black Sea, the merchant ships were used to supply and, later to evacuate, the Odessa garrison, to supply the defenders of Sevastopol, and to assist the Black Sea Fleet and the Soviet Army during the defense of the Caucasus. In the north, the majority of available 40 merchant ships were used for transportation of Lend-Lease cargo and raw materials (in western convoys and also along the Northern Sea Route). Twelve ships were lost. In the Pacific, merchant ships participated in the transportation of Lend-Lease cargo from the U. S. and continued to provide sea trasnportation for Far Eastern region, and along the Northern Sea Route. In the Caspian Sea, the tanker fleet was used extremely intensively, delivering Baku's oil.

The war took a heavy toll of the Soviet Merchant Fleet. Nearly half (380) of all ships were lost and practically all

remaining ships were badly in need of repairs. The Soviet Union collected all the Axis shipping it could as reparations. A number of ships, mainly Liberty-class, were obtained under Lend-Lease. Decrepit was the term describing the condition of small old ships built in various countries during previous two to three decades.

The war caused considerable damage to Leningrad, Murmansk, and a number of other ports, while such large ports as Odessa, Novorossiysk, Nikolayev, Tuapse, Tallin, and Riga were destroyed.

The plan for the restoration and development of the Soviet economy approved in March 1946 envisaged, for the merchant marine, the delivery of 400,000 tons of ships, accelerated repair of suitable ships, capital reconstruction of major ports, 2.2 times greater cargo turnover in 1950 compared with 1940, and a 2.5 times increase in production capacity of ship repair yards.[17] Actually in 1950 the Soviet Merchant Marine transported 33.7 million tons of cargo with a total cargo turnover of 21.4 billion ton-miles. The promised tonnage was not delivered, although the repair facilities were improved and port restoration had begun. The inability of the mercantile fleet to fulfill the plan was recognized in the Counsel of Ministers Decision of 17 June 1947 "on measures to improve the operation of the merchant

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[17] Morskoy Flot No. 5, 1967, p. 6.

arine and fulfillment of the State plan for transportation of argo in 1947". While this "stick" intensified somewhat an lready tense situation in the industry, it could not and did ot produce drastic improvements.

Directives for the fifth Five Year Plan (1951-1955), dopted by the 19th Party Congress in October 1952, devoted onsiderably greater attention to the merchant marine. The apital investments were increased, somewhat larger facilities r new constructions allocated, an intensified procurement of ips abroad approved, modernization of existing and construction f new shipbuilding yards and ports, planned.

During the 1951-1955 five-year period, the growth of the viet Merchant Marine exceeded that in the previous five-year eriod by 63.8%. More than half of the new ships received were viet built. In addition, many ships underwent major repairs, he last time such an approach was used on a large scale by the viet Union. In 1955 the Merchant Marine carried 53.7 million ns of cargo with total turnover of 37.2 billion ton-miles.[18]

The XX Party Congress directives for the sixth Five Year an, (1956-1960), envisaged a merchant fleet growth by 1,600,000 t (to be built mainly by the Soviet and Comecon country yards) d increased participation of Soviet ships in transportation of

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[18] Morskoy Flot No. 6, 1967, p. 7.

freign trade cargo.[19] The Soviet North was singled out as a piority area for merchant marine development. The timber eport there was carried out mainly by foreign ships (85.6%) cartered by the Soviet Union. By 1959 only 70% of the Northern Seamship Company tonnage was powered, including 77.5% still urning coal and only 22.5% using liquid fuel.[20]

While the sixth Five Year Plan was never fulfilled, (it ws replaced by the 1959-1965 Seven Year Plan), the measures rovided in it did play an important role in the development f the Soviet Merchant Marine. While not contributing much irectly, the Plan did set a definite trend, building up a rerequisite for the future accelerated development of the erchant marine. In effect, it was the first plan which was arried out during its initial three years as it was visualized: ore funds were allocated and spent for ships at home and abroad, nd more domestic shipbuilding capacity was allocated and tilized for civilian construction.

During the Seven Year Plan period (1959-1965), the Soviet erchant Marine underwent a truly unprecedented development. he plan for the merchant marine was revised twice, each time with considerable increase in tasks. The first revision came after

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[19] Morskoy Flot No. 6, 1967, p. 7.

[20] Morskoy Flot No. 3, 1967, pp. 8-10.

te 22nd Party Congress (October 1961), when it was decided to acelerate even more the already fast growth of the merchant mrine for the reason that the plannedgrowth of the cargo cpacity of the fleet was lagging behind the growing demand of te foreign trade, and, consequently, a considerable expenditure ws required to charter foreign ships. The second increase was i 1963, for the plan was fulfilled two years in advance. The icreased tasks set for the Soviet Merchant Marine in 1963 were aso over-fulfilled towards the end of 1965, again an unprecedented henomenon in Soviet planning practice.

According to the original plan, the cargo turnover was o increase by 220%, but the actual increase was 360%. In 958 the Soviet Merchant Marine carried only 6.6% of the total argo turnover for all types of transportation in the country, hile in 1965 it carried 14%. In foreign trade, the cargo urnover increase was 480%. The total cargo turnover increased rom 57.4 billion ton-miles in 1958 to 209.9 billion tons in 965. The merchant fleet tonnage grew from 2,848,000 register ons in 1958 to 7,150,000 register tons in 1965, or 2.5 times. n 1958 the Soviet Merchant Marine had about 250 ships suitable or long hauls while in 1965 there were over 800 such ships. he average cargo carrying capacity of the dry cargo ships ncreased 150% over the Seven-Year Plan period, while that for

d tankers increased 180%. The Soviet Merchant Marine jumped om the 12th place in world ranking in 1958 to 6th place in 65, becoming one of the youngest fleets in the world with most 80% of its ships built in the previous ten years. Towards e end of the period, the Soviet Merchant Marine sharply creased its participation in the charter market.[21]

The Seven Year Plan resulted in the complete elimination f coal-burning ships, which at the beginning constituted 77.5% f the total ship inventory of the Northern Steamship Company fered by way of example above. The average age of ships was creased from 14 to 8 years, while the average speed increased om 8 to 14.5 knots. As a result, the amount of export timber rried on Soviet ships increased from 14.4% to 1959 to 62% 1965. In 1962, the Northern Steamship Company was receiving e new ship per month, and in 1965, two ships per month. though completely retiring old ships, the company nevertheless creased its tonnage by 1.7 times.[22]

The phenomenal growth of the Soviet Merchant Marine during e seven year period attracted the attention of world shipping mmunity and press. For the first time in its history, the

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[21] _Morskoy Sbornik_ No. 7, 1966, pp. 9-14, and No. 8, 1967, p. 6-8.

[22] _Morskoy Flot_ No. 3, 1967, pp. 8-10.

oviet Merchant Marine began to be viewed as a growing challenger ad effective instrument of Soviet foreign policy.[23]

Directives for the 1966-1970 Five Year Plan approved y the 23rd Party Congress in April 1966 provided for a 50% ncrease in Soviet Merchant Marine tonnage, an 80% increase n total cargo turnover, and a 40% increase in port productivity.[24] ccording to the plan, the average ship operating time toward he end of period was to reach 330 days per year for dry cargo hips and 325 days for tankers.[25]

Although the plan was not fulfilled, actual performance as close to the planned figures. The fleet was augumented by 40 new ships totalling 4.5 million dwt, an increase of 42% over five-year period. Total cargo turnover in 1970 amounted to 54 billion ton-miles, an increase of 70% over 1965. (In foreign uns, which accounted for 91% of the ton mileage, the increase as 78.4%).[26]

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[23] See Reporter, February 10, 1966, pp. 24-28.

[24] Morskoy Flot No. 6, 1968.

[25] Morskoy Flot No. 11, 1967, p. 8 and No. 2, 1970, pp. 3-5.

[26] The socalled Cuban Sea Bridge and the closure of the Suez anal contributed considerably to this Soviet index. Day-in and ay-out the Soviet Merchant Marine has had some hundred ships on he Cuban run, where total tonnage delivered in 1970 exceeded 9 illion tons. The Soviet North Vietnamese lines were served in 1970 by more than 150 ships. The 1970 cargo carried to North ietnam was said to be equivalent to about 1,000 trainloads. ew Times No. 10, 1971.

During those five years, 730 million tons of cargo and 167 llion passengers were carried by the Soviet Merchant Marine. I 1970 Soviet ports handled 1,300 million tons of cargo, a fteen percent under-fulfillment of the plan.[27] Average ship erating time increased for dry cargo ships from 310 days in 1965 t 331 days in 1970, and for tankers from 311 days to 322 days.[28] verage "speed" of dry cargo ships grew from 285 miles per day n 1965 to 315 miles per day in 1970, and tankers, from 327 to 33 miles per day. At the end of 1970, the Soviet Merchant rine had established 65 foreign lines including 33 with a ublished schedule. In addition, there were many lines in coastal avigation.

Reporting to the Collegium of the Ministry of Merchant arine, Minister Guzhenko stated that the Soviet Merchant Marine uring 1966-1970 "assured the complete fulfillment of the cargo ransportation requirement in coastal navigation, the independence f Soviet foreign trade from the capitalistic charter market, and ssistance to fighting people of Vietnam, Egypt, and other ountries".[29] First Deputy Tikhonov added that, by satisfying

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[27] Ibid.

[28] Morskoy Flot No. 3, 1971, pp. 3-7.

[29] Vodnyy Transport, 11 February 1971.

th requirements of the Soviet national economy, the Merchant ine fulfilled "the century-old dream of Russia's leading igators".

The following table illustrates the augmentation of the iet civil fleet. It can be seen that, while total annual wth has been around 1 million tons, not all ships belong the merchant marine.

Statistical Table of Soviet Self-Propelled Ships
Over 100 Registered Tons Recorded in the USSR Register

Type of Ship	1967		1968		1969		1970	
	A*	B*	A	B	A	B	A	B
1. Passenger and cargo-passenger	186	485,545	196	514,773	203	511,587	203	405,602
2. Dry-cargo	1,667	5,791,813	1,710	6,117,164	1,778	6,588,615	1,819	7,114,373
3. Tankers	360	2,919,106	382	3,066,737	403	3,205,605	425	3,388,652
4. Service and auxiliary	660	335,147	667	334,420	695	354,563	698	333,521
5. Fishing	2,629	2,517,377	2,714	2,741,709	2,800	2,992,445	2,888	3,263,251
6. Technical	306	267,945	305	268,425	315	275,097	329	287,749
7. Others	205	156,289	214	205,186	226	253,126	250	312,059
8. TOTAL	6,013	12,473,222	6,188	13,248,414	6,420	14,181,038	6,612	15,215,407

Source: Sudostroyeniye No. 1, 1969; No. 6, 1969; No. 5, 1970; No. 5, 1971.

*A - number of ships
*B - total capacity, registered tons
1. Data as of December 31 of indicated years

The Five Year Plan for 1971-1975, directives for which were pproved by the 24th Party Congress in April 1971, provides for a rther increase in Soviet Merchant Marine tonnage of 5 million ns. It is planned to increase total cargo turnover by 35%, ile increasing cargo carriage by 40%. The plan provides for the nstruction of new ports and modernization of existing port cilities. The deep-draft dock areas in the Soviet ports are to increased by 37%.[30]

It is planned to increase container carriage and to replenish e merchant fleet with ships carrying 40, 200, 300, and 700 ntainers. Special container terminals in Leningrad and khodka, utilizing the latest container handling techniques, are become operational. The introduction of ships of 5,000 dwt d 25,000 dwt with stern ramps as well as LASH (lighter aboard ip) ships, each designed to accommodate 40-50 lighters of 0-400 tons each is also being planned. The Soviet Merchant rine is supposed to receive a number of large bulk carriers 23,000 dwt, 50,000 dwt, and at the end of the period, -80,000 dwt, combination tanker-ore carriers of up to 120,000 t, and large, 150,000 dwt tankers. More intensified long-haul rry service, most of which will be suitable for ice navigation

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[30] <u>Morskoy Flot</u> No. 3 and No. 4, 1971; <u>New Times</u> No. 10, 1971.

n the Far East, the Baltic and the Caspian Seas is visualized.[31]

The merchant fleet is to be augmented according to following pproved principles: new constructions will have an increased argo capacity "up to rational limits", with increased speed, ptimum minimization of number of ship types built in series with ide introduction of automation and crew reduction. It is planned o increase the profit from Merchant Marine operations by 29%, nd the net profit from foreign runs by 28%.

The development of the Soviet Merchant Marine in the more emote future, during the second half of the 1970s and the eginning of the 1980s, although not validated by any announced lan, is being discussed by leaders and specialists of the Ministry nd can be visualized as follows:

(a) Ships - The process of ship specialization already ell under way will not only continue but intensify, coupled ith the increased size (tonnage) of ships. Bulk carriers of 0-100,000 dwt and larger as well as tankers of about 200,000-50,000 dwt most likely will be built. The number of general argo ships, so numerous in the present Soviet Merchant, will efinitely be reduced. Considerable attention will be devoted o containerization, which will be particularly intensive during he second half of the 1970s, when the port facilities and other

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[31] Morskoy Flot No. 9, 1970; New Times No. 10, 1971; and ovetskaya Rossiya, 25 May 1971.

odes of transportation should be ready for it. During the second lf of 1970s, containerized cargo should exceed 30% of the tal. The speed of ships will be increased gradually, for in st cases a drastic increase in speed is not yet warranted. t only technologically but it would require the modernization ports, particularly their cargo handling facilities.

LASH and Roll-on/Roll-off ship types will be introduced considerable number during the 1975-1980 period. The process ship automation should not only continue but will most likely intensified. New types of crews composed of specialists ivided into two groups - control and maintenance - will man ighly automated ships. Wide introduction of submarine transports, arge air-cushion and hydro-foil ships during 1970s is unlikely. ew methods of handling and transporting bulk cargo, such as atering down the cargo and loading or unloading it through ose-pipes, combined with 90-95% enrichment of ores, will robably be introduced on an experimental basis towards the end of he 1970s.

(b) Ports - Initially in large ports (Zhdanov, Murmansk, akhodka, Novorossiysk, Ismail) and later in others, more highly utomated cargo processing devices will be installed, and there hould be a four to five-fold increase in productivity of loading nd unloading operations. More deep-channel approaches to the

rts will be dredged and dock area depth increased. Specialized ocks (terminals) for handling containers and packaged (unitized) argo will be built in Leningrad, Riga, Il'ichevsk, Odessa, ldivostok, and Petropavlovsk. Specialized docking areas for ndling chemicals, ores, coal, and similar cargo will be built.

(c) Management - Wide introduction of a computerized control stem (ASU) will succeed the initial, present basin and eamship companies computer centers. Towards the end of the 70s the automation of control in the Soviet Merchant Marine ould be completed.

Coupled with the further increase in line shipping with he employment of specialized, automated, series-produced ships nd improved port facilities, the measures most likely will esult in a considerable improvement in the over-all efficiency f the Soviet Merchant Marine.[32]

Those are the main stages in the development of the Soviet erchant Marine and the most probable trend of its development uring the decade of the 1970s. It can be seen that despite he numerous attempts, mainly through unrealistic plans approved the Party, to speed up the growth of the Merchant Marine and to ncrease its role in the overall transportation system, in reality,

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[32] Krasnaya Zvezda, 4 August 1970; Literaturnaya Gazeta, January 1971; Morskoy Flot No. 11, 1970, pp. 4-7 and No. 7, 971, pp. 3-5.

n for a variety of reasons (mainly the priority given to the ilitary production) that goal was not achieved up to the middle of 1950s. Starting in 1956, but particularly during the 1958-1970 period, not only did the Soviet Union for the first time develop an extensive and realistic program of merchant marine expansion but, more important, for the first time was able to implement it. In fact, speaking about the plan, it, too, was imperfect, for it was revised at least twice, but, in this case, upward.

The foregoing decisions and figures do not tell the complete story of Soviet Merchant Marine development. Moreover, they do not reveal either the reasons for the decisions or the mechanism producing the figures. The rest of this chapter will be devoted to an examination of the factors which necessitated the decisions and the ways they were implemented; the present organization and the management (control) of the Soviet Merchant arine; the Soviet Merchant Marine research and development, ducational institutions, and the personnel policy; ports and hip repair facilities; some economic aspects of Soviet Merchant arine operation.

The Need for the Merchant Marine

Up to the middle of the 1950's the development of the viet Merchant Marine was dictated mainly by the internal conomic needs and demands of Soviet foreign trade, which was ot substantial.[33] Since that time, however, there has been a onsiderable increase in Soviet foreign trade and in the development f Soviet program of economic and military assistance. The eed of the Soviet economy for sea transport between Soviet ports primarily associated with the development of new economic egions, in many of which land transportation is practically bsent) has intensified. The events in Cuba, Vietnam, and the iddle East have not only increased the demand for shipping - o transport armament, equipment, and goods - but, in turn, were o a certain degree influenced by the cargo.

Since 1955, the growth of Soviet foreign trade has outstripped the growth of the Soviet economy. The growth of ransportation of foreign trade cargos in turn exceeded the growth f the foreign trade. For example, during the period 1955-1967 the transportation of foreign trade cargo grew 4.2 times, while the value of the Soviet foreign trade grew only 2.8 times.[34] In

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[33] See Appendix II, Soviet Foreign Trade, Economic and Military Aid.

[34] N. D. Mozharov, "Cooperation of Socialist Countries in the Area of Sea Transportation", Transport, Moscow, 1969, p. 62.

tree years, 1959-1961, sea transportation of foreign trade cargo icreased more than two times, reaching 58.5 million tons in 161.

The reasons for such rapid growth are both political ad economic. On the political side, the obligations assumed by te Soviet Union toward a number of Arab countries, Indonesia, ad India during the second half of the fifties were of definite iportance. During the same period, trade with China continued o grow, and a considerable portion of it was carried by sea. oward the end of the 1950's and the early 1960's, what the oviets call "the process of disintegration of the world colonial ystem" had intensified considerably. During 1960, for example, n Africa alone, 17 newly independent states were established. he Communist victory in North Vietnam and particularly the ictory of the Castro revolution in Cuba were of significant mportance. Not all the above outlined events played an equal nd permanent role in generating the demand for Soviet shipping. ome, like Cuba and North Vietnam, left the Soviet Union with o choice; others, like Indonesia, had looked very promising, and ence worth the gamble. The third category of country such as the Arab countries, while in the majority ideologically alien, resented the Soviet Union with the opportunity to undermine estern positions in the region and hence with possible political

nd, in the future, maybe even economic gains. The break with hina in the late 1950's on the one hand forced the Soviet Union o reconsider its obligation toward certain countries, and as result, for example, sharply increase its assistance to India. n the other hand, the break relieved the Soviet economy of a onsiderable burden thus permitting more flexibility in trade s well as economic and military assistance.[35] The traditional oviet design "to free the country of the capitalistic shipping arket" and to have greater flexibility in the support of political oals should be added to that set of factors.

The peculiarity of the Soviet economy plays an important ole, for, while the USSR is the second economic power in the orld and produces sophisticated armaments, the overall level f Soviet technology is still below that in most the Western ountries. This factor has given a peculiar character to Soviet oreign trade. While a positive balance of payments has been

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[35] While the ideological, historical, and nationalistic spects of the Sino-Soviet rivalry and break have been investigated n great detail, the economic aspect, with the exception of the ifficulties the break created in China, has to a large degree een neglected. It is a firm belief of this writer, that hina's needs and the Soviet Union's economic possibilities, rimarily industrial capacities, were incompatible. The break, herefore, although producing clearly undesirable political onsequences for the Soviet Union, simultaneously released onsiderable industrial capacities, permitting the Soviet overnment greater flexibility in its foreign trade, economic nd military assistance.

aintained in most of the years of Soviet power, the physical olume of Soviet exports and imports has varied sharply. Heavy, ulky, raw materials have dominated the cargo in Soviet export hipping. The increased foreign trade in monetary terms has een primarily with capitalist countries from which mainly items f advanced technology have been important. In return, a very ew industrial goods produced in the Soviet Union could be sold n capitalist countries, and, hence, raw materials continue to emain the main item of Soviet export to them. In the trade with eveloping countries, the picture is reversed. All this produced situation whereby in 1967 Soviet export sea shipments exceeded mports by nearly nine times in physical volume, as can be seen rom the following table:

Soviet Foreign Trade Shipment (thousand tons:)

All means of transport / sea transport (Share of sea shipment -%)

	1960	1965	1967
Total	99,310 44,690 (45%)	173,910 91,837 (52.5%)	206,683 108,756 (53%)
Export	84,376 38,765 (46%)	151,767 79,088 (52%)	184,563 98,459 (67%)
Import	14,934 5,925 (40%)	22,143 12,749 (57%)	22,120 10,297 (46%)

Source: "Soviet Foreign Trade in 1967", Foreign Relations Institute, 1968, and N. D. Mozharov, pp. 62-63.

Soviet Merchant Marine participation in assistance o North Vietnam goes back to 1954-1955, when two Soviet ships, rkhangel'sk and Stavropol', were assigned exclusively to the SSR-North Vietnam "line".[36] With the escalation of the Vietnam ar, the number of Soviet ships delivering cargo to North Vietnam ncreased correspondingly: in 1964 47 Soviet merchant ships eached North Vietnam; in 1965, 79; in 1966, 122; 1967, 433.[37]

The first Soviet ships, Arkhangel'sk, Brats, Izhevsk, and olnechnogorsk delivered cargo to Cuba in the fall of 1959. The sea bridge" to Cuba was established in 1960, when the first oviet tanker, Cheboksary, delivered 11,000 tons of oil, followed y uninterrupted deliveries by other ships. In 1960, two million ons of oil were delivered and in 1969, 5.5 million tons.[38] At resent, the annual cargo turnover of the Cuban "sea bridge" is bout 9 million tons (7.8 million tons to Cuba, and 1.3 million tons, mainly sugar and ore, to the Soviet Union in 1969). During the 1960-1966 period, Soviet seaborne cargo shipments between the USSR and Cuba grew nearly five times and with North Vietnam, 3.4 times. Toward the end of the 1960's the Soviets had 20-30

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[36] Morskoy Flot No. 1, 1971, pp. 3-4.

[37] Report to the U. S. House of Representatives, Committee on Armed Services, "The Changing Strategic Naval Balance, USSR vs. USA", Section 4, Merchant Marine, U.S. Govt. Printing Office, December 1968, Washington, D. C.

[38] Morskoy Flot No. 8, 1970, p. 53.

hips on route to or from Cuba on any given day.[39]

Seaborne cargo shipments between Soviet ports and developing ountries grew considerably during 1961-1965. With Socialist ountries it increased from 6.3 million tons in 1960 to 16.4 illion tons in 1967. The seaborne shipments between the USSR nd capitalist countries grew about three times, while with apan, 5.5 times (6.7 million tons in 1965), with Italy, 3 times million tons), and with West Germany, 7 times (3.1 million ons).[40]

Shipping Policy

The foregoing factors and figures are definite testimony o the importance of the Soviet Merchant Marine during the 1960's. ut at the beginning of the decade discrepancy arose between the lanned growth of merchant marine tonnage and the tonnage actually equired. It forced the Soviet Union to increase considerably he chartering of foreign - flag ships, which in turn "reduced the ffectiveness of foreign trade" or, in simple language, cost too uch and forced the Soviets to pay in badly needed foreign exchange.[41]

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[39] V. G. Bakaev, "USSR na morskykh putyakh" (USSR on World ea Routes), Znanie, Moscow, 1969, p. 16.

[40] N. D. Mozharov, op. cit., pp. 63, 66 and 104.

[41] Moreover, the shortage of ships imposed an added burden pon the other, already overloaded, modes of Soviet transportation, articularly the railroad system.

his is why at the beginning of the 1960's a review of the even-year plan for the development of the Soviet Merchant Marine as made, resulting in accelerated shipbuilding at domestic ards and increased orders for merchant ships abroad. In 1962 e total annual increase in Soviet Merchant Marine cargo carrying apacity was equal to the growth of sea shipments of foreign rade cargo, and toward the end of the decade exceeded it. The otal tonnage of dry cargo ships increased from 2,107,000 egistered tons in 1958 to 4,704,000 registered tons in 1965. n even more rapid growth of total tonnage was achieved in the anker fleet: from 741,000 registered tons in 1958 to 2,446,000 egistered tons in 1965, or 330%.[42] Major factors for such a apid tanker fleet expansion were Cuba's need for oil, which had o be shipped thousands of miles, boycott attempts (which only artially succeeded) organized by Western oil companies, and the rowth of Soviet oil exports.

The development of foreign trade, particularly on the asis of the long-term agreement preferred by the Soviets, created more or less steady flow of cargo to and from certain geographic nd political regions. It permitted the Soviet Union to establish "foreign trade cargo traffic directorates" and to establish five roups incorporating several such directorates, European, Middle

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[42] N. D. Mozharov, p. 105.

East - African, South Asian, Far Eastern, and American.[43]

<u>The European Group</u>, where close to one-half of foreign trade cargo is shipped, includes three directorates: the Mediterranean (Italy, France, Greece); the Scandinavian; and Continental (West Germany, Belgium, the Netherlands and Great Britain). Oil, oil products, coal, and timber are the main cargoes (by volume) in this group.

<u>The Middle East - African Group</u> includes five directorates: The Near East (Turkey, Syria, Lebanon, Cyprus); the Red Sea Countries; the Persian Gulf Countries; the North African Countries; the West African Countries. The largest cargo flow is to Egypt.

<u>The South Asian Group</u> includes India, Pakistan, Ceylon, Burma, Malaysia, Cambodia, Thailand, and Indonesia; <u>The Far Eastern Group</u>, Japan, North Korea, and North Vietnam; <u>The American Group</u>, Cuba, Brazil, Argentina, Canada, the U.S., Mexico, and other countries of the Western Hemisphere.

Practically all major Soviet basins (Northern, Baltic, Black Sea-Azov, Caspian, and Far Eastern) are participating in more than one group through the steamship companies located there. Some steamship companies of a particular basin have been assigned to specific directorates, and also are specializing in

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[43] <u>Soviet Union Sea Transport in Fifty Years</u>, Moscow, Transport, 1967.

particular cargo.

The Northern Basin companies are specializing in shipments f timber and minerals, mainly to the European group, as well s delivery of coal to the USSR from Spitsbergen.

The Baltic Basin companies are mainly involved in hipments of industrial goods as well as coal and oil mainly o European and American (including Cuba) groups. The companies f the basin are also participating in shipments to West Africa roups.

The Black Sea-Azov Basin companies are serving all five groups and are carrying a considerable portion of Soviet foreign rade cargo, mainly oil, coal, cement, metals, machines, and sugar. The companies of Far Eastern Basin are serving the Far Eastern and in part the South Asian and the American groups.

Up to 1965 the Caspian Basin provided partial deliveries of Soviet foreign trade cargo to Iran in addition to internal transportation of oil from Baku. Starting in 1965, but especially after the closure of the Suez Canal, it has been involved in the growing volume of Iranian cargo to and from Europe.

With the closure of the Suez Canal, the length and the duration of the North Vietnam runs from the Black Sea and the Baltic increased considerably, thereby requiring more ships to maintain even the same volume of cargo. While continuing North

ietnam shipments from European Basins, the Far Eastern Basin as been gradually assigned the larger share of cargo for North ietnam. Shipment via railroad and the Northern Sea Route are o have been increased correspondingly.

The Soviet Merchant Marine has developed extensive liner ervice in four major categories: purely Soviet, operating jointly ith other Socialist countries, jointly with capitalist countries, nd jointly with developing countries. The economic advantages f liner shipping are obvious, but their organization and aintenance are possible only in the case of the availability f a steady flow of cargo, at least in one direction. The learly established policy is to expand liner service, something elatively easy to achieve in internal shipping or in the case f lines operated jointly with Socialist or developing countries (thanks to the planned deliveries and the absence of opposition for variety of reasons). The initial Soviet attempts to join lines un by Western countries, many of which are under the strong influence of British shipping companies, ran into opposition. The shipping conferences[44] initially rejected Soviet steamship

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[44] A conference is usually formed by a number of shipping companies agreeing to provide scheduled runs on certain routes at fixed freight rates. Their customers often receive more favorable rates as a reward for long business associations. The conferences serve specific lines, many with announced schedules. The ships participating in a line service are calledliners. The occasional cargo, or cargo whose volume fluctuates considerably, is usually carried by tramps.

ompany applications for membership. Of the various reasons iven for rejection, the most common and important were: all oviet steamship companies and their ships are government owned, nd the principle of government non-interference with commercial hipping would be violated by acceptance of the Soviet companies; he alleged fear that the Soviets were trying to monopolize heir own shipments, while infiltrating the Western lines.

The rejection of the Soviet application for membership n London's Baltic Exchange and in various Australian conferences esulted in not just a war of words, but certain deeds from the oviet side. At least some Soviet business with the Baltic xchange was cancelled, and Soviet shipping companies organized number of "outsider lines" competing with the existing Western ines, often by cutting rates. Finally in 1969 a number of oviet steamship companies were accepted as members in various, reviously exclusively Western, shipping conferences.[45] By the

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[45] *Morskoy Flot* No. 3, March 1971. For the detailed description of the Soviet "battle" with Western conferences, see David Fairhall, "*Russian Sea Power*, pp. 119-148, Gambit, Boston, 1971. Actually the first to accept a Soviet member, the Baltic Steamship Company in 1960, was a passenger conference controlling services in the North Atlantic. The Soviet reaction was expressed in an article which stated: "In these days, it is a hopeless enterprise to discriminate against the Soviet Union, and it is good that the Australian conferences have finally understood this". *Izvestiya*, 15 March 1969. The Soviets claimed that up to 1969 they were paying over 1 million rubles annually to foreign shipping companies to carry Australian wool to Soviet ports.

ad of 1970, out of 65 Soviet lines, 15 were being operated jintly with Western shipping companies, and the number continues t grow. In April 1971 a joint Soviet-French line between Odessa ad Marseille was opened, and in May, the Japan-Mediterranean Sa line became operational.[46]

The growing importance of liner service can be illustrated b way of the example of the Chernomorskoye (Black Sea) Steamship Cmpany which in the middle of 1971 had more than 80 ships asigned to all four types of lines. In order to increase the efectiveness of the company liners, a special Department of Iternational Lines was organized.[47]

The conflict between Western shipping conferences and the Sviet Merchant Marine has not been unique, for the conferences peviously were involved in a conflict with the U.S. Maritime Cmmission and opposed any attempts to impose shipping regulations b the U.N. (UNCTAD - United Nation Conference on Trade and Dvelopment).[48] Soviet efforts have been directed toward reassuring

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[46] _Vodnyy Transport_, 8 July 1971.

[47] _Vodnyy Transport_, 18 September 1971.

[48] The Soviet Union obviously prefers that UNCTAD play a more iportant role in regulating international shipping, as is evident fom a number of pronouncements by Soviet Merchant Marine officials, ad particularly clearly expressed in former Merchant Marine Mnister Bakayev's publication _The Soviet Union on World Sea Rutes, 1970._

Western ship owners and demonstrating that once admitted, they are faithful observers of conference regulations, which, in fact, according to available information, they have been. The Soviets flatly deny the allegation that they desire and plan to monopolize their own seaborne trade, emphasizing that it is a practical impossibility and that the achievement of independence from the world freight market does not mean monopoly.

Starting in 1962 there was a gradual increase in the number of Soviet ships chartered by foreigners, with correspondingly greater earnings of foreign currency. In 1962, Soviet ships carried 1.9 million tons of foreign cargo, in 1965, 8.6 million tons, and in 1967, 15.7 million tons.[49] Simultaneously, the number of foreign ships chartered by the Soviet Union has increased, too. Chartering increased 4.4 times during the 1959-1967 period, and in 1967 59.7 million tons of Soviet goods were carried by foreign ships, while the remaining 64.1 million tons of seaborne foreign trade cargo were carried by Soviet ships.[50] Soviet statistics are vague concerning the balance of charter in monetary terms, for they do not specify what percentage of cargo carried by foreign ships was transferred by the ships of CMEA countries. The Soviet Minister of Merchant Marine stated

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[49] V. Bakayev, op.cit., p. 25.

[50] V. Bakayev op.cit., p. 23.

1969 that between 1964 and 1968 the merchant marine earnings f convertible currencies increased ten times. It is fair to ssume that, at least in foreign convertible currencies, the harter balance continues to be favorable for the Soviet Merchant arine.

The activity of the Soviet Merchant Marine and merchant arines of CMEA countries is closely coordinated in Section o. 3 of CMEA Permanent Committee for Transport. The Soviet rganization, Sovphrakht, in cooperation with its counterpart in MEA countries, conducts a coordinated charter policy through the harter Bureau. Cooperation in mutual use of tonnage, charter f foreign tonnage, mutual use of ports, ship-repair bases, xchange of information, joint policy toward international egulations, etc. are well developed within the CMEA framework. otal tonnage of Socialist countries at the end of 1970 was 1.4 million registered tons, or approximately 9.4% of the world otal. It was argued that with its share of world production utput in excess of 1/3 of the total, merchant marine growth s not only warranted "from the economic and other points of iew", but should be intensified.[51] The effectiveness of CMEA ountry merchant marines undergoes close examination during the

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[51] *Morskoy Flot* No. 1, 1971, pp. 47-49, and *Vodnyy ransport*, 23 January 1971.

nthly Moscow meetings of their representatives.[52]

The Soviet Merchant Marine is maintaining a few joint ines with developing countries which have been operating for ny years. The joint line with India was organized under an reement signed between the two countries on 6 April 1956, and bout 20 Soviet and Indian ships are now serving the line.. Th joint line with Egypt was organized after the signing of an reement on 18 September 1958.[53]

The Soviets have never failed to answer Western accusations ncerning the Soviet merchant marine deliveries of cargo of veloping countries.[54] The Soviet countercharges are usually sed upon the claim that up to recent times Western shipping mpanies had no competitors in the developing countries, and nce dictated their own terms. Those companies have been cused of "squeezing more than two billion dollars annually from th developing countries for the transportation of their goods", d of being irritated at the "unselfish" Soviet assistance to

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[52] A. V. Voronkov, YU. V. Klemen'yev, Merchant Fleet of viet State, Moscow, Znanie, 1971, p. 44.

[53] Ibid., p. 45, and New Times No. 10, 1971.

[54] See for example, an article in July 1970 issue of U.S. ws and World Report, and Soviet Minister Guzhenko's answer it in New Times No. 34, 1970, pp. 27-29.

te developing countries.

As for the accusation that the Soviet Merchant Marine permits is ships to carry cargoes of foreign shippers on their return rns at cut rates, the Soviet Minister admitted the charge, alling the practice "perfectly normal". He added that "many oreign shipping companies do the same and no one has yet accused hem of engaging in economic subversion", and "it would be bsurd to deny that the Soviet Merchant Marine is interested in arning foreign currency". In their counterattacks, the Soviet epresentatives accused the U.S. shipping companies of charging ates "more than double the world's standard" and being subsidized y the government which, in addition, "have introduced iscriminatory regulations", seeing in them an indication of a risis in U.S. shipping. Admitting the economic competition hich is going on today between the two systems in the maritime ield, the Soviet Minister concluded that "socialism is demonstrating ts superiority over capitalism", emphasizing that the Soviet erchant Marine is technologically more advanced than the leets of leading western countries, including the U.S.[55]

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[55] *New Times* No. 34, 1970, p. 29.

Fleet Composition

To implement the above outlined policies, the Soviet erchant Marine has to have ships in appropriate number and of uitable quality and assortment. Certain aspects of Soviet olicy in this respect are considered in the analysis of Soviet hipbuilding (the choice of rational, or optimum, sizes of ry cargo ships and tankers; production, i.e. mainly series onstruction; selection of speed and type of machinery for the arious ships, etc.). However, the operational aspects nfluencing the fleet growth and composition and the employment f ships under particular circumstances were not discussed. It s appropriate to briefly consider these problems.

One of the major features of the Soviet Merchant Marine s its serial composition. Large-scale standardization of ship ypes was accomplished at the beginning of the 1960's, when more han 30 different types, which used to be produced for the oviet Merchant Marine, were reduced to 11.[56] The use of a tandard design for ships and ship machinery allowed the Soviet nion to build ships in large series, to improve the training f crews and operation of ships and of ship repair facilities. ong-term planning, although it did not always work smoothly,

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[56] Morskoy Sbornik No. 7, July, 1963, p. 12.

has been a contributing factor to improving the composition of the merchant marine and its performance, including expansion of liner services. It has been claimed that the economic gains from the above measures are in the tens of millions of rubles.

During the last 12 years, Soviet Merchant Marine was supplied with more than one thousand ships with total of 9.3 million deadweight tons. Most of the new ships have speeds in excess of 16 knots. The highest priority in the merchant fleet replenishment has been given to dry cargo ships, tankers, and passenger ships.

Dry cargo, particularly general cargo, ships are in the largest number in the Soviet Merchant Marine. Most of them are of heavy tonnage, and can carry bulk cargos and heavy and long cargos. Many of them have removable hatches, making it possible to open the deck wide. The advantages of that type of ship are constantly being emphasized in the Soviet Union. In addition to the conveniences they provide for loading and unloading operations, they are the best suited for carrying a variety of military cargos. The Soviet Union convincingly demonstrated this when it used Poltava-class ships to transport missiles to Cuba in 1962.

The dry cargo ships, which were built in large series during the last decade, are by class: Leninskiy Komsomol class,

built in Nikolaev and Kherson, with 16,000 tons deadweight and speed about 19 knots; *Kapitan Kushnarenko* class, essentially the same design as Leninskiy Komsomol, but with a 13,500 hp diesel instead of a 13,000 hp steam turbine; *Poltava* class, built during 1960-1967 in Nikolaev and Kherson, with 12,500 dwt and speed around 17 knots; *Slavyansk* class, with 12,900 dwt and a speed of 18 knots. One of the Slavyansk class ships has completely automated control of the propulsion unit.

The dry cargo ship classes built in large series abroad include the *Omsk* class, 14.9 thousand dwt, built in Japan, the *Beloretsk* class, 14.9 thousand dwt, built in Denmark, and the *Pula* class with 12.2 thousand dwt, built in Yugoslavia.

Other classes of ships built for the Soviet Union in foreign countries are the *Krasnodar* class, built in Finland in 1961-1968, the *Murom* class built in Poland, and the *Vyborg* class built in East Germany, all between 12.4 - 14.9 thousand dwt and with a speed of 17-18 knots. The Soviet Merchant Marine has about 300 timber carriers, which carry more than seven out of the ten million tons of exported timber. The Soviet timber carriers are suitable for carrying, and are being used to carry, other types of cargo. Two series of large timber carriers, the gas-turbine propelled Pavlin Vinogradov, 6,000 tons dwt, and the diesel-propelled Vyborgles of the same tonnage, and a large series of medium and

mall timber carriers of 3.3-4 and 1.4-2.4 thousand dwt espectively were built in Soviet yards. In addition, a large eries of Volgales class ships of 5.8 thousand dwt was built n Poland, and of Kotlasles class ships, in Finland. Many Soviet ry cargo ships have ice-reinforced hulls and are suitable for avigation in northern areas with, and under certain conditions ithout, ice breakers.[57] The current Five Year Plan provides for he construction of a number of bulk carriers and other specialized hips. A large ore carrier, Chernomory'ye, 50,000 dwt, is under onstruction in Okean, one of the Nikolaev district shipyards.[58]

Tankers constitute close to 40% of the total Soviet Merchant arine tonnage. Although the average tonnage of the Soviet tanker s still below that of the world's major maritime nations, it is teadily growing. Besides, the size of Soviet tankers has been ictated by the depths in home ports and in ports of the foreign ountries with which the Soviet Union trades. Eighty-five percent f the tankers were built during the 1960's and have a speed of ore than 15 knots. The Soviet-built Sofiya class ships of close o 50,000 dwt are at present the most advanced and largest Soviet ankers. They have hull reinforcement for ice navigation, and

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[57] A. V. Voronkov, op. cit., pp. 16-18.

[58] *Komsomol'skaya Pravda*, 22 September 1971.

ome have been built for foreign ship owners. Starting in 967, a large series of Velikiy Oktyabr' class tankers of 15.2 housand dwt was built. Also starting in 1967 a large series f small tankers, the Baskunchak class, of 1.6 thousand dwt, as built in the Soviet yards. But the majority of Soviet Merchant rine tankers were built abroad. Between 1962 and 1965 Japan elivered tankers of the Lisichansk class of 35,000 tons dwt; aly, the Leonardo da Vinci class of 49,000 dwt; Yugoslavia, he Split class of 20.5 thousand dwt; Poland, the Bauska class f 19,000 dwt and International, of 20,000 dwt; Finland, the vek class of 4,200 dwt. Several tankers were modified for efueling naval ships, and some tankers are used for delivering uel to naval bases. The largest Soviet tanker, Mir, 150,000 wt is under construction. The first gas carriers, the Kegums lass, designed to carry 2,800 cubic meters of liquid gas, were uilt in Japan in 1965, but no more ships of this type have een reported.[59]

The present Soviet <u>passenger fleet</u> has about 80 ships for nlimited navigation and several hundred small ships for oastal navigation, including hydrofoils serving local passenger ines. About 60% of the large passenger ships are less than

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[59] A. V. Voronkov, pp. 22-25, Morskoy Sbornik No. 7, 1966, p. 9-14, and Sudostroyeniye No. 4, 1966, p. 18.

en years old, and all are serially built. There are six passenger hips of the Ivan Franko class for 700 passengers, with a speed f about 20 knots; 19 ships of the Mikhail Kalinin class for 00 passengers, and 9 ships of the Kirgizstan class for 240 assengers.

The Soviet passenger fleet now operates 15 international ines with a total length of 27,089 miles, linking the Soviet nion with 37 ports in 24 countries. The Soviet General Maritime assenger Agency (v/o Morpasflot) has been promoting tourism board Soviet passenger ships. In 1968 the Black Sea Liner, hota Rustaveli, made her first trip around the world. Mixed ruises involving several modes of transport are now being rganized.[60] Soviet passenger ships employed in international ines or under charter provide the Soviet Union with an important ource of foreign currency.

[60] Morskoy Flot No. 6, 1971, pp. 14-16, No. 10, 1970, pp. 24-25.

Organization and Management of the Soviet Merchant Marine

During its development, the Soviet Merchant Marine did not avoid the usual growing pains. The Independent People's Commissariat of Water Transport was organized in January 1931, incorporating the Soviet Merchant Marine and river transport, but prior to this, the Merchant Marine was subordinated to the People's Commissariat of Transport Communications. In April 1939, the Independent People's Commissariat of Sea Transport (Merchant Marine) was organized. In March 1953, right after Stalin's death, the Soviet Merchant Marine and river transport were again united in a single Ministry of Sea and River Transport. Finally, in August 1964, an All-Union Ministry of Merchant Marine (Ministerstvo Morskogo Flota) with the mission "to supervise all sea transportation of the country" was organized.[61] The Ministry of Merchant Marine is subordinated to and supervised by the Council of Ministers and its agencies. The Ministry activity is coordinated with the Ministry of Water Transport, Ministry of Foreign Trade, Ministry of Railroad, Ministry of Shipbuilding, and others.

The Ministry of Merchant Marine is headed by a minister

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[61] *Morskoy Flot*, No. 6, 1967, p. 7.

ad a number of deputies. To assist the minister, and to provide 'ollective leadership", there is a collegium consisting of the inister as its chairman, his deputies, and a number of members the collegium including all the chiefs of the main dministrations. The decision of the collegium are put into ffect by order of the minister. The minister can overrule the ollegium, but it in turn can appeal to the Council of Ministers. here is a relatively clear distinction between staff and line nctions. The function of the staff in Moscow is to plan, oordinate, and control. The immediate economic management is ainly in the hands of the basin steamship companies, which are e operating divisions of the Ministry. The Ministry of Merchant arine is also the agency of state supervision of mercantile avigation in the USSR.[62] It publishes regulations, instructions, ad statutes which are binding on all ministries, departments, nd organizations. The USSR Registry is within the purview of he Ministry. The most recent changes in the Ministry structure ook place in late fall 1970.

The Ministry is now comprised of two main administrations, he Main Administration of Fleet and Port Operations and, the ain Administration of Development and Capital Construction of

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[62] Article VI, Soviet Merchant Shipping Code.

orts, Yards, and Shore Facilities and several administrations nd departments. The most important is the Main Administration f Fleet and Port Operations, which supervises the operations of 5 Soviet steamship companies through three subordinate dministrations.

The Administration of Fleet and Port Operations of the outhern Basin, *Yzhflot*, supervises the operation of seven teamship companies: Chernomorskoye (Black Sea), Azovskoe Azov), Novorossiyskoye, Gruzinskoye (Georgian), Dunayskoe Danube), Kaspiyskoe (Caspian), and Sredneaziatskoye (Middle sian) Steamship Companies. The Administration of Fleet and ort Operations for the Northwestern Basin, *Sevzapflot*, supervises wo northern steamship companies, Severnoye and Murmanskoye, nd four Baltic companies, Baltiyskoye (Baltic), Estonskoe Estonian), Latviyskoye (Latvian), and Litovskoye (Lithuanian). he Administration for Fleet and Port Operations of the Far astern Basin, *Dal'flot*, supervises three steam ship companies - alnevostochnoye (Far Eastern), Sakhalinskoye (Sakhalin), amchatskoye (Kamchatka). The Northeastern Administration of erchant Marine with headquarters in Tiksi is subordinated irectly to the Ministry. The Middle-Asian Steamship Company perates in the Aral Sea and on the Amy Darya River.[63]

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[63] *Vodnyy Transport*, 13 September 1970, and *Morskoy Flot* o. 11, 1970.

During the fall 1970 reorganization of the Ministry, the Scientific-Technical Administration, incorporating the Technological Council, the Department for the Introduction of Advanced Methods of Transportation and Loading and Unloading Operations, the Department for Containerization and the Department for Analysis were established.

Each of the Soviet steamship companies is a large enterprise with a vast area of responsibility, including not only the operation of ships but of ports, ship repair yards, salvage ervices, etc.

To manage such a huge and complex enterprise as the oviet Merchant Marine with its highly centralized structure nd under the overwhelming priority of the Soviet plan, based pon various economic as well as political criteria, is obviously very difficult task. In spite of the greater emphasis upon he economic independence of the major units of the structure, radually introduced after the 1965 Economic Reform, the entral apparatus of ministry, its main administrations, and he management of the steamship companies are in constant need of receiving and supplying the flow of data concerning the ulfillment of the plan.[64] The Soviet preoccupation with statistics is not for the sake of statistics per se, but is an

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[64] V. G. Bakayev, op. cit., pp. 22-23.

bjective necessity under the system of management control based pon central planning.

It now appears that the point has been reached where unning the economy under the existing principles and structure s becoming more and more difficult, and either the principles hould be changed (and there is no indication of the leadership's eadiness for this) or the methods should be adjusted to the ituation without considerable modification of the structure. he Party approved state network of computer centers and the nified automatic communication system, to be gradually introduced ithin the next ten years, appears to bear witness to acceptance f the latter. The need for improvement in the system of control f the Soviet economy was labeled "the main problem of the Party conomic policy" in Brezhnev's speech to the 24th Party Congress. arty and government decisions stressed a need for the speediest ntroduction of a comprehensive system of automated control ased on a network of computerized centers as a means of fulfilling he task. The All-Union Automated Control System (OGAS- bschegosudarstvennaya Automaticheskaya Sistema Upravleniya) ill incorporate the automated system of Gosplan, the Central tatistical Administration, the All-Union Supply Administration, he industrial branches, and other centrally subordinated gencies, each having its own system called ASU (Avtomatcheskaya

Sistema Upravleniya - automated control system). All ASU systems are based on a network of computer centers down to the large enterprise level. A number of such computer centers are now in operation. The problem, however, is that the elements of the system introduced earlier were based upon various computers which are in the main obsolescent and incompatible with one other. Moreover, the installed computers utilized non-standard programs. For those two reasons, they can not be linked together even in the framework of one industry, not to mention of an All-Union system. The Soviet Merchant Marine case represents a typical example.

The Ministry of Merchant Marine, by virtue of its activity and the availability of a relatively well-developed communication system, was among the first where introduction of the automated control system, ASU, was initiated. During 1962-1963 the TsNIIMF (Central Scientific Research Institute of Merchant Marine) worked out computer programs for the organization of cargo movement, distribution of ships on lines, and the optimum fleet development. Since 1964 the optimum lines schedule has been controlled with the use of the Minsk-22 Computer.[65] In 1965 an experimental Calculating Computerized

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[65] TsNIIMF Transactions, Vol. 133, 1970, pp. 45-97.

Center was organized in the Baltic Steamship Company, followed in 1968 by two centers at the Black Sea Steamship Company and the Far Eastern Steamship Company. In 1966 the Main Computerized Calculating Center of the Ministry of Merchant Marine was organized.[66] The center's task has been to control both the routing of ships and the flow of cargo and to plan and regulate the operation of ships and ports, in cooperation with steamship company centers, whose introduction into service and operation the main center is supposed to coordinate.

The ASU of the Ministry of Merchant Marine, "Morflot", is supposed to be developed on the basis of existing computer centers utilizing a third generation of computers. The ASU Morflot is being developed under the supervision of the Institute of Control Problems, USSR Academy of Sciences, in cooperation with various scientific research and educational organizations. Two Soviet Academicians, V. A. Trapeznikov ("Scientific Leadership") and N. P. Federenko ("Chief Economist") are in charge of the system's development. The scope of the system can be illustrated by the outline of functions the system is to perform. Each function is tied to a corresponding sub-system, as follows: 1. "Operational Control of Fleet (ships) location" 2. "Operational Control of Cargo Transportation Process"

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[66] _Transactions_, p. 93, and _Morskoy Flot_ No. 11, 1967, p. 14.

3 "Operational Planning, Control of Fleet and Port Operations"
4 "Current Planning of Basic Activity of Merchant Marine"
(utomates preparation of annual plans and economic calculations)
5 "Charter" (Automates flow of information concerning the
carter market situation, analyses the economic effectiveness
o charter transactions, determines optimum ship requirement)
6 "Technical Control of Fleet Condition, Ship Repair Plans, and
Iplementation" 7. "Supply Planning and Stocktaking" 8.
'ookkeeping and Statistical Calculations, Economic Analysis"
9 "Personnel". The ASU's of steamship companies, ports, and
lrge shiprepair yards are to have similar appropriate sub-systems.
unified system of documentation based upon computerized data
pocessing is also under development. Those are the basic
fatures of the planned unified automated system of merchant
rine control.[67]

The system of communications existing in the Soviet Merchant
rine can hardly cope with the fully developed ASU Morflot and,
terefore, there are plans to improve it "to the level of world's
st systems" over the current five-year period and in compliance
th the unified automated system of communications of the country,
ich is presently under development.[68]

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[67] V. Voronkov, pp. 27-31.

[68] <u>Transactions</u> Vol. 133, pp. 44, 99.

The development of ASU Morflot has already been associated ith a number of problems. The computers installed during the rush to create more computer centers in steam ship companies are of various designs, and many of them do not meet the demands of the system. There is lack of program standardization among steamship companies, and the existing and presently utilized programs do not always correspond to the design of the subsystems of ASU Morflot and hence have to be modified and adjusted to the central system. In September 1971, the Chief of Far Eastern Steamship Company Computer Center wrote "what at present constitutes the ASU of the steamship company is not clear".[69] The Ministry was accused of trying to introduce first the subsystems for the center and of neglecting the interests of the operating divisions (steamship companies). The existing variant of the system design was criticized for its complexity and the excess of information flow it requires, which presumably "would overload the system".[70]

The main problem, it seems, is not the amount of information processed by the system, but its quality and reliability. While automation of the chain of information definitely reduces the intermediate bureaucratic echelons "corrections" and the adjustment

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[69] *Vodnyy Transport*, 14 September 1971.

[70] *Ibid.*

of figures required by the plan, such a possibility would not be completely eliminated by computerization, particularly at the initial level (enterprises). An unrealistic report fed into computer does not change its quality, i.e. "garbage-in, garbage-out". Of course, the specifics ofmerchant marine operations, the rather great dependence upon non-Soviet sources of information, and the need to analyze a set of objective data (cargo, speed, weather parameters, time factor, ship capacity, etc.) seems to diminish the negative effect of traditional Soviet "adjustments" of the data and, hence, makes application of automated control system more effective. Accepting such a hopeful assumption, one might conclude that the measures under implementation would increase the effectiveness of merchant marine management, resulting in reduced turn-around time, increased ship usage, and improved utilization of port capacities.

Personnel Policy, Educational and Research Institutes

In the course of developing a merchant marine, any country faces two immediate problems: procuring ships and manning them. While the first problem can be solved during a relatively short period of time by building ships and buying them, the second requires a considerably greater period of time, for it takes

years and even decades to educate an appropriate number of specialists and to gain experience.

Pre-Revolutionary Russia had two maritime academies and nine nautical schools. After the Revolution, the nautical schools were transferred into specialized secondary educational establishments, and two higher institutes to train engineers for water transport were opened, one in Leningrad and another in Odessa. Leading personnel of steamship companies and other merchant marine enterprises was trained in the Academy of Water Transport. Drastic educational reform for the Soviet Merchant Marine was introduced in March 5, 1944 by Decree of the State Committee for Defense "on measures concerning the training of command cadres of the mercantile fleet". Higher engineering education for ship's officers was introduced. Educational institutions of the merchant marine were enlarged and upgraded. The decision was said to be motivated by the considerable losses of personnel during the war, and the planned expansion of the Soviet Merchant Marine. Three higher merchant marine academies, Leningrad, Odessa, and Far Eastern, were organized in addition to twelve nautical and one Arctic schools. In Soviet specialized literature, the decision has always been referred as historic.[71]

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[71] *Morskoy Flot* No. 3, 1969, p. 34; No. 10, 1967, pp. 7-14; and *Vodnyy Transport*, 13 March 1969.

During the post-World War II period, the number, and particularly the size, of merchant marine educational institutions increased. In 1945 the Higher Arctic Nautical School was organized. In 1954 the Arctic School was merged with the Leningrad Higher Maritime Academy into the S. O. Makorov Leningrad Higher Engineering Nautical School (Academy), the largest Soviet Merchant Marine educational institution.

At present there are four higher and twelve specialized secondary educational establishments, administered by the Ministry of Merchant Marine, engaged in training officers for an engineer diploma in fourteen specialities and a technician diploma in ten specialities.[72] In addition to the Leningrad Higher School, there are three more, Admiral G. I. Nevel'skoy the Far Eastern Higher Engineering Nautical School; the Odessa Higher Engineering Nautical School; and the Odessa Engineering Institute of Merchant Marine. All four combined have 5,000 full-time cadets and more than 4,000 correspondence courses and part-time students. In addition, three institutes are training engineers for shore services and some of them, such as the Gor'kiy Engineering Institute of Water Transport, have departments for training ship officers. All higher schools have period of training of not less

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[72] Morskoy Flot No. 3, 1971, pp. 3-7, and Soviet Military Review No. 6, 1970, pp. 6-9.

han five years, and for some specialities it is five years nd six months. Secondary specialized nautical schools have eriods of training of from three years to four years and three onths.[73] The post-graduate training is provided by higher chools and two merchant marine scientific research institutes. ost of the graduates pursue full-time study.

The education is free, and the cadets receive allowances, niform, and free board. But there are also part-time study rrangements with extended period of training, and correspondence ourses. Many sailors (unlicensed and sub-officer seamen) study t both higher and secondary nautical schools by correspondence. uch studies are encouraged. The educational institutions ccasionally send instructors to serve on ships on long voyages o help correspondence-course students, and in large ports, pecial student consultation centers have been set up. Students n correspondence courses are given additional paid leave for a eriod of 20-40 days of year to prepare for and to take examinations. pproximately one-third of the Soviet seamen are involved in tudies at the higher or secondary educational level. The number f seaman correspondence-course and part-time students studying n just the educational institutions of the merchant marine reached 3,000 in the 1968-1969 school year. In 1970 one out of four

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[73] _Vodnyy Transport_, 26 May 1970, and 25 May 1971.

men in the Soviet Merchant Marine had a diploma of a higher or specialized secondary educational establishment.[74]

Cadets in higher and secondary nautical schools receive good sea practice, which starts on sailing ships, and continues on special training ships assigned to the schools. In 1970, the training fleet of the Soviet Merchant Marine consisted of 15 ships, and has been growing since. A large series of B-80 training ships (the Soviets call them "training-cargo ships", for they can and do transport cargo) has been under construction. The original order for 3 ships from Poland was augmented in 1970 to a total number of 10 to be delivered during 1971-1973.[75] Senior cadets are receiving practice aboard operational ships of the Merchant Marine.

During the last five year period, 1966-1970, 32,179 engineers and technicians were trained, and 8,150 specialists improved their qualifications in the merchant marine educational system.[76] The ship's officers of the Soviet Merchant Marine are relatively young. At the end of 1969 there were 1,600 licensed captains, of whom 800 were between 31 and 40 years old, 750 between 41 and 60 years old, and about 40, more than 60 years old.

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[74] Morskoy Flot No. 3, 1971, pp. 3-7; No. 11, 1971, p. 62.

[75] Morskoy Flot No. 11, 1971, p. 63.

[76] Morskoy Flot No. 3, 1971.

The captains were distributed as follows by nationality: 1,100 Russians, about 200 Ukrainians, 32 Georgians, 32 Jews, 23 Azerbaijanis.[77] The Soviet Merchant Marine even has several women officers, and at least three of them have been masters, actually commanding ships. Of 1,600 Soviet licensed captains, about 700 have higher education. On an average, in the Soviet Merchant Marine it takes eight years for a graduate from a higher nautical school and ten years for a graduate from a secondary specialized nautical school to become a captain.[78] It is openly admitted that graduates from secondary nautical schools have had a progressively growing feeling of a lack of education, and many for this reason continue in higher nautical schools by correspondence.

During the 1971-1975 period it is planned to increase enrollment in the educational institutions of the Merchant Marine. Existing higher nautical schools in Odessa and Leningrad are being expanded, and the decision was made to organize a new school, the Novorossiysk Higher Engineering Nautical School.[79]

Apparently there is no lack of young men who desire to enroll in nautical schools and become merchant marine officers.

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[77] Nedelya No. 50, December 1969, p. 13.

[78] Morskoy Flot, No. 11, 1970, pp. 44-45.

[79] A. V. Voronkov, p. 47.

ı 1971 there were from 3 to 5 applications (varying from school ͻ school) for each of the 10,000 openings available in higher ıd secondary specialized merchant marine nautical schools. In ıe Odessa Higher School there were 2,000 applications for 500 ɔenings. In the Kherson Secondary Specialized School there ɜre 1,200 applicants for 90 openings in the command department.[80]

The Soviet Merchant Marine educational establishment ɔnducts an extensive public relations program. In addition ɔ propagandizing merchant marine service throughout the country's igh schools, a number of higher and secondary nautical schools re sponsoring extra-curricular programs in some of them to tudy maritime subjects. A few schools went even further. In rkhangelsk, for example, there is a high school which introduced, n addition to the regular study program, a maritime program hich includes such subjects are navigation, radio communication, arine engineering, etc. in the ninth grade. During the summer, ale students involved in the program have an opportunity to ail aboard nautical school training ships and obtain additional raining. The Northern Steamship Company is sponsoring the whole rogram.

As a result, the percentage of male graduates from high chools maintaining close ties with merchant marine organizations

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[80] Vodnyy Transport, 31 August 1971.

applying to continue their education in nautical schools is nsiderably higher compared with the high school graduates thout such ties.[81] The foregoing permits the conclusion that ere is neither a shortage of applicants for merchant marine utical schools nor there is noticeable shortage of basic ecialists required by merchant marine, and hence, the system f specialists training in the Soviet Merchant Marine is fulfilling ts basic task.

In addition to their educational role, the Soviet nautical chools, particularly at the higher level, are involved in xtensive research work. But the bulk of research work for the oviet Merchant Marine is conducted by two very large institutes, he Central Scientific Research Institute of Merchant Marine in eningrad (TsNIIMF), with branches in the Far East, Baku, and urmansk, and the State Design and Scientific Research Institute f Merchant Marine in Moscow (Soyuzmorniiproekt), organized in 960, with branches in Leningrad, Odessa, and Vladivostok.

The TsNIIMF was first organized as the Institute of hipbuilding and Ship Repair in March 1929, assuming its present title and mission after the fall 1930 reorganization. The decision of the Ministry Collegium and Minister of Merchant Marine Order No. 475 of 2 December 1955 concerning the intensification

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[81] _Vodnyy Transport_, 3 October 1970.

f scientific research work in the merchant marine, allocation of reater funds, construction of new buildings and laboratories, tc., were important factors in the growth of the role of the wo institutes and of their influence in the Ministry. pparently this did not come about without the help of the oviet Navy and the participation of its leaders, for at that ime, Fleet Admiral of the Soviet Union, I. S. Isakov, one of he most respected and best educated men in the higher echelon f Soviet Navy Command, assumed the position of the Deputy inister of Merchant Marine for Science and Technology, and is redited with playing a crucial role in the preparation and he implementation of the decision of December 1955.[82]

The scope of the work of the two research institutes is o broad that there is hardly any topic or aspect related to he merchant marine which it does not cover. The staff of esearch specialists in each institute numbers in the several undred.

It is difficult to draw a clear demarkation line between he specialities of the two institutes, for they have both in number of instances been involved in research dealing with he same subject, for example, unitization and containerization f cargo or standardization of ship designs. However, the TsNIIMF

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[82] *Transactions*, Vol. 133, pp. 7-10.

is primarily concerned with the mercantile fleet, its ships, and problems associated with them. The Soyuzmorniiproekt, on the other hand, is concerned with the economic performance of the entire merchant marine, particularly over the long range, and on the technological side, with shore facilities such as ports, repair yards, and systems of cargo handling. Any given problem is usually handled by one department of either institute. The research findings and proposed solution for the problem are reported to the Scientific Council of an institute which, after approval, sends the recommendations to the Ministry for practical application.[83] During the past several years, both institutes have produced a number of recommendations, including those dealing with the automation of ships and management control of the Ministry, which were accepted and have either been or are being implemented.

There are fifteen nautical schools training unlicensed and sub-officer seamen with a period of study of around one year. These schools and a number of special courses from a few weeks to 3-4 months in length supply the Soviet Merchant Marine with a pool of qualified personnel. Many sailors discharged from the Soviet Navy upon completion of their service as well as naval

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[83] Examples of such recommendations are given in this chapter as well as in other chapters, particularly the one on shipbuilding.

officers separated from the Navy for various reasons often join the Merchant Marine, and thus increase the pool of qualified personnel. The romanticism of sea duty, a degree of adventurism so common to the young, good pay (better than for shore duty), and the possibility for advancement through education are but a few of the factors attracting many Soviet young men to service in the Merchant Marine. Soviet restriction on travel abroad is also a definite factor in making sea duty attractive.

A system of material incentives is widely applied in the Soviet Merchant Marine. In addition to free food, for which 30-49 rubles per month, depending upon area of operation, is allocated,[84] uniforms, better housing for families ashore, with a network of kindergartens and nurseries operated by the Merchant Marine, seamen are paid bonuses for the successful fulfillment of plans and are provided with rest and recreation stays at health and rest homes. More than 150 hospitals and 170 polyclinics are run by the Merchant Marine Ministry, which employs more than 5.5 thousand doctors.[85] New Soviet ships, which are in the majority, have comfortable cabins for the crew and good recreational facilities, including swimming pools in some ships.

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[84] A. V. Voronkov, p. 29.

[85] Morskoy Flot No. 8, 1970, p. 12.

Practically all large Soviet ports have seamen clubs and cinemas and some have hotels where families of seamen can stay on visits to the ports. The Ministry schedules regular radio programs "for sea-farers", with good music and prescribed news and propaganda and so called "radio letters" from relatives of the seamen. Each ship has its own amateur musical and singing groups, and some ships have orchestras. Athletic teams are formed from among the crew members. All these groups and teams do not limit their activity to entertainment alone, which certainly is a factor, but they perform while visiting foreign ports and also participate in sports competitions with their hosts. This so called "cultural and sport activity" of the crews is closely supervised and directed to produce a favorable effect upon foreigners.

The system of "political organs" in the Soviet Merchant Marine, which at the ship level includes the Pompolit (Political assistant to the captain) and Party and Komsomol (Young Communist League) organizations, is responsible for the organization and maintenance of such activity. Ship captains, most of whom, together with the senior ship officers, are members of the Communist party, have to support that activity and probably find it beneficial to the morale of the crew.

Propaganda and political education, regularly conducted

among crew, are designed not only to indoctrinate sailors in Soviet Communist ideology but to make them effective representatives abroad. That obligation of Soviet crew members is openly proclaimed in the Soviet Merchant Marine, and crews of Soviet ships are constantly reminded of it. There are now more than 1,250 Soviet crews which are "collective members of Soviet societies of friendship and cultural ties" with people in foreign countries. Thus, one more form of "profitable" employment has been found for the Soviet Merchant Marine.[86]

Shore Facilities

For normal and, even more important, for effective operation, any merchant marine has to have well developed shore facilities, particularly ship repair and port facilities. In general, the development of shore facilities throughout the world lags behind fleet development. There are very few ports which can accommodate super-tankers, and the development of progressive methods such as containerization is restricted by the availability of ports equipped to handle containers. In

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[86] Vodnyy Transport, 19 October 1971. The article by Yu. Evfharestov, member of the Ministry of Merchant Marine Collegium and apparently in charge of political work in the Soviet Merchant Marine, gives a revealing description of the political role of the Soviet Merchant Marine and attempts to present the "new Soviet man".

general, it appears easier to build a fleet to the appropriate size than to develop the necessary shore facilities, particularly ports, and the Soviet experience in this respect might be considered typical. Even in the past, when the Soviet Merchant Marine was small, the existing shore facilities did not satisfy the requirements. With the rapid development of the Soviet Merchant Marine, the gap between the shore facilities and size of the fleet widened, not because shore facilities have not been developed, but because the rate of their development has not matched the rate of the fleet growth. Recognizing the problem, the Soviets openly stated that the future profitability of the Merchant Marine should not be bound to the emphasis on increasing its tonnage, but would result from the harmonious development of every branch of the industry. For the near future at least, that harmony can be achieved only through the accelerated development and improvement of ship repair and port facilities.[87]

Ship Repair

The Soviet Union started specialization in ship repair just prior to World War II, when all large ship repair yards were subordinated to a special department of the ministry, while smaller ones remained under the control of steamship companies.

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[87] Morskoy Flot No. 4, 1970, pp. 6-10.

A number of new ship repair yards were built before the war. The larger yards specialized in major repair as well as construction of small series of auxiliary ships. The situation remained unchanged after the war for over the decade. The three categories of repair, small, medium, and major, continued to be practiced; the rationale for repair was dictated by the need to maintain available tonnage and was not justified by economic validity.

At the beginning of the 1950's, the rehabilitation of existing ship repair yards and construction of new ones increased the production capacity, 2.75 times over that of 1940. During the decade of 1950's the modernization of ship repair yards continued, and a new yard was built in Nakhodka. As a result, in 1960 the capacity of Soviet Merchant Marine repair yards was 3 times greater than in 1950 and 8.2 times greater than in 1940. What appeared to be a phenomenal growth actually bears testimony to how weak the ship repair capability used to be.

In 1959-1961, the research and design institutions of the Merchant Marine with representatives of steamship companies made an extensive analysis of expenditures for ship repair and developed the economic and technological rationale for some types of repair. Optimum periods of service for various types of ships and the approved schedules for allocation and amortization

of funds for ship renovation were worked out. In 1961 new regulations concerning ship repair were approved and introduced. Major and medium ship repairs were excluded as economically unsound, and only two types of repairs, a small and large, which differ only in volume of work, were introduced.

In 1957 all ship repair yards were subordinated to steamship companies. Starting in 1962 the development of ship repair facilities was accelerated, and capital investment for 1966-1970 was increased three times over that for the previous period.[88] Two new ship repair yards, one in Il'ichevsk (Black Sea) and the second in Slavyansk (Far East), are presently under construction. When completed in 1972-1973, the Il'ichevsk ship repair yards will be Soviet Union's largest. During the last five year period, 1966-1970, a number of ship repair yards were modernized, and many were supplied with large floating docks. The above measures, combined with the reduction in number of ship types built and the construction of ships in large series, considerably improved the ship repair situation in the Soviet Merchant Marine. In addition, foreign ship repair facilities, particularly in Poland and East Germany, can be and often are used. Soviet ship repair yards are specializing more and more in

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[88] Morskoy Flot No. 10, 1967, pp. 7-14.

he repair of specific types and classes of ships enabling them o be better supplied with parts, still in short supply, and to ring the improved technology to bear. The modular replacement ethod is being introduced, but owing to a lack of spare parts, t is still not widely applied yet.[89]

The shortage of ship repair facilities forced the Soviets to organize and keep so called ship repair brigades (SRB) aboard the ships which were paid out of ship repair funds. Together with the base technical service (BTO) assigned to the ports, the SRB performed about 15% of the total volume of work necessary to maintain normal operation of ships and to prolong the period between repairs at a ship repair yard. It is planned to increase the BTO services to 22% of such work in 1975 and up to 37% in 1980 after wich the SRB will be disestablished.[90]

The one reason the Soviet Merchant Marine is satisfied with the goal of 330 days of ship operating time, compared with 340-350 days in most of the Western countries, is the still relatively weak ship repair and maintenance capabilities, both of which are slated to be strengthened.

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[89] *Vodnyy Transport*, 14 July 1970.

[90] *Transactions*, Vol. 133, p. 108.

Ports

There are not many natural harbors in the USSR, particularly in the European part. For this reason, most of the Soviet harbors have to be protected by breakwaters. Port facilities were considerably expanded prior to World War II, but neither their locations, with few notable exceptions, nor their cargo handling equipment was good. During World War II more than 70% of the port facilities in the Baltic, the Black Sea, and the Northern Basins were destroyed. Many ports, including such large ones as Tallin, Riga, Nikolayev, Odessa, were left without a single pier or cargo storage facility. The only undamaged ports were in the Caspian Sea and the Far East. For eleven years (1945-1956) most of the funds allocated for ports were spent for restoration, and not until 1956 was a new stage in the development of port facilities initiated.[91]

The expansion of Soviet foreign trade and the beginning of rapid expansion of Soviet Merchant Fleet forced the Soviet Union to start a major port facility improvement program. The highest priorities were given to expanding bulk-cargo handling facilities, the construction of deep-draft piers and approaches, bunkering facilities and wide introduction of mechanized

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[91] Morskoy Flot No. 10, 1967, pp. 7-14.

cargo-handling equipment (gantry cranes, fork lifts).

Construction of new ports such as Il'ichevsk, Wrangel' and modernization of existing ones has been underway for years. The completion of the third stage of the Port of Il'ichevsk will make it the second largest in the Soviet Union. The Port of Wrangel', about 20 miles from Nakhodka, being built with Japanese financial and technical assistance. The construction plan for the Port of Wrangel' calls for it to be completed in 1973. The new port will have 60 piers for deep-draft ships and a total berthing length of 12 kilometers. Special container terminals will be built, and modern cargo transfer equipment installed (for example, the coal terminal will process 12,000 tons of coal per hour).[92] The Port of Nakhodka was gradually built up in the post-World War II period in an area 100 miles southeast of Vladivostok. The port benefits from the Japanese Current, and completely ice-free the year round, while Vladivostok sometimes freezes. A special extension of the Trans-Siberian Railroad has been built to Nakhodka. The future Port of Wrangel' is being called a satellite of Nakhodka, but the Ministry of Merchant Marine disputes the term, emphasizing that in the 1980's it will be proper rather to call Nakhodka a satellite of Wrangel', as

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[92] _Trud_, 22 September 1971.

the latter will have facilities four times as great and will become the largest deep-water port in the Soviet Union.[93]

There are now 8 extra class, 21 first class, 17 second class, and 19 third class ports in the Soviet Union and about 100 small ports. All together, they processed close to 300 million tons of cargo in 1970.[94] However, the construction of new ports and the modernization of existing ones has not been keeping pace with the rapid expansion of the Soviet merchant fleet, and the port facilities have become a major hindrance to the efficient operation of the whole merchant marine.

There is nothing unusual in the present situation, because for many years the main attention of the Ministry and its central planning organs had been devoted to developing the fleet and increasing its tonnage. In the ten year period 1959-1968, capital investment in the fleet exceeded that in ports by more than 7.5 times. While the Soviets have obtained a rather modern and to a large degree diversified fleet, their ports are incapable of serving it properly, and the ships are losing a considerable portion of their operating time in ports waiting to be processed. or example, in 1968, 57% of the total operating time of dry-cargo

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[93] Vodnyy Transport, 7 March 1971.

[94] V. Voronkov, pp. 35-36.

hips was spent in ports. Besides the low capacity for processing hips there are deficiencies in planned scheduled arrivals of oviet ships, further increasing the time loss.

A comparison with foreign ports is striking. For example, n 1968 Soviet ships lost 268 ship days in foreign ports waiting o be loaded or unloaded, which constituted 1.6% of all time ost in unproductive waiting. In the Soviet ports, they lost ,341 ship days, or 27.5%, i.e. 24 times as much as in foreign orts. In foreign ports, longshoremen await the arrival of ships, hile in Soviet Union ships wait until longshoremen are free to nload them. As a rule, longshoremen in foreign ports work only ne shift, while Soviet longshoremen work three shifts, yet ccording to Soviet calculations the transfer volume in Soviet ports is only 2% higher than in the foreign ports.

There are two major reasons for such low performance: the degree of mechanization in Soviet ports is still below that in foreign and there is a labor shortage. For example, during 1966-1968 the volume of processed cargo in Soviet ports grew by 14.7%, but the mechanical equipment increased only by 1.1% and the number of workers by only 2.8%.[95] This is why at the end of 1970 the Ministry requested a one-third increase in the

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[95] Morskoy Flot No. 12, 1970, pp. 11-14.

number of port workers, a request which is unlikely to be satisfied. On the other hand, the Soviet love for bookkeeping and statistics has produced a huge bureaucracy in the ports, resulting in a situation where there is more mangerial and clerical personnel than longshoremen and port workers.[96]

The remedy is seen not in reducing the flow of information and the bureaucracy, but in automation, i.e. introduction of the automated system of control, the ASU. Meanwhile, the bureaucracy is at work, and the delivery of each piece of machinery to a port is accompanied by more and more, quite often completely unrealistic, norms for loading and unloading operations, which in turn increased the amount of fine a port must pay for the time wasted by ships while waiting to be processed. A paradox situation is created, where the port administration quite often resists the introduction of new technology, preferring to operate according to established norms.[97]

As stated previously, the problem of disproportionate development of fleet and shore facilities has been recognized, and certain corrective measures, initiated. Already in 1971 thanks to the measures taken, the time lost by ships in ports

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[96] Vodnyy Transport, 29 August, 1971.

[97] Vodnyy Transport, 4 March, 1971.

was reduced, in some steamship companies by as much as 60%, but the gap between the cargo carrying capacity of the fleet and the capacity of ports remains a serious problem, particularly in the Far East.

During the current five-year period (1971-1975), it is planned to build more deep-draft berths, particularly in ports handling export-import cargos, to gradually replace most of the general purpose cranes with specialized cargo handling equipment with a high rate of productivity, to improve the scheduled operation of the fleet and to introduce more automatic equipment. Ports are viewed as the main point of application of the Merchant Marine in its drive to improve productivity.

The greatest expectations of the Soviet planners in realizing this goal lie in the broad introduction of unitized cargo processing systems, particularly containerization. The development of a universal cargo containerization handling system has been called a technical revolution in commercial shipping. Eliminating the traditional pier-side sorting, warehousing, and repackaging of goods, containerization offers vast savings to shippers, tremendously increases the productivity of specialized ships and ports, handling through specialized terminals. The leaders of the Soviet Merchant Marine are well aware of the advantages of containerization, and are planning appropriate

measures. The importance and the complexity of the problem deserve special consideration.

Containerization

The overall importance and magnitude of the cargo handling problem in the Soviet Union can be illustrated by the following. According to recent data, the number of workers involved in cargo handling in the USSR in 1970 was eight million, after increasing at the rate of 250-300,000 annually.[98] The Soviet Institute of Transport Problems states that the total cost of load-and-storage operations is approaching 15 billion rubles per year.[99] The annual consumption of some packaging materials in 1969 amounted to 600 thousand tons of steel, 48 million square meters of lumber, and 450 million square meters of fabric.[100] Bulk transportation of cargo has produced tremendous annual losses, including 2 billion bricks, 18 billion square meters of glass, and 3 million tons of cement.[101]

The Soviet Union has developed an extensive package-handling

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[98] Vodnyy Transport, March 16, 1971.

[99] Ibid.

[100] Deribas, A. T. Transportation of Cargo Without Reloading, Moscow; Znaniye, 1970, p. 4.

[101] Deribas, op. cit., p. 6.

system including the handling of containers. In 1970 there were more than 900,000 continers in use, but most were the small, three-ton size.[102] The number of large containers meeting International Standard Organization (ISO) specifications is small, and as of 1970 these containers were not being mass produced.[103] Moreover, the Soviet transportation system is not yet prepared to handle ISO approved containers.

The problem faced by the Soviet Merchant Marine is even more acute due to the rapid introduction of containerization among leading maritime powers and their successes in the highly competitive charter market. Containerization was introduced into conferences of which the Soviet steamship lines are members. Due to the absence of specially built container ships, the only commodities left for Soviet ships in the conferences to transport were small amounts of irregularly scheduled and low-rate cargo unsuitable for containerization.

The experimental use of containers by ships of the Polava

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[102] The greatest owner of containers in the Soviet Union is the Ministry of Railroads, which possesses 724,000 units of 1.25, 3 and 5 ton capacity.

[103] The International Standards Organization (ISO) in 1968 has adopted as standard dimensions for containers an 8 ½ foot height, 8 foot width, and lengths in 10 foot increments up to a maximum of 40 feet.

class and Lininsky-Komsomol class was initiated by the Soviet Merchant Marine in the Black Sea in 1967. The use of containers was also developed along the Northern Sea Route during the same year.[104] The emphasis on the Northern and Far Eastern Region is logically explained by the short navigational period along the Northern Sea Route, prevailing climatic conditions, a lack of covered storage facilities, and the shortage of port facilities.

Beginning in 1969 several Soviet steamship lines began to build up an inventory of their own containers. Utilizing these containers an unspecified amount of cargo, usually expensive articles, was delivered to Cuba, Italy, Egypt, Kuwait, and other countries.[105] In spite of using small containers, the Soviet Merchant Marine's volume of containerized cargo in 1970 reached 600,000 tons. Starting in May 1970, ships of a Baltic line, using Leningrad as one terminal and a suitable European port as another, were carrying 10 and 20 foot ISO standard containers leased from foreign countries.[106] The transit of containers via Trans-Siberian Railway from Europe to Japan has been established and a regular container line between Nakhodka and Japanese ports

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[104] Morskoy Flot No. 3, 1968 and No. 11, 1970.

[105] Morskoy Flot No. 1, January 1970.

[106] Morskoy Flot No. 4, April 1971.

was opened in the spring of 1971.[107] Also, during summer of 1971, the container line between Il'ichevsk and Bulgaria was opened.[108] Along the Northern Sea Route and in the Northeastern Regions of Soviet Far East, special self-propelled barges (Sever type, 14-ton cargo capacity and the improved Vostok type, 22-ton cargo capacity) carried aboard ships are used for loading and unloading unitized cargo and containers.[109]

The Central Scientific Research Institute recommended seven new general cargo ships, all of them capable of carrying containers. The proposed new ships are designed to operate as liners and are self sufficient for handling containers. According to the Soviet Minister of Merchant Marine, during the period 1971-1975, container ships will be built with capacity of 40, 200, 300, and 700 20-foot containers. Roll-on/roll-off ships and LASH ships designed to take on board 40-50 lighters of 200-400 tons each are under consideration.[110] The construction of cargo helicopter carriers was also recommended. Among the arguments favoring the construction of such a ship is the frequent

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[107] Pravda, 4 July 1971.

[108] Vodnyy Transport, 28 August 1971.

[109] Morskoy Flot No. 1, 1971.

[110] Vodnyy Transport, March 16, 1971.

necessity for unloading cargo at harbors or points on the shore lacking cargo handling facilities. A converted AMGUEMA-class with three KA-25 K helicopters and a specially designed Project No. 567 A cargo ship with three MI-8 helicopters were considered. Increased reliability of loading and unloading operations of those ships was claimed owing to their relative independence of weather conditions.[111]

The first Soviet container ship, Svetlogorsk, built in Vyborg in 1971, can carry 218 containers. East Germany and Poland started to build container ships in the late 1970's.

Containerization is planned to be introduced in two stages: the first stage, 1971-1975, "organizational-technological preparation" will involve building up a container inventory, the development of a maintenance-repair base, and experience in container utilization. This preparation will parallel the construction of container ships, of which 18 have been authorized. The Ministry, considering this number inadequate, is arguing for an additional eight container ships with a 150-200 container

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[111] The proposed cargo helicopter carrier in conjunction with a containerized or unitized cargo system comprises the major elements of the ship helicopter extended delivery system (SHEDS). In addition, most of the new ships proposed for containierization will be self-sufficient. The two measures would result in extra cost, but are extremely important militarily.

capacity for use on short and medium range lines (USSR-Italy, USSR-France, etc). In addition, there is a plan to buy from East Germany an unspecified number of ships carrying 40 containers each (for lines between Germany, Bulgaria, and the USSR). The Ministry of Merchant Marine plan envisaged 23,000 20-ton (or equivalent) containers by the end of 1975.

During the second stage, 1976-1980, "containerization will become the main means of transportation for general cargo". The fleet of container ships will be considerably enlarged to include an unspecified number of specialized container ships with a 1,200-1,400 container capacity and a speed of 23-25 knots, 20-30 ships with a 700-container capacity, and 25 ships with a 300-container capacity.[112]

Meanwhile, the absence of specialized container ships in the Soviet Merchant Marine, and all the consequences thereof, was said by Minister Guzhenko to be "the result of the short-sighted technological policy" of the two main administrations of the Ministry.[113] Even a partial solution of the containerization problem will improve the situation in the Soviet ports somewhat, but most of the problems will remain, and the Soviet port

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[112] Morskoy Flot No. 4, 1971, pp. 2-6.

[113] Vodnyy Transport, 14 July 1971.

facilities will for years to come still be a major obstacle in the Soviet Merchant Marine's course to greater efficiency.

Some Economic Aspects of the Soviet Merchant Marine

In spite of the apparent similarities between the operations of the Soviet Merchant Marine and the merchant marine of any other maritime nation, it is an extremely difficult task to compare their performance in economic terms. In fact, such basic categories as ownership and the objectives of operation differ so drastically that they as often the sole reason for rejecting any attempt to compare the performance of the Soviet Merchant Marine with its Western counterparts. The centralized planning and control in the Soviet Merchant Marine are often pointed out as another reason for the impossibility of such a comparison, and the rationale of fleet utilization in the Soviet case might be completely different from the Western rationale, profit making. According to D. Fairhall "some factors are declared to be more rational than others and the nature of the criteria applied to the planning might have very little in common with the familiar Western criteria".[114] What is implied

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[114] See D. Fairhall, op. cit., pp. 111-114.

here is the possibility of using the Soviet Merchant Marine to achieve purely political and military objectives, as certainly might be, and occasionally has been, the case. As for the political purpose, the Soviets themselves do not deny the importance of using their merchant marine to that end. Moreover, the Soviet Merchant Marine is considered to be a part of a unified internal transportation system and as such its performance and utilization, if measured against the interests of the overall system, do not necessarily coincide with Western standards of efficiency.

In spite of the recent Soviet emphasis upon profit, profitability, and the introduction of cost accounting in every enterprise, when one examines current Soviet Merchant Marine statistics, he will find continued emphasis on cargo turnover, ton-miles, cargo processed, cargo capacity, etc.

On the other hand, allowing for the aforementioned peculiarities of Soviet Merchant Marine operations, an impartial observer cannot fail to recognize the existence of a pragmatic understanding of its economic function by the Soviets. In addition to its satisfying the Soviet Union's shipping requirements, "liberating the Soviet Union from dependence upon capitalistic charter market", and assisting in the development of Soviet foreign trade, there is a genuine drive toward greater efficiency in the

Soviet Merchant Marine which in essence does not differ much from that in any other merchant marine of the world. They are trying to increase the productivity of their ships, ports, ship repair yards, improve ship design, select better propulsion units, install more productive cargo handling devices, introduce automation, and reduce the administrative apparatus. They are, in general, attempting to introduce the best from world maritime practice into their merchant marine. Occasional rate cutting, either to gain competitive advantages or to avoid returning empty, is not unique to the Soviet Merchant Marine, and has a long history in world maritime practice.

The economic reform, "the new system of planning (management) and incentives", launched in September 1965 was gradually introduced into the Soviet Merchant Marine during the period 1966-1968. First established in a number of pilot enterprises, a Latvian steamship company, the Port of Riga, a ship repair yard in 1966 and a Murmansk steamship company in 1967, the reform gained momentum, and in 1968 the Ministry of Merchant Marine completed the conversion of all its enterprises to the new system.[115] The introduction of the reform resulted in a greater degree of enterprise independence from central control and permitted

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[115] Communist of Armed Forces No. 21, November 1969, p. 47.

wider application of economical methods of management. Profit and profitability were applied as standards for measuring the performance of ships, ports, steamship companies, etc.[116]

The reform did not grant the enterprises complete control over the distribution of profit and the portion left to the industries varied. As for the Merchant Marine, 84.8% of the 1966 profit was left to the Ministry, of which over 70% was reinvested.[117] Planning and measuring of merchant fleet performance in foreign runs in terms of profit was introduced even before the reform, and high profitability of operations has been claimed. The announced rate of return was 18.5% for 1968, 13.2% for 1967, 4.9% for 1960, and 3.7% for 1958.[118]

In 1969 Minister of Merchant Marine Bakayev claimed that the Soviet steamship companies' profits could be the envy of "any ship company" in the world, that the profit covers not only

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[116] It has been constantly emphasized in the Soviet Union that the Socialist state is not at all indifferent to how an enterprise obtained a high profit. Not denying at all the concept of profit, many Soviet economists emphasized, however, that the high profit can be obtained "only through high prices" (which, in fact, is a "general law" stated by Marx). Party directives did not demand either the maximization of the profit or the raising of prices. Increased labor productivity and the reduction of production costs have been stressed as the main goals.

[117] Morskoy Flot No. 6, 1968, p. 35.

[118] Communist of Armed Forces No. 21, November 1969, p. 48.

operational expenses but capital investment for future development as well, and that in 1968 there was a net profit of 300 million rubles.[119] How much of the 300 million rubles was earned by charter and how much by Soviet coastal shipping is not clear.

Bakayev became a strong advocate of a more rational planning approach and further reduction and simplification of system of indexes, at least in relation to the Merchant Marine. He emphasized the peculiar character of the industry's operation, the need for a greater sense of responsibility toward customers, and broader application of the incentives provided by the reform on the basis of a more rational establishment of funds for this purpose. He also argued for better coordination of plans between the Merchant Marine and its major clients, and the need for the party responsible for a delay to bear material responsibility for it. The Minister emphasized the need to use only one index, profitability, as it is more objective and completely indicative of efficiency in the shipping companies. The decisive influence on profit growth of the rate of fleet expansion was used to justify the profit deficiency as an index. Profitability, on the other hand, cannot be changed unless the operation of the fleet is improved.[120]

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[119] Ibid., p. 49.

[120] The profitability is calculated as the ratio of profits to fixed and working capital.

The Minister was also against the application to the Merchant Marine of group norms which are established for all Soviet industries and which determine the economic incentive funds. There is a lack of uniformity among the various Soviet steamship companies which is caused by the specialization dictated by such factors as geographical location (influencing navigation and fleet composition), which is in turn usually linked to different wage levels and material and fuel costs; the prevailing cargo and, hence type of ships; type of service, i.e. coastal or foreign shipping, etc. For example, even two companies, Murmansk and Severnoye, operating from the same northern basin are different in this respect. The average ship of the Murmansk Company is 30% larger, the average distance to carry a ton of freight is 40% farther, and the average wage for workers is more than one and one half times higher.[121] The importance attached to the Soviet Merchant Marine has been acknowledged, and the majority of requests of the Ministry were satisfied.

In comparison with wages in other Soviet industries, Soviet seamen are well paid. In addition to wages and longevity bonuses, there is a system of incentive bonuses determined by the performance of the ship and contribution of the crew to it. In the fall of 1971 a very important regulation for rewarding

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[121] _Ekonomicheskaya Gazeta_, No. 25, June 1968, p. 5.

ships operating at reduced manning levels was approved by the Council of Ministers of the USSR. The possibility for management to eliminate excess labor was opened by the reform and first tested on a wide scale by a chemical combine. In the Soviet Merchant Marine, the experiment to man ships at a reduced level (crew strength has often been in excess of the actual need) was initiated in 1969, and it produced a very favorable result in that productivity was increased by 11%. The main reason for such a phenomenon was purely materialistic, for the remaining crew members were paid better. All the wages of the relieved members in rubles and 50% in foreign currency (crews on foreign runs are paid in both Soviet and foreign currencies) were left for distribution among the remaining crew members. As a result, the average wage on such ships increased by 22% and crew costs dropped by 11.5%.[122]

The approved regulations not only sanctioned operations with reduced crews (subject to approval by the Minister, providing that the safety of navigation is not being compromised), but even improved the system of material rewards for the crew paid for by the saved funds.

The 1971-1975 plan visualizes a 23% increase in labor

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[122] Morskoy Flot No. 8, 1970, and Ekonomicheskaya Gazeta No. 39, September 1971, p. 7.

productivity on ships, 12% in cargo handling operations, and 35% in ship repair. In the near future it is planned to reduce crew by 20-25% and in the more remote future by up to 50%.[123]

Party control of the unions, the practical absence of unemployment, and the shortage of labor produced a situation where the workers not only permit, but welcome, the introduction of any labor-saving devices. Surprisingly enough, it is the local administration which tries to resist and avoid the introduction of such devices, because of unrealistic increases in the norms and indicies often accompanying them. As can be seen, apart from a few obvious and often crucial differences, many other factors determining the economic performance of the Soviet Merchant Marine are quite similar to those operating in any other merchant fleet.

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[123] Vodnyy Transport, 5 October 1971.

Conclusions

The development of theSoviet Merchant Marine over half of a century has been extremely uneven. Up to about the middle of the 1950's it had not been distinguished either by the rate of its development or its size or the characteristics of its ships and what Captain A. T. Mahan, U. S.N., wrote at the end of the last century ". . . . . Russia has little maritime commerce, at least in her own bottoms: her merchant flag is rarely seen"[124] remained generally true. However, the existing merchant marine was able to, and to a large degree, did satisfy a rather considerable dependence of the Soviet economy and certain regions of the country upon sea transport. The size and character of the Soviet landmark create such a dependence, for in some areas, particularly in the Far East and the Northern territories, overland transportation does not exist, and the sea is not only the most logical, but the cheapest way to transport goods.

In the pre-World War II period, not until the first Five Year Plan (1928-1932) was the Soviet Merchant Marine reinforced by a sizeable number of new constructions. During the second Five Year Plan (1933-1937) merchant ship construction was curtailed

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[124] Quoted in Reporter, February 10, 1966, p. 25.

in favor of warship construction. The attempt to correct the situation during the third Five Year Planlost out to the war.

After World War II and up to the middle of the 1950's there was very little new construction in the Soviet shipyards. The procurement of ships abroad, though important, was not on a very large scale either.

In 1956 the accelerated development of the Soviet Merchant Marine was started. Considerably larger domestic shipbuilding capacities were provided and orders for ships abroad increased. For 15 years approximately 40% of the new ships were built in domestic yards; about 50% were built in Socialist countries, particularly Poland and East Germany, and the remaining 10% in capitalist countries.

It is doubtful that the decision to accelerate the development of the Soviet Merchant Marine, particularly as far as rate of its development is concerned, was the result of a planned approach. It strongly resembles a reaction to the existing situation, when the requirements for sea transportation generated by the relatively fast development of Soviet foreign trade and the initiation of economic and military aid were far in excess of the Soviet Merchant Marine's capability, and hence forced heavy dependence upon the charter market. The victory of the Castro revolution in Cuba, growing foreign trade, and foreign

economic and military aid sharply increased this dependence at the beginning of the 1960's. Restrictive measures against ships carrying cargo to Cuba initiated by the American government and a boycott organized by Western oil companies against non-Soviet tankers carrying Soviet oil to Cuba aggravated the situation. The foregoing made an even faster growth rate imperative, with the result that the growth for the period from 1961 to 1966 was labeled unprecendented by the Western press. Unprecendented or not, it was still a reaction to a situation and not a planned activity.

The development resulted in elevating the Soviet Merchant Marine role in the world shipping community. Prior to World War II, the Soviet Merchant Marine was in 23rd place in world shipping, in 1960 it moved to 11th and in 1966 to 6th, the place it continues to occupy.

Starting with the middle of the 1960's, when the situation had somewhat stabilized, one can validly speak of the planned development of the Soviet Merchant Marine, an assertion which is particularly true for the current Five Year Plan (1971-1975).

Such benefits of a planned economy as the allocation of shipbuilding capacities, construction of ships of approved types in large series, and greater maneuverability of capital, permitting emergency financing of ship procurement abroad, were

certainly beneficially utilized. The Soviet claim that they serve as an example of the development of a national mercantile fleet can in general be accepted.

The present Soviet Merchant Marine is sufficiently large and diversified to carry more than half of the Soviet foreign trade cargo, to deliver military and economic aid, to satisfy basic domestic needs in sea transport, and to earn enough foreign currency to pay for the Soviet charter of foreign ships and even supplement the Soviet need for foreign currency. It is obviously in no position to dictate terms and determine shipping rates in the world shipping community. While occasionally providing real competition to ships from capitalist countries and representing the commercial power of the Soviet Union on the ocean trade routes, the Merchant Marine will for a long time be preoccupied with the Soviet Union's own trade needs.

The Soviet Merchant Marine's share of the world shipping tonnage is minor, and compared with the other nations in terms of GNP, industrial output, and size, neither Soviet foreign trade nor its merchant marine are really great. Of course, there is room for growth in the latter.

In terms of ship composition, Soviet Merchant Marine is not well balanced yet, in comparison with major mercantile fleets of the world. It has very few bulk carriers, is just starting

to receive container ships, and only planning to build lighters aboard ships (LASH).

The smaller Soviet ships are well suited for trade with smaller, less developed countries of the world, where modern cargo handling equipment is practically absent and volume of trade does not require large specialized ships. In containerization and cargo handling and distribution ashore, the Soviet Merchant Marine is behind many Western countries. Disproportions between the ability of the merchant fleet to carry cargo and ports facilities to process it is well understood by the Soviet authorities, and measures to remedy the situation are underway.

Liner service is being rapidly developed in the Soviet Union. However, while the unusually high proportion of general cargo ships provides the Soviet Merchant Marine with diversified capabilities, it is becoming an obstacle and often leaves them with a less profitable cargo and the necessity to resort to tramp service particularly in international lines and in the conferences of which they are members. The planned emphasis upon larger specialized ships should improve the situation.

While membership in various international maritime organizations, conferences, and agreements permits the Soviets to promote their own interests, in the final analysis it might be

advantageous to the world shipping community. In general, the Soviets have demonstrated their willingness to cooperate, and many countries understand this. It was reported that the U.S. decided to explore ways to encourage more liberal U.S.-Soviet commercial shipping arrangements, including greater access to each other's ports and reducing the lengthy advance notice of a ship's arrival (from 30 days to 14 days), thus making sea trade between the Soviet Union and U.S. somewhat easier.[125]

It has been recently proved that people sailed the seas for trade ventures 9,000 years ago.[126] Historically, the world trade centers and sea routes along which goods have been moved have constantly shifted. The main factor determining the shift, however, is not the sea routes themselves or the availability or absence of a merchant marine in one or another country or regions, but the country's or region's industrial capacity, its ability to produce, sell, and buy.

The import-export trade of the Soviet Union has been greatly increased, thanks to the economic development of the country in general and industrialization in particular. Other

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[125] Washington Post, September 11, 1971.

[126] Washington Post, September 26, 1971.

developments, including the growth of Soviet Merchant Marine itself, have been derivatives from these factors.

The fact that more than half of the Soviet ships were built abroad does not minimize the overwhelming role of Soviet industry, whose development created the condition whereby goods can be produced for sale, armament and equipment can be built for military and economic aid and even natural resources exploited and exported as payment for imported goods. Of course, the Merchant Marine is not a simple carrier of all these cargos, but also produced effective feedback for further development of the same activity, i.e. foreign trade, economic and military aid, for which, initially, it was built.

In today's world it is difficult to separate economic power from political and military power. As an offspring of the former the Soviet Merchant Marine is providing considerable support to the other two. Its ability to move cargo anywhere in the world and to be employed, on occasion, in direct support of the Soviet Navy has definite strategic significance. The decade of the 1960's produced three major crises, in Cuba in 1962, in Vietnam, and in the Middle East, and in all of them the Soviet Merchant Marine played an important role. Moreover, it can be said that without the Soviet Merchant Marine, the Cuban crisis would probably not have occurred and those in Vietnam and the

Middle East would be of a different nature.

The auxiliary role of the Soviet Merchant Marine for the Soviet Navy is significant. The Soviet Merchant Marine personnel policy, which is generally successful, is benefited by steady supply of trained men from the Navy. Conversely, the Merchant Marine represents a "personnel bank" of trained reserves for the Navy.

During Soviet Navy and Army exercises, a number of Soviet Merchant Marine ships usually take part, and contingency plans for speedy conversion of merchant ships into military transports exist.[127]

It appears that the economic (commercial), political, and military roles of the Merchant Marine are well understood by the Soviet leadership, who are using it as an instrument of Soviet national policy.

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[127] Rear and Supply of the Soviet Armed Forces No. 11, 1970, pp. 75-78.

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DEVELOPMENT OF SOVIET MARITIME POWER

by

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Development of Soviet Maritime Power

Volume II

By

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CHAPTER III

SHIPBUILDING INDUSTRY

General Development and Yards

The number of ships and the total tonnage of a country's merchant marine and Navy are not necessarily indicative of the nation's maritime power or its industrial might. Liberia, for example, has the world's largest registered merchant marine, and Argentina and Brazil have sizable Navies; however, none of these nations can be called maritime powers of magnitude. The shipbuilding industry of a country is a better indicator of a country's maritime development.

Pre-revolutionary Russia had a relatively well developed shipbuilding industry, characterized by distinct eccentricities: (1) specialization in naval construction; (2) extensive control by foreign capital; (3) dependence (and often far beyond necessity) upon foreign technology. Naval construction programs, often being more profitable, monopolized Russia's shipbuilding capacity, resulting in very few merchant marine ships being built in Russian shipyards. In 1913 85% of the

total Russian merchant marine tonnage was comprised of foreign built ships.[1] The history of Chernomorskyi Shipbuilding Yard in Nikolaev is very illustrative. Completed in 1897, the shipyard was owned by a Belgian company. Starting in 1901, the yard participated in the construction of a number of navy ships, among them the famous Potemkin, and produced steam engines, boilers, and turrets. In 1911, the yard became the property of a French company and was awarded a contract to build the latest Russian battleship and to supply propulsion plans for another battleship being built by "Russude" (presently "61 Communars Ship Yard"). The growing demands of Russian naval programs required the modernization of the yard, subsequently accomplished by the British Vickers Company. In 1912 the shipyard built the Krab, the world's first submarine-mine layer. Ensuing pressure from the Russian mercantile banks forced the company to sell a sizeable block of stock to the Russian controlled International Commercial Bank; the resulting joint stock company was named the "Society of Nikolaevsk Shipyards". During World War I, the shipyards built a large number of naval ships of various types and classes. In 1915, the Petrograd International Bank, financier of both yards, centralized the

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[1] Sudostroyeniye (Shipbuilding), No. 11, 1967, pp. 31-37.

administration and therein effectively monopolized the shipbuilding industry in the southern Russia.[2]

A considerably larger group of Russian shipyards, located in Petrograd, was also heavily involved in naval shipbuilding with a relatively minor allocation to commercial ships. Owing, in part, to the naval shipbuilding orientation, the technological level of the Russian shipbuilding industry remained comparable to that of major European maritime powers. Supporting industries, receiving less emphasis, were subsequently less developed and hence, Russia's dependence on foreign deliveries, particularly ship machinery. A number of types and classes of ships built prior to the revolution were equal and some even superior (eg. destroyer Novik) to comparable ships of the major maritime powers. Commercial shipbuilding, to the contrary, was under-developed; during the period 1905 to 1917, Russian shipyards built only eight merchant ships.

The Russians did not hesitate to experiment, and at the beginning of 20th Century the world's first tanker with diesel propulsion, Vandal, was built in Sormovo.

The chaos and destructiveness of the revolution and the civil war brought the Russian shipbuilding industry's productive

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[2] _Sudostroyeniye_ No. 5, 1971, pp. 45-51.

activity close to nil, and most of the shipyards, fell into decay. However, in 1921, the first southern shipbuilding yards (Black Sea) and in 1922 the Petrograd shipyards began their restoration, and gradually resumed the work. In January, 1922, the shipbuilding trust was created in Petrograd to "organize the work of the shipbuilding yards for the restoration of the Navy".[3] Again, as prior to the revolution, the emphasis was placed on naval shipbuilding. It soon became clear that the one-sided emphasis on naval construction was beyond the reach of the badly damaged Soviet economy. The introduction of the New Economic Policy (NEP) and urgently needed foreign exchange for import payments forced the Soviet Government to reconsider the shipbuilding industry priorities and to place greater emphasis on the merchant marine.[4] Additionally, the poor condition of in-country transportation demanded the hasty development of water transports. In 1924, the Soviet Government decided to construct timber carriers, tankers, and refrigerators immediately.[5] By the beginning of 1925, previously initiated

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[3] Shipbuilding No. 4, 1969, pp. 69-70; No. 4, 1970, pp. 1-5.

[4] Shipbuilding No. 5, 1971, pp. 45-51.

[5] Shipbuilding No. 11, 1969, pp. 17.

efforts resulted in the complete restoration of all remaining ships of the nationalized merchant fleet. Ships construction began in 1925 simultaneously in Leningrad and in Nikolaev. Early in 1925, the Special Committee of the Consul of Labor and Defense presented the first five-year shipbuilding program for the years 1925-1930 and the Central Bureau for Shipbuilding was organized in Leningrad. The first four ships, timber carriers, with a cargo capacity of 3,100 tons were laid down in the Baltic Yard in January 1925.[6] The first tanker of 10,000 dwt (deadweight tons) laid down in November 1925 in Nikolayev, was ready exactly four years later. The relatively long period for the construction of this tanker, the Embaneft, was explained as being a weakness of the industry, the necessity of utilizing only available machinery, and a preoccupation with the naval construction which continued in high priority.

In 1927, the first cruiser, Chervona Ukraina, whose construction began prior to the revolution, was completed.[7] In 1928, all of the suitable remaining ships of the former Russian Imperial Navy, were either restored or completed and the Soviet shipbuilding industry started to build new naval ships. The

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[6] Shipbuilding No. 11, 1969, and Shipbuilding No. 4, 1969, pp. 69-70.

[7] Shipbuilding No. 11, 1969, and Shipbuilding No. 4, 1971, pp. 7-11.

first Five-Year Plan, 1929-1933, visualized construction of 216 ships for the Soviet Merchant Marine, 1 floating dock, and 16 harbor tugs. However, not only was this program not fulfilled, but two combined programs, 1925-1930 and 1929-1933, produced only a total of 104 merchant ships.[8] Throughout the 1930's, so few commercial ships were built that the programs for their construction are not discussed in modern Soviet specialized literature. The 15 year period from 1925-1940, resulted in the construction of 23 tankers with total capacity of 200,000 dwt. A large number of river boats were built by secondary shipyards, and priority programs such as the construction of a few ice-breakers were fulfilled. The minimal performance of the shipbuilding industry with regard to the Soviet Merchant Marine is casually explained by "this period having coincided with the beginning of intensive construction of the Navy".[9] The third Five-Year Plan, 1939-1943, devoted somewhat greater attention to the merchant marine, but the plan never materialized because of war.

A number of innovative methods were introduced to the shipbuilding industry prior to World War II. In 1930, in a Soviet Far Eastern Shipyard, the first tug with an electro-welded

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[8] Shipbuilding No. 11, 1967, pp. 1-3, and No. 4, 1970, pp. 1-5.

[9] Shipbuilding, No. 11, 1967, p. 2.

hull was built. In 1932, Admiralty Yard, in Leningrad, while building a timber carrier introduced the sectional method of hull construction.[10] However, those innovations were seldom widely used in commercial shipbuilding and were primarily employed for naval construction.

A program for shipyard restoration, primarily for purposes of naval construction, was initiated prior to World War II and a number of new major shipyards were built. The Nicholaev's Yard was modernized; the Sormovo Yard production capacity was extended (primarily for sectional construction of submarines); two new yards, one in the north, Severodvinsk, and one in Komsomolsk on the Amur were built (both designed to build cruisers, destroyers, and submarines). Modernization of the Leningrad shipyards had been started, but was interrupted by the war.

During the war, the Soviet shipbuilding industry managed to complete the construction of ships with a high degree of prewar readiness; however, the industry was basically involved in the repair and maintenance of ships of the Soviet Navy, some yards built tanks and other items for ground forces.

The war resulted in the severe damage or destruction of

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[10] _Shipbuilding_ No. 4, 1969.

many of the principle shipbuilding yards, particularly in the Black Sea area. Immediately following the war, the Soviet shipbuilding yards were among the first enterprises to be restored and many considerably modernized. The productive capacities of many yards including Zdanov, Sormovo, Severodvinsk, and later Kerch', were enlarged, and covered fabrication shops, permitting year round production in the northern area, were added. Former German yard in Kaliningrad (Koenigsberg), was rebuilt.

The allocation of shipbuilding capacities in the Soviet Union during the first post war decade reminds one of the prewar situation; i.e., naval shipbuilding, intensified in 1947, had received far greater priority in allocations, while commercial shipbuilding was conducted on a residual basis. However, there was an increase in the number of smaller yards and the portions of the larger ones which were involved in commercial shipbuilding.

Two major decisions made soon after Stalin's death altered not only the nature of Soviet shipbuilding, but also affected the allocation of capacities. The first decision was connected with the beginning of nuclear submarine construction in 1953; the second involved termination of the construction of a large series of cruisers and conventional destroyers. A number of build-ways, previously committed to cruiser and destroyer

construction, were subsequently vacated. Some of those previou involved in cruiser construction in Severodvinsk and Komsomolsk on Amur were gradually converted to the construction of nuclear submarines; part of the others previously allocated to destroyer construction were redirected to the production of diesel submarines. The remaining vacated build-ways were allocated (in Leningrad and the Black Sea Yards) to commercial shipbuilding, thus initiating, together with increased orders abroad, a rapid development of the Soviet Merchant Marine. The accelerated submarine building program definitely demanded an expansion of the Soviet submarine building facilities which, probably, took place during the late 1950's and early 1960's.[11]

At the present time, the Soviet Union has approximately 15 major shipbuilding yards, close to two dozen of medium sized shipbuilding yards, and many small shipbuilding and ship repair yards and shops, the total number of which probably approaches a few hundred (including those involved in fishing fleet and river fleet repairs). The major Soviet shipbuilding yards, the type construction (naval or commercial) and geographic location are as follows: (1) Northern area - Severodvinsk - practically exclusive naval construction specializing in submarines. This is one of the newest and most modern Soviet shipyard which,

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[11] Jane's Fighting Ships 1966-1967 thru 1970-1971 editions.

according to a probably exaggerated statement by Admiral Hyman Rickover, has "several times the area and facilities of all of the U. S. submarine yards combined."[12] (2) Baltic Area - four yards in Leningrad: Baltic and Admiralty primarily involved in commercial construction; Sudomekh - submarine construction; Zhdanov - both naval (destroyers type specialization) and commercial; and one in Kaliningrad specializing in escorts construction and performing minor commercial construction; (3) Sormovo - primarily submarine construction; (4) Black Sea Area: Nikolayev - both naval and commercial construction; Kerch - both naval and commercial construction; Kherson - primarily commercial construction; (5) Soviet Far East - Komsomol'sk on Amur - primarily naval (all types) construction; and Khabarovsk - both naval and commercial.

In addition to the above, there are a number of smaller but nonetheless important yards located in Vyborg, Klaipeda, Riga, Tallin, Astrakhan', Azov, Sevastopol, Kiev, Yaroslavl, Perm', Rybinsk. Most of these yards are involved exclusively in commercial ship construction, and many combine shipbuilding and extensive ship repair.

As can be seen, the major shipbuilding yards are widely

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[12] <u>Fortune</u>, August 1, 1969, p. 122.

disbursed and all four Soviet Naval Fleets; Northern, Baltic, Black Sea, and Pacific, have shipbuilding facilities capable of satisfying their basic needs in all types of ship; this is particularly true with the Soviet Pacific, Black Sea, and Baltic Fleets. The preoccupation of Severodvinsk Yard with submarine construction does not seriously handicap the Northern Fleet because its proximity to the major shipbuilding center in Leningrad and the existence of inland waterways, which facilitate the distribution of ships among the other two fleets in the European part of the USSR. A major Soviet submarine building yard, (Sormovo), lying deep inland, used to ship newly constructed submarines in section by railroad. At present, the yard is connected by the system of inland waterways with three European Soviet Naval Fleets.

The sectional method of ship construction, mastered in the 1930's, received wide application in the post-World War II development. Later, a large block construction method was added which permitted the construction of large ships far exceeding the capacity of a building way, through the joining of blocks while afloat. In the late 1940's, the riveted method of hull construction was rejected completely. The advanced technology of the full construction resulted in a 30% reduction in the number of workers involved in the process, while doubling the output.[13]

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[13] Shipbuilding No. 4, 1970, p. 3.

The deadweight of Soviet built ships is being constantly increased. A series of Kazbek-type tankers of 11,800 DWT, built at the beginning of 1950's, was followed by the Praga-type with doubled deadweight and Sophiya-type whose deadweight reached 49,000 tons. Today, the tanker MIR of 150,000 DWT is under construction. During the decade of the 1960's rather large and sophisticated war ships of the Kynda, Kresta, and Moskva classes were also built.

A degree of ingenuity and innovation was also widely exercised in the field of propulsion. In the first half of the 1950's as a result of a lack of large powerful marine diesels, smaller diesels were employed in electric-diesel propulsion systems. A typical ship for such a system was Dneproges laid down in 1954.[14] Existing and slightly modified steam turbines were also employed for merchant ship construction. A dry cargo ship, Pariskaya Kommuna, built largely on an experimental basis, was fitted with gas turbine of 13,000 horsepower. The variable pitch propeller found wide application aboard Soviet merchant ships. The speed of many Soviet merchant ships, particularly dry cargo ships, was raised to 19 and some to 22 knots. The application of automation, particularly to control the main machinery of the ships, started at the middle of the 60's and is

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[14] _Shipbuilding_ No. 5, 1971, pp. 45-51.

presently being widely expanded. The search for and experimentation with new types of ships, such as katamaran, hydro-foils and air-cushion is continuing; number of ships built on new principals are already being widely used by the Soviet merchant marine and river fleets.

The importance of the Soviet shipbuilding industry was recognized by the opening of the new permanent "Shipbuilding" pavilion in 1967, at the Soviet Exhibition Fair in Moscow, VDHKH, where many new and progressive methods of shipbuilding were proudly displayed. The wide application of new materials including plastics in Soviet shipbuilding was evident. The Soviet Government's support of the shipbuilding industry also can be illustrated by the fact that each launching of a new major merchant ship is widely publicized and treated as "a victory of the labor".

Research and Development

The successes of Soviet shipbuilding industry would have been impossible without a powerful support received from various research and development institutions as well as the maritime educational establishment. In addition to several dozen scientific research institutes and design bureaus subordinated to the Ministry of Shipbuilding Industry, there are a number of

scientific research institutes and design bureaus which are subordinate to the Soviet Navy and which contribute to the various fields of shipbuilding in a very substantial manner, particularly for ship propulsion including nuclear systems. The educational institutions, such as marine engineering institutes and various navigational nautical schools are annually turning out a considerably greater number of graduates (marine engineers and naval architects) than any other country in the world.

The scientific research efforts in the area of shipbuilding is coordinated by the Soviet Academy of Sciences and the Institute for Complex Transport Problems. The major shipbuilding research centers are located in Leningrad and Moscow, but the centers in the Gorki, Black Sea, Kiev, and Soviet Far East areas are also important. Among the best known Soviet scientific research institutions are the following: Central Scientific Research Institute of Merchant Fleet (TSNIIMF); Central Scientific Research Institute imemi Academik A. N. Krylov; Central Diesel Scientific Research Institute; Scientific Research and Project - Design Institute of Sea Transport, Sousmorniiproekt; Central Design Bureau, Baltsudoproekt; and the Leningrad Central Project - Design Bureau. The contribution of the Scientific Research Institutes, subordinated to the fishing industry and river transport,

have also been considerable.[15]

Over 200 scientists with Doctor of Science and Candidate of Science degrees are working for two leading research institutions of the Soviet merchant marine, Souzmorniiproekt and TSNIIMF. In addition, more than 50 doctors of science and 400 candidates of science are working for the higher educational institutions of the merchant marine. Research work is also done by a number of central project-design bureau and more than 30 specialized institutes of shipbuilding and other industries.[16]

The Leningrad Shipbuilding Institute is the largest Soviet educational institution directly connected with the Soviet shipbuilding industry. The institute has 44 departments, and during the period of 1946-1967 graduated more than 12,000 marine architects and engineers. It was organized in 1902 on the initiative of the Soviet academician and ship builder, A. N. Krylov.[17] A number of Soviet universities and poly-technic institutes have their own shipbuilding departments; the better known among them is the shipbuilding department of Gorki Polytechnical Institute, organized in 1920. The department mainly

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[15] Central Scientific Research Institute of Merchant Fleet, Transactions, Vol. 133, Leningrad, 1970.

[16] Morskoy Flot No. 7, 1971, p. 3.

[17] Shipbuilding No. 8, 1970, pp. 7-8.

associates with shipbuilding yard Krasnoye Sormovo in Gorki, and many of its graduates have occupied the leading positions in the yard. Among the recent contributions of the research work of department were detailed research on hydro-foil and air-cushioned ships.[18]

Some of the works by Central Scientific Research Institute of Merchant Fleet demonstrate the scope and the influence of the Soviet research institutions upon the decisions made regarding shipbuilding and general development of the merchant marine. The basic work for the typification of fleet and the selection of minimum necessary number of types of ships was done in the institute in the late 1920's and early 1930's.[19] Immediately after World War II, the world shipbuilding experience in construction and exploitation of merchant ships was summarized and analyzed. The problems of typification and the selection of the appropriate technical - economic parameters of ships were among the main outcomes of the study. During the 1947-1952 period optimum typification of ship, the so-called "Network of Ship's Types", was recommended and included eight classes of dry cargo ships, five classes of tankers and a number of other ships. A 1955-1956

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[18] Shipbuilding No. 6, 1971, pp. 61-64.

[19] The institute programs are described in its Transactions through a number of years. Particularly descriptive for this purpose is Volume 133, Leningrad, 1970.

study resulted in selection of the optimum limits of propulsion units for various ships and the recommendations to increase the deadweight of constructed tankers, which resulted in the decision to build the Sophiya class tanker.[20]

During the 1958-1962 period, the institute worked out a plan of general prospective development of sea transport for the 1959-1980 period. The recommendations of the plan serve as a basis for further work in the designing and the construction of larger ships with higher speeds, and further reduction in the number of types of specialized and universal ships. During the 1961-1963 time frame, the recommendation for typification of merchant marines of Comecon countries were worked out together with the selection of types and basic ships parameters. As for the 1971-1975 period, the accelerated construction and introduction of fast dry cargo liners, container ships, and lighter carriers, LASH, "capable of competing with any ships while working on the international lines" was proposed and basic design of the ships formulated.

The introduction of so called complex automation on the new ships, which could result in a 15-20% crew reduction, was strongly recommended. The measures to increase profitability of the Soviet merchant marine, with emphasis on the efficiency of

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[20] _Ibid._, p. 17.

cargo handling devices and containerization, were worked out on the assumption that "the sphere of activity of the Soviet merchant marine, especially in the transportation of foreign cargo will be widened considerably". The more detailed plan for the future development of the merchant marine for the 1971-1980 period was worked out, where the basic types of ships, their parameters, and the rate of their construction were determined and the basic ship designs worked out. The further increase in the proportion of narrow specialized cargo ships, and the further automation of diesel, steam, and gas turbines ships were recommended. The construction of transport submarines in limited numbers was not excluded.

Examining past programs and measures proposed by the Soviet research institutions and comparing them with the actual shipbuilding performance produces striking similiarities, especially in case of shorter range (usually five years) programs.

Each major aspect of ship design, shipbuilding, and naval weapons system development has its own research institute. There are separate institutes for hydro-dynamics and ship construction, welding, turbines, boilers, diesels, electronics, naval missiles, underwater weapons, etc. The observed improvement in the design of Soviet naval ships and growing sophistication of their weaponry, better and more economical ships built for merchant

marine, fishing and river fleets, experimentation and construction of new type vessels (such as hydro-foil and air-cushioned) are testimony that the research resources allocated to the Soviet shipbuilding industry are producing significant results.

Shipbuilding Methods Employed

Because Soviet shipbuilding yards were built at different times, they can be divided, according to layout and production facilities, into three major categories. The first category is represented by the yards built prior to the revolution and among them are the largest Soviet yards. They have variety of shops capable of manufacturing all necessary items for a ship under construction. Some of these ship yards have the Soviet's oldest and longest (over 200 meters) inclined end launch building ways. Two of these yards, one in Leningrad, and the second in Nikolayev, have custom building capabilities in facilities and in skills. They certainly meet the demand for small quantities of individualized ships, such as complicated research vessels or sophisticated naval ships.

The second category of the shipbuilding yards, representing the largest group, are those primarily built prior to World War II and designed to build naval ships utilizing the components provided by supporting industries. Straight line production flow

is utilized in enclosed, level building positions, and each yard has a ship dry docking capability.

The third category is represented by ship yards built or modernized after World War II, yards of the most modern design employing most productive production practices. Many of ship yards in this category are used for commercial shipbuilding.

It is standard practice of the Soviet Ministry of the Shipbuilding Industry to limit the assignment of the construction for each class of ship to as few yards as possible and thus to gain the greatest possible advantages from specialization, standardization, and series production. Often, the development of a particular yard has been planned with a specific shipbuilding program in mind. Those yards engaged in major production programs are designed, arranged, and tooled in such a way as to assure a smooth flow of series production of a particular ship type.

The central planning of the shipbuilding programs and the production processes involved in their materialization provides for increased standardization and involves a design process with a major goal being to facilitate production. Highly specialized design bureau usually located in the vicinity of or nearby the shipbuilding yard are assigned to design a given ship type which will be produced by the yard.

The majority of the Soviet major shipbuilding yards have

well spaced and conveniently located shops for fabrication, sub-assembly and machining, employing varieties of conveyor systems, transversers, and other devices. Some of the production lines have been automated. The automation mainly involved steel plate processing, fabrication, sub-assembly, and material transport. Practically all machinery is Soviet designed and built.

Some hot cutting machines are operating on a photo-electric cell principle, and others are controlled by computer. The Kristal hot-cutting machine has three modifications, one of which employing plasma-arc cutting, or oxygen cutting. A number of Soviet shipyards have mechanized the welding of joints and framing connections. The automation of production processes resulted in a considerable reduction in assembly and welding time, and increase in output per square meter of working space. The advantages of automated and improved methods of processing and fabricating steel are further utilized in a number of methods for hull assembly, resulting in cutting down building way times and thereby increasing the number of ships turned out without increasing the numbers of ways. Complete hull section assembly method worked out a long time ago for construction of submarines, is widely being used. A some-what modified method employs the so-called "block technique". The hull is divided, for example, into nine blocks, which later are assembled into sections at

three positions (each section is assembled from three blocks). Later the sections are transferred to the final hull assembly line where they are joined together and launched. By using these methods, the production cycle of BMRT Mayakovskii was reduced to 3.5 months.[21]

Another sectional construction method called the "Island Method" is employed for construction of larger ships. The hull is divided into blocks, or islands. These islands are constructed simultaneously on the building ways with sufficient space between them for the installation of machinery prior to final assembly. The complete utilization of building ways working space is achieved. Several variations depending upon a number of islands exist for this method. For example, the three islands variation requires a building position long enough for a complete ship plus an additional island. Generally, the process starts at the head of the building way with the formation of a stern island. When the completed hull that shared the building ways with the stern island is launched, the stern island is moved to the foot of the building way. The second, the mid-ship island, is built and joins the completed stern island, and simultaneously the third, the bow island, is being built, and connected with the mid-ship island. Meanwhile, another stern island is started at the head

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[21] <u>Shipbuilding</u> No. 1, 1970.

of the way, and should be completed by the time the bow island is joined and the completed ship launched, after which the entire cycle can be repeated. Employing the three islands method the construction time of the tanker, Geroi Bresta, was cut from seven months to 3.5 months.[22]

Another method of hull assembly presently being widely introduced involves the launching of two separate whole sections which later are joined together afloat. First introduced at the Rybinsk Ship Yard while building a bulk carrier for river-sea navigation,[23] the method is presently employed in construction of much larger ships, including tankers.[24]

Most Soviet ships are built on level ship-assembly positions from which the following launch methods are used:

a floating launch dock;
a controlled launch/ship transverser-fed facility;
a floodable basin/building dock combination;

All methods have a built-in ship retrieval capability. The floodable basin/building dock combination includes building docks which are connected by water-tight gates to a floodable launching basin that has access to navigable water through another set of

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[22] Shipbuilding No. 12, 1970.

[23] Izvestiya, 16 October 1969.

[24] Shipbuilding No. 12, p. 8.

water-tight gates or caissons. Each building dock is equally suitable for single, large hull construction or multiple, small hull production. When construction is completed, the gates to the dock are opened and the ship floats into the basin. The level of the basin is then adjusted to that of the estuary. After that, the outer gates of the basin are opened to allow the ship to be moved to the fitting out area. In multiple hull production, the dock gates are opened and the completed ship or ships are rolled out dry into the basin, leaving the uncompleted hulls behind. The dock gates are shut, and the launching basin is flooded to enable the hull to be floated to the deeper portion of the basin. Then, the deep basin water level is adjusted to the level of estuary and the new hull is moved through the gates for fitting out.

The geographic location of the majority of the Soviet shipyards requires weather protection and themajority of the shipbuilding positions at major Soviet yards are enclosed in heated buildings. A device permitting conventional method hull painting and creating a sort of micro-climate on the floating docks was introduced in Zdanov Shipyard in Leningrad.[25] The device, through a system of ducts, distributes hot air with controlled temperatures through the working areas as well as

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[25] Morskoy Flot No. 6, 1971, p. 7.

along the ships hull, creating better working conditions and permitting paint drying during the winter.

Propulsion Systems and Their Development

The continuous reduction in the cost of maritime transportation, primarily resulting from the increased sizes of ships, improved propulsion systems and the automation (resulting in the reduction of crew size) will take place in the future as well and apparently along these same lines.[26]

The reduction of hull resistance can also bring remarkable improvement. The bulbous bow has brought with it, in recent years, a marked saving either in power needed to propel a ship of certain displacement, or in increase of speed. But in principle, the problem is one of converting the flow around the ship's hull from turbulent to laminar.

Friction resistance can be eliminated by creating an air cushion between the ship's hull and the water surface, or by using hydro-foils which lift the ship's hull out of the water. But both methods suffer from a serious shortcoming, for they

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[26] Shipbuilding No. 4, 1968, pp. 11-15. Very interesting and revealing discussion of this problem can be found in "Shipping, the Next 100 Years", J. and J. Denholm, Ltd., 1967, and The Journal of Commerce and Shipping Telgraph, 1967, 18/I, # 43393.

require a very high-power output to remain underway (approximately half of the main propulsion power generated by hover-craft is expended in creating the air cushion, while speed has little effect on this power). A hover-craft making 60 knots requires 100 horsepower per ton of weight, whereas a modern displacement ship making 22 knots, requires only two horsepower per displacement ton.

At the present time, the great majority of ships are driven by diesel or steam turbine. Diesels are used almost exclusively when low and medium power is required. The steam turbines have been used when high power was required. The recent years have witnessed more and more diesels entering the high-power field. If, in the early 1950's, 10,000 HP was the limit for a diesel, today the limit approaches 50,000 HP, meaning that one engine will develop all the power a propeller can absorb.

In contrast to diesels, maximum power for the steam turbines has never been a problem. Steam pressure in steam turbines presently are around 40 to 60 kg/cm^2 and the temperature is 460°-500° C. The thermal efficiency of steam turbines is not as high as that of diesels and presently is in the average of 25-27%. In certain cases, it was increased up to 30%, when steam pressure is 70-80 kg/cm^2 and temperature 500-510° C.[27]

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[27] Shipbuilding No. 4, 1968, p. 14.

The gas turbine might be a good propeller drive. There is no problem with feed water or with condensers, but partially because of a still low quality of fuel, the efficiency of gas turbines are in neighborhood of 30-32%. More technologically advanced gas turbines using better fuels can probably raise the efficiency to 40%.

The existing atomic reactors use a very small percentage of the energy hidden in the atomic nucleus. The breeder reactors are more promising. The energy obtained in the atomic reactors can be used in steam turbines or in closed cycle gas turbines. If and when the way to obtain electrical energy directly will be discovered, it would result in the most efficient propulsion system. Such has been the general trend in the improvement of various types of ship propulsion systems.

Diesels

The first diesel was produced in Russia at the beginning of the last decade of 19th century by Russky Diesel Plant, where the production of diesels continues. However, while producing a number of diesel types for the various modes of transportation, the production of large powerful, contemporary marine diesels did not start until the beginning of 1960's when a technical assistance agreement signed in 1959 with Burmeister and Wain

(Denmark) provided the Soviet Union the license to build the famous B & M marine diesels. The production was organized at the Bryansk Plant.

Prior to World War II, Russky Diesel produced DKRV 65/69 diesels of old design with 1,900 - 2,400 HP output, and 110-125 rpm respectively. During the decade of 1930's production of more modern diesels, DKRV 68/120 type with 1,800 - 2,700 HP output and 100 rpm was organized. Another plant, Kolomensky, built less powerful diesels.[28] After the World War II, diesel propulsion plants for the Soviet built ships were designed on the basis of diesels manufactured by Russky Diesel of the following types: 6 and 8 DR 30/50 with 600 and 800 HP output (300 rpm), 8 DR 43/61 with 2,000 HP output (250 rpm) as well as universal industrial diesels, D 50 of 900-1,000 HP and D 100 of 1,800 HP.

The low power output of the Soviet built diesels presented the shipbuilding industry with considerable difficulties. A number of diesel-electric plants with 7,000 HP were designed and built.[29] The diesel electric propulsion plants utilized the output of 2-4 diesel generators through a powerful electric motor driving the shaft. This type of propulsion plant permitted the Soviet

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[28] Shipbuilding No. 11, 1967, pp. 31-37.

[29] Ibid., p. 16.

Union to build the UL (reinforced for ice navigation) class of ships needed at the northern areas.

The B & W low revolution powerful marine diesels (674 VT 2BF - 100; Soviet code DKRN 74/160, and DKRN 50/110) whose production was mastered by Bryansk Plant in 1961, played a very important role.[30] The majority of the Soviet motor ships are propelled by foreign built diesels, and ships over 15,000 tons have been using them exclusively. Many of these "foreign built" diesels are being manufactured by Poland, (under licensing from Burmeister and Wain, Denmark, Sulzer - Switzerland, and M.A.N. - West Germany) and Czechoslovakia.

The first powerful 9,500 HP marine diesel of the Soviet design was built by the Bryansk Plant in 1969.[31] In 1971, the 21,000 HP marine diesel of unknown origin was built for the first time by the same plant.[32] It is fair to conclude that without the foreign deliveries of diesels, the Soviet merchant marine

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[30] Soviet Government permission to buy the license for the diesel apparently was not obtained without a strong inter-agencies battle. During the 1960's, a number of articles in the Soviet Press describing the work of Bryansk Plant referred to the unnamed "Those who opposed the idea, demanding the acceleration of domestic R & D and mastering the production of diesels".)

[31] _Pravda_, 28 February 1969.

[32] _Izvestiya_, 24 May 1971.

(84% of ships are diesel powered) would be hard pressed for propulsion plants installations and many ships would either not be built or the rate of the merchant marine growth would be slower.

The naval diesel propulsion installations went through a somewhat similar process of development. Of course, the naval requirements have been of different nature as for the size, power, and rpm. The demand for the reserve power have often excluded diesel as the main engine on the combatants.

Initially in the late 1920's and early 1930's, slow speed, four cycle, solid injection diesels of several sizes were produced. They were used as main engines in auxiliary ships and as generator drivers. Later on, two types of four cycle diesels for naval installations were built. The first of these were rated at 1,100 and 1,400 HP at 460 rpm and had specific weights of 22.7 and 18.9 kg/HP respectively. The second type was lighter (13 kg/HP) rated at 600, 800, and 1,100 HP at 600 rpm. Two cycle diesels with loop scavanging rated at 4,200 HP and 6,000 HP were also produced in the pre-war years.[33] Serial production of the 30-D and its successor, 40-D diesels was organized. The 40-D engine rated at 2,500 HP had a two stage

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[33] Morskoy Sbornik No. 7, 1966, pp. 76-83.

super charging system. Compared with the 30-D, the 40-D power was 25% greater, its fuel consumption reduced and it was 20% lighter.[34] A definite success in the post war years was serial production of the Type 61 diesel, a two cycle, 6,000 HP engine. The Type 61 diesel, having 1,200 hour service life prior to major overhaul, can be used as a pure diesel or in combination diesel-gas turbine installations as a sustainer engine. The M-50 diesel designed by a Navy bureau have been produced for many years and is now widely used in the Soviet Union. This marine diesel is produced in 1,000, 1,100, 1,200, and 1,500 HP sizes. Power changes are provided for by stepping up rpm and super charging. The specific weight of the M-50 diesel is 1.4 - 1.7 kg/HP.

The big success for the Soviet diesel builders was the development in early or middle 1960's of the M-503 diesel, which have been in the serial production and widely used by torpedo boats, fast patrol boats, and light combatant ships. The M-503 diesel is 42 cylinder, 7-black star with 6 cylinders in each row. It is equipped with reverse reduction gearing and is produced in several modifications. The main modification develops 4,000 HP and has a specific weight of 1.35 - 1.63 kdg/HP. The specific fuel

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[34] *Ibid.*, p. 79.

consumption in the power range from 10% to full is not exceeds 175 grams/HP/hour (the optimum value is 158). The M-503 is four cycle diesel with driving turbo-super charger and has unlimited permissible time of continuous operation at maximum power. These engines basic characteristics exceed that of many foreign designed diesels (Fiat 560, MB-518 Mercedes Benz, 24WZ Mitsubizhi).

Steam Turbine Propulsion Systems

If the majority of Soviet merchant ships have diesel propulsion, the majority of Soviet major combatants have been using steam turbine propulsion systems. Prior to the revolution, Russian built steam turbine plants could not satisfy the demands of the Navy and many installations were imported.

The first Soviet built steam turbine propulsion systems were developed in the late 1920's and early 1930's for escorts, and for destroyer leaders. Many of the Soviet first destroyers had foreign built turbines. Later in the 1930's, the Soviet research work resulted in the design and construction of steam turbines for a second generation of Soviet built destroyers. After the war a modernized version of pre-World War II design steam turbines were installed on Soviet Otlichnyi and Skory Class destroyers and Chapaev and Sverdlov Class cruisers. The steam

parameters of those installations were 27-32 kg/cm^2 and 420-450°C.

Just before World War II, the destroyer Opytnyi (Experimental) with very productive, but not manueverable once-through boilers was built.[35] The extensive experimentation with this propulsion system continued after the war. During the test runs in 1947 and 1948, the destroyer Opytnyi developed speed up to 42 knots, but the system, because of its poor manueverability, was found unsuitable for the war ships and the experiment dropped.

In the early 1950's, a new lighter, more economical and maneuverable system with partially automated controls was designed for escorts (utilized on Kola and Riga Classes). A two stage reduction gear was used with the turbines. During the middle 1950's, a steam turbine propulsion plant, for the Kotlin class destroyers, was developed. The further improvement in Soviet built steam turbine installations dealt with the following: the specific weight of the turbines, the condensers, and the reduction gears dropped considerably; the turbine blade periferal velocities, rpm and load on the reduction gear increased. All this made possible the reduction of the specific weight of the installation, while almost doubling the power of the aggregate and simultaneously

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[35] The boiler was designed by Professor Ramzin, a well known specialist, accused leader of so-called Industrial Opposition, sentenced in 1932 to jail where the boiler was designed in the middle 1930's.

increasing its efficiency. The auxiliary mechanisms and heat exchangers were also improved.[36] Obviously, the best available steam turbine installations were selected for nuclear powered submarines of the Soviet Navy.

The task to develop suitable steam turbine propulsion plants for serial production and installation aboard of large dry cargo ships and tankers was set up in 1954.[37] Such installations were developed by Central Research Institute of Sea Transport during the 1955-1959 period and installed on Leninsky Komsomol class dry cargo ships and Prage Class tankers, and in 1963 on the tanker Sophiya. The steam parameters of this installation are 42 kg/cm^2 and temperatures 450-470°C. Demands for the steam turbines with higher parameters up to 80 kg/cm^2 and temperatures up to 515°C have been made and their development during the 1971-1975 period should be expected.

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[36] For the specific characteristics of some Soviet boilers and steam turbines, see Morskoy Sbornik No. 7, 1966, pp. 76-83.

[37] Shipbuilding No. 11, 1967, pp. 31-37.

Gas Turbines

The necessity to build a propulsion system combining the advantages of the turbine and the simplicity of using the open heat cycle, i.e. the gas turbine, was well understood in the Soviet Union even in pre-World War II times. As was also the case in the other countries, the research and design work for the creation of marine gas turbine propulsion system were conducted in the middle and the end of 1930's. The Soviet Navy designers, particularly the group headed by Engineer-Captain First Rank Professor G. I. Zotikov, worked out the theoretical fundamentals, and certain design principles, for the naval gas turbines.[38]

The gas turbine advantages in the use as a main propulsion engine or additional engine (a sort of booster) are in the following: low weight for large power in one aggregate; good maneuverability and immediate readiness to develop speed right up to the limit; smaller number of auxiliaries; suitability for a high degree of automation of all processes; simplicity of service.

After the war, research was conducted along two directions: the utilization of the experience of marine steam turbine building

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[38] Morskoy Sbornik No. 7, 1966, pp. 78-83 and Sudostroyeniye No. 11, 1967, pp. 31-37.

and the adaptation of the experience of the aviation industry where gas turbines produced a sort of technological revolution. The aviation gas turbines were first to be used by the Soviet Navy when they were installed as booster type engines on torpedo boats. The experiments were conducted during 1956 and 1957. Soon, however, better gas turbine were developed, built, and installed aboard many Soviet Naval ships. During the decade following the initial test, the power of gas turbines used by the Soviet Navy increased approximately ten times, specific fuel consumption was cut 1.5 times and engine life was increased many times.[39] At the present time, many Soviet Navy guided missile destroyers, various type escort ships (some in combination with diesels), and boats are equipped with gas turbines as main propulsion systems. The Soviet Navy occupies a leading position compared with other navies of the world in its use of gas turbine propulsion systems (definitely quantitatively and possibly even qualitatively).

The research efforts for the implementation of gas turbines in merchant marine ship propulsion systems started in 1956.[40] The first Soviet gas turbine driven ships were the series of Pavlin Vinogradov class timber carriers built in the early 1960's.

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[39] Morskoy Sbornik No. 7, 1966, pp. 78-83.

[40] Transactions, Vol. 133, p. 41.

The French built gas turbine of approximately 4,000 HP was used. The first domestic marine gas turbine system, 13,000 HP, GTU-20, designed and built by Leningrad Kirov Plant was installed on dry cargo ship, Parizhskaya Communa, and widely tested since 1968. The gas turbines of the GTU-20 type are expected to be improved to a point when gas temperatures of 900 - 1,000°C will be utilized and specific fuel consumptions of 165-175 gram/HP/hour achieved.[41]

Nuclear

Besides the fact the Soviet Union has several classes of nuclear powered submarines, one ice breaker, Lenin, (built in 1959) and the Arktika Class larger ice-breakers under development and/or construction, very little detail is known on the quality of the Soviet nuclear propulsion systems. Some information, however, generally dealing with chronological data and theoretical considerations of the system application, particularly to the merchant marine, have been published. Accordingly, the first ship nuclear propulsion systems were worked out at the beginning of the 1950's and from 1953 the Soviet Union began construction of nuclear submarines.[42] In 1956, during XX Party Congress,

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[41] Ibid., p. 146.

[42] Morskoy Sbornik No. 6, 1971, p. 18.

academician I. V. Kurchatov argued for the necessity of having a "wide open road for the nuclear energy application for the transport purpose" and that "the initiative of the engineers and the designers of ship building industry" should be encouraged.[43] During the 1956-1957 period, the Central Scientific Research Institute made an extensive analysis concerning the feasibility and prospectives for applications of nuclear energy in the Soviet Merchant Marine.[44] In 1968, in the Institute of Complex Transport Problems under Gosplan, the plan for developing nuclear power in maritime transport was discussed and the necessity to develop economical atomic power installations for merchant vessels, 1.5 - 2 times smaller and 4-6 times lighter than the first marine nuclear installations, stressed. In general, marine nuclear propulsion systems are already beyond the experimental testing stage. However, as for the merchant marine application, the widening of the sphere of nuclear power was said to be dependent on the cost of the reactor, fuel, service and repair.[45] Nevertheless, it was concluded that the wide application of nuclear propulsion system to the merchant marine is a question of the near future.

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[43] Shipbuilding No. 4, 1970, pp. 51-58.

[44] Transactions, Vol. 133, p. 42.

[45] Trud, 31 May 1968.

The Central Research Institute tied the problem with the scope of the application of nuclear propulsion systems, arguing that widely applied experimentation with the nuclear propulsion system, even in the case that the systems will not be profitable at the beginning, is needed.[46]

Other Soviet specialists,[47] while recognizing the lower limit of economically effective application of nuclear propulsion systems as being in neighborhood of 50,000 HP, have emphasized that in the next several years it will be difficult for a nuclear propulsion systems to compete with those of the diesel or steam turbine. In general, the Soviet pronouncements concerning the wide introduction of nuclear power in maritime transport up to 1968-1969 had been more enthusiastic then that they are today, whereas the cost factor has been mentioned as a major obstacle. Nonetheless, the specialized ships for the specific tasks and certain geographical areas, seem to be under consideration and may be even under development.

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[46] Transactions, Vol. 133, p. 146.

[47] Shipbuilding No. 4; 1971

Automation of Propulsion Systems

The automation of propulsion systems is relatively well advanced. Little if anything is published concerning the automation aboard the Soviet naval ships. However, already in the middle and late 1950's, most of the propulsion plan of the Soviet escorts, destroyers, cruisers, and submarines, had various degrees of automation. It is logical to assume that the sophistication of the automatic devices have been increased together with the scope of their application. As for the merchant ships, the TSNIIMF began to work with the problem in 1948. The steam turbine propulsion plant incorporating various automated devices for Leninskii Komsomol, Praga, Sophia class ships were the outcome of this work.[48]

From 1958-1963 the efforts were directed to achieve "complex automation" of steam turbines and diesel propulsion plants. A special system for the repair and maintenance of automatic devices was organized in the Ministry of Shipbuilding.[49] The system for the first automated diesel ship, Inzhiner A. Pustoshkin, was worked out in 1963. The system served as a prototype for the

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[48] Transactions, Vol. 133, p. 133.

[49] Ibid., p. 115.

development of automated diesel propulsion ships (Novgorod class). A considerable degree of automation has been achieved on the first gas turbine ship, Parizhskaya Kommuna.

At the end of 1960's the Soviet Shipbuilding Research Institutes completed the study determining the "rational degree of automation of propulsion systems" which presently serves as a guideline.[50] In 1970 it was stated that "in the USSR ships of various types with completely automated diesel, steam turbine, and nuclear propulsion are being designed and built".[51]

The scope of ship automation is being constantly widened in the Soviet Union. The automatic stabilization system initially introduced in 1955 to the Kotlin Class DD and since widely used on many types of Soviet naval ships, has also been installed on some commercial and scientific research ships. An automatic transverse stabilization system installed on the scientific research ship Akademic Kurchatov is typical.[52]

An automated navigational system had been designed and tested. A system for the automated electro-chemical protection of ship hulls from the corrosion has been worked out, but no

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[50] Ibid., p. 25.

[51] Ibid., p. 116.

[52] Sudostroyeniye No. 9, September 1967, pp. 31-34.

data was published concerning its practical test.

As of the beginning of 1971, the Soviet Merchant Marine had 15 motor ships with so called complex automation, and one of them, the Soviet built Svetlogorsk has an automated navigational system in addition to the automation of propulsion plant.

Leaving aside the quality and reliability of Soviet systems of automation, owing to the absence of any data upon which they can be judged, it can be said that at least in quantative sense, the Soviet Union is among the leaders in the application of ship automation.

To summarize, a considerable research work has been performed to determine the optimal types and sizes of propulsion systems for the Soviet ships. However, the selection of propulsion systems did not always, and in early stages including the past World War II period, seldom corresponded to optimality due to lack of appropriate engines and in many cases boilers. Quite often what is available instead of what is the best was installed. At the present, the situation has improved considerably and the concept of optimality is being applied to a larger degree. Thanks to the availability of larger diesel engines the upper limit of their use was elevated from 10-12,000 HP at the end of 1950's and the beginning of 1960's to 20,000-25,000 HP at the present. High pressure, super heated steam propulsion systems were also introduced.

The Soviet Union considerations and preferences relating to maritime propulsion for the decade of the 1970's, particularly for the 1971-1975 period, appears to be reflected in the planned deliveries of ships which are as follows:

Universal dry cargo ships (4.5 - 13,000 dwt), timber carriers (1.5 - 12,500 dwt), refrigerators (5,000 - 10,000 dwt) will have propulsion plants whose power will not exceed 15,000 - 20,000 HP.

Increased number of bulk carriers which dwt will reach 80,000 - 100,000 tons, but propulsion plant will not exceed 15,000 - 20,000 HP.

Fast dry cargo ships with speed of 23-24 knots and large tankers of 150,000 dwt with propulsion power up to 30,000 HP.[53]

The majority of propulsion plants (up to 90%) will not require more than 12,000 - 15,000 HP, and, therefore it is clear that the low revolution diesel will continue to be the most widely used engine. The steam turbine systems will be used on large tankers and probably on some fast dry cargo carriers, including container ships. The gas turbine would most likely continue to be used on a wide experimental basis.

The Soviet Union will definitely start the construction of larger tankers, bulk carriers, container ships, LASH, etc. in

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[53] Morskoy Flot No. 2, 1971.

the near future, and the propulsion systems above 30,000 HP would be needed, and gas turbine or steam turbine for them have to be developed. Most likely it will be the latter. In the more remote future, particularly the 1976-1980 period, the further increase in power of ship propulsion plant is expected (approximately 50,000 HP for one shaft ships and up to 100,000 HP for two shafts ships). Power installations of 10,000 - 30,000 HP are expected for hydro-foils and 50,000 HP and more for air-cushioned ships. The diesels evolution is not expected to produce considerable increase in power output much above 50,000 HP and for this reason, it was proposed to concentrate research on turbine driven systems:[54] (a) steam turbines with intermediate super heating and high steam parameters (80-100 kg/cm^2 and 515-540°C with specific fuel consumption of 165-175 gr/HP/hour). (b) gas turbines with prolonged service life and more economical (about 175 gr/HP/hour). Northern latitude navigation is viewed as most favorable for gas turbines where the low air temperature can help to achieve the most economical specific fuel consumption of 170 gr/HP/hour and lower. In the more remote future, the gas turbine is viewed as the most promising. For the hydrofoils and air-cushioned ships it will remain the main type of engine; (c)

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[54] _Transactions_, Vol. 133, 1970, pp. 145-156 and _Morskoy Flot_ No. 2, 1971.

water cooled nuclear reactors for steam turbines capable to compete with the systems on the organic fuel, where power output, of 50,000 HP or more is needed. Power output of above 60,000-75,000 HP is considered already suitable for nuclear propulsion.

Soviet Hydrofoils

The Soviet Union occupies the leading position in the world in the varieties and number of hydrofoils produced. The chief designer of Soviet hydrofoils and head of the Sormovo Hydrofoils Design Bureau is R. E. Alekseev (the winner of Lenin State Prize). His story is quite revealing in the history of Soviet hydrofoils designs and construction. In 1941, as a graduate student of the Gorki Polytechnical Institute, he presented the unusual graduation (diploma) design - a hydrofoil boat. The war interrupted further development and Alekseev was sent to work as an engineer at Sormovo Shipbuilding Yard. The yard, in its term, soon was switched to tank production. In 1943, however, while the city was still being bombed by German planes, Alekseev was ordered to continue work with the hydrofoil. After prolonged experimentation and testing, the first Soviet hydrofoil of serial production, Raketa, was introduced for Volga and other river navigation in 1956.[55] After the Raketa, 110

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[55] Pravda, 14 July 1971.

passengers Meteor, 300 passenger Sputnik, 150 passengers Burevestnik, 50 knots Chaika, and sea-going 118 passenger Kometa, sea-going 260 passenger Vikhr' were designed and built in Sormovo. Other design bureau have also worked with hydrofoils. In Leningrad, 12 passenger sea-going Nevka, 92 passenger Strela, and 100 passenger sea-going Taiphun with automatically controlled foils were built.[56] Many Soviet built hydrofoils such as Vikhr', Chaika, Burevestnik, were still (at the beginning of 1971) in the stage of experimental exploitation and some were modified in the process.

In 1970 the Soviet Union had five classes of hydrofoils in serial production, and 150 passenger lines were served by them. During the period of 1958-1968 the hydrofoils carried more than 30 million passengers.[57] Recently, the Alekseyev Bureau designed and built two more classes of hydrofoils - sea-going Voskhod, and Tsiklon. The latter, instead of propellers, use water jets.[58] In May, 1971, modernized Kometa-M cruised from Yalta, Black Sea, around Europe to Helsinki, Finland,[59] with intermediate stops in many major European ports.

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[56] Taiphun has two sets of engines and propellers - for slow and high speed and special start foils.

[57] Sudostroyeniye No. 4, 1970, pp. 37-41.

[58] Pravda, 14 July 1971.

[59] Vodnyy Transport, 20 July, 1971.

Air-Cushioned Vehicles
(ACV, Hovercraft)

The idea of air-cushioned motion is not new. The theoretical consideration, some with great details, began to appear in a number of countries in the 1920's and 1930's. In the Soviet Union, the idea was first developed by K. E. Tsiolkovskii. The initial work of Tsiolkovskii was continued by Professor V. Levkov, from Novocherkassk Polytechnical Institute and since 1930, its director. The air dynamic laboratory of the institute started to test a model of chambered ACV in 1927 and later (1930) the test continued in the air dynamic tube. In 1933, a special design bureau headed by Levkov was organized with the task of building and testing ACV. The first test of the air-cushioned boat, L-1, was conducted in 1934.[60] The L-1 developed speed of 135 kilometers per hour (over 70 knots). More powerful and heavier L-5, was built and tested in 1937. Both L-1 and L-5 were capable of riding over different types of ground. Some more models of L type ACV's were built; the largest weighing 15 tons. A naval version of L type ACV existed and was tested in the Gulf of Finland in the late 1930's. The war interrupted the work.

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[60] Sudostroyeniye No. 7, 1971, pp. 55-56 and Socialisticheskaya Industria, 29 November 1970, p. 4,

After the end of war, Levkov continued his work with ACV's, but in addition to difficulties with design, the Soviet economic situation, particularly the low level of technology and lack of appropriate engines, did not warrant the success. With Levkov's death in 1954, the experiments discontinued. In 1957 an ACV of original design by a student at Gubkin Petroleum College, G. Turkin, was built but the test was never concluded by the designer who died in 1959 overwhelmed by the problem.

The decade of the 1960's witnessed a number of attempts to solve the problem by various Soviet agencies. The attempt to develop Turkin's idea was undertaken at the Chelyabinsk Tractor Plant and its design bureau; it was a failure. The same disappointment awaited the attempts of Volgagrad Plant, of the Tsagi Research Institute and elsewhere under various ministries and departments. By 1962, most of the projects were discontinued because, according to the State Scientific Technical Committee under the Gosplan, of "poor prospects for hovercraft and low technical characteristics of the experimental models."[61] In 1963 the work on ACV was resumed at the NATI's Chelyabinsk affiliate only to be dropped in three months time, whereupon, the the USSR Ministry for Tractor and Agricultural Machine building

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[61] Komsomolskaya Pravda, 14 November 1967.

handed over the project to the USSR Ministry for Chemical and Petroleum Industry. In the mid-1960's, apparently, the work with ACV in the Soviet Union could be described by a single word, a mess. A battery of articles, some being very critical, appeared in the Soviet Press arguing for the urgently needed machine (ACV), and requesting the resumption of design and experimental work. "Where are the air-cushioned machines" became quite a common leader in many Soviet newspapers, particularly professional periodicals; and sound arguments were presented for the necessity of building them.

The poor development of the Soviet ground transportation system, particularly highways is commonly known. In Siberia, Tumen' Oblast, where the oil fields are under intensive development, in 1969 there were only .014 kilometer, or 14 meters, of paved roads per each 100 sq. kilometers (in India there are 33 kilometers). Nearly half of Siberia's territory is known to be occupied by impassable swamps. The cost of 1 kilometer of road is from 340,000 rubles to 1.5 million rubles. The number of roads which had been built was 14 times as little as the average for the country. Western Siberia was called the "ideal testing ground for grinding out conventional road transport". Even heavy duty trucks and tractors were wearing out after one year of use; special vehicles, being used in the oil land, had to be discarded

after a few months service for broken carriers. Helicopters were being used at an hourly cost ranging from 260 rubles (MI-4) to 1,700 rubles (MI-6).[62] The river transport plays a very important role in Siberia, but the rivers are frozen during the winter from five to seven months. The cost of transport amounted to 17% in 1959 and 26% in 1967 of the total cost of oil drilling.[63]

Air-cushioned vehicles under the circumstances were found even in the second half of the 1960's to be superior in every aspect to the transportation facilities which were employed in Siberia, and some even called ACV "singularly prospective and universal under the circumstances". The passenger transportation along the thousands of rivers does play an important role too, and in many cases can be provided only by air-cushioned boats. The ACV proponents recommended the creation of a united center on hovercraft research which, in addition to experimental work, would have the production facilities as well. But for a while the State Committee for Science and Technology under the Gosplan and a number of ministries resisted the idea referring to the fact that "up to now, the acceptable technological solutions eliminating existing problems of the machine (ACV) have not been

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[62] Komsomolskaya Pravda, 28 February 1969.

[63] Ibid.

found neither in our country nor abroad".[64] Toward the end of the 1960's, however, the proponents of the ACV proved that not the idea, but the attempted ways of its implementation were defective and this was the strongest reason for intensifying the research and further experimentation. At that time (1969) the proponents had a good argument supporting their battle and they did not miss the opportunity to use this in the following statement claiming that: "our country is being considerably behind the contemporary level of ACV development reached abroad, particularly in England",[65] which the opponents could not easily refute, for more than technological the matter now could easily be interpreted from the position of international prestige and, hence, acquired a political overtone. No one in the Soviet Union could dare to ignore such a factor and, suddenly, the green light for the ACV was open and its bright future "discovered" at the top of administrative technological bureauocracy and the same State Committee for Science and Technology recommended to the Gosplan "to include air-cushioned ships in the plan of country's economic development", and also recommended to the Ministry of Shipbuilding Industry "to undertake correspondent measures for

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[64] Ibid.

[65] Vodnyy Transport, 11 January 1969.

industrial production of a party of such ships".[66] The ACV Sormovich was singled out as a "particularly promising type". In all fairness it should be emphasized that the arguments of opponents, particularly from the State Committee, were not as ridiculous as presented by the proponents of the ACV. First, in overall, the research of the air-cushioned principles, though not centralized and conducted by various institutions and agencies, nevertheless was relatively extensive, and a number of experimental models performing rather satisfactorily were produced (Neva, Raduga, Sormovich). Second, the technological solution leading to the construction of well performing machine was not found and, probably, the Soviet industry was not ready and capable to assure argued mass production of the air-cushioned machines.

A powerful support to the ACV proponents was probably given by the Soviet Navy which have had definite ACV interests, and a number of models, shown during the Navy Day Parades in the late 1960's and in 1970, were developed. The Navy's version of ACV was used as a means to discharge the advance party of naval infantry during an amphibious operation and for other similar purposes.

The following air-cushioned vessels were designed, built, and tested:

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[66] _Shipbuilding_ No. 2., 1970.

Sormovich - first built in 1965, 50 passenger, 100 kilometers per hour, is being viewed as promising and recommended for production;

Orion - average speed 60 kilometers per hour, 80 passengers, also recommended for serial production;

Gor'kovchanin - 50 passengers, slow, around 30-35 kilometers per hour, but viewed as very promising and is being produced in large number. All the above ACV's are for inland water navigation. The navy version, shown in Moscow in 1970, was a sea-going ACV with approximate capacity for a platoon of naval infantrymen.

In spite of the obvious interest developed in the Soviet Union toward ACV of a rather conventional type, the future, and hence long term research orientation is viewed to belong to the other type of "flying vessels" - "ekranoplan" (thereafter referred as skimmer, surface skimmer system, wing-in-ground vehicle). The interest in such a system both from the Soviet Navy and Merchant Marine has recently been clearly evident and expressed in the Soviet specialized literature.[67] The various countries', including the Soviet Union, research efforts so far clearly indicated the two design approaches to the problem's solution:

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[67] N. I. Belavin, Ekranoplany, Sudostroyeniye, 1968; Shipbuilding No. 3, 1971, pp. 14-21; Krasnaya Zvezda, 21 August 1970.

(a) "wing" (flying wing, wing-in-ground) vehicle, with which the overwhelming majority of research efforts have been associated, including experiments of the Odessa Institute of Engineers of Merchant Fleet, and (b) fuselage, of which the Airfoilboat X-112 is typical.[68] Most of the wing-in-ground vehicles designed so far followed to a large degree the Katamaran principle, and have a carrying wing with two floats on the ends. Presently, the aero-dynamic characteristics of the skimmers are apparently low, and, combined with the power plants used, are keeping down the speed achieved (about 50-80 knots). But the ACV requires three times more power than a skimmer of the same mass and speed. Moreover, the skimmer speed is considerably higher than ACV. The major problem is presented by the start, during which all the above advantages of skimmer, because of it's air-hydrodynamic qualities, are substantially reduced. The hope for the skimmer use in a rather broad spectrum of speed (from 100 to 200-300 knots) and ranges, requiring only 20-70 HP/ton (presently existing skimmers require 75-380 HP/ton) was expressed. If on a distance up to 2,000 miles all of an ACV cargo capacity would be used for fuel, a skimmer in addition would be able to carry 500 tons of cargo.[69] With the increase in size, the skimmers useful

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[68] Jane's Surface Skimmer Systems 1968/1969 - 1969/1970.

[69] Shipbuilding No. 3, 1971, p. 20.

load is growing considerably while required power per unit of weight is diminished. The Soviet development along this direction would be quite logical. The appearance of a satisfactory model skimmer prior to the middle of the 1970's is unlikely. During the current five year plan, the Soviet Union will produce a number of ACV types, most of them rather small and suitable only for passenger transportation.[70]

Some Factors Determining Designs and Construction

Often, while analyzing Soviet shipbuilding, conclusions, concerning sizes of the ships built, are associated with the availability of and sizes of building ways, experience, and the general level of the Soviet technology. While all these considerations are certainly valid to a large degree, the economic factor, the profitability of a ship the Soviet Union plans to build, its suitability to the planned environment of operation, are often ignored. However, it was found that all these factors are closely examined by the Soviet specialist and the economical ones are often adopted; the search for the optimality, taking under consideration as many variables as possible, is often conducted with the finding used in the decision making processes. A very

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[70] _Morskoy Flot_ No. 7, 1971, pp. 3-5.

demonstrative case is the Soviet Union's approach to tanker construction and the composition of the tanker fleet. The table below shows the economic performance of various sizes of Soviet tankers and includes required capital investment and operational expenditures determined on a concrete example of the transportation of 1,000,000 tons of oil at the distance of 5,000 miles:

Tankers Cargo Capacities (,000 dwt)	Speed (knots)	Unit Construction Cost (,000 rubles)	Capital Investment For Fleets (million rubles)	Annual Operational Cost of Fleet (million rubles)	Cost of Transportation of 1,000,000 tons of oil at 5,000 mi. (million rubles)
10	15	3,960	40.1	6.68	10.68
20	16	5,700	29.1	4.95	7.86
35	17	8,230	24.4	4.00	6.44
50	17	9,700	20.2	3.45	5.47

Source: M. A. Gnatkov, *Giants of the Ocean Roads*, Znanie P.H., Moscow, 1969, pp. 18-33.

For a 25,000 dwt tanker fleet the cost of transportation of 1,000,000 tons of oil for 5,000 miles is 7,190,000 rubles. The 50,000 dwt tanker fleet reduces this cost down to 5,470,000 rubles, or by 24%. However, the corresponding increase in size of 50,000 dwt tankers fleet to 100,000 dwt tankers fleet produces considerably smaller increases amounted to 10-12%.[71] All data representing Soviet cost and are correspondingly valid only for the Soviet tankers. Operational realities, i.e. ports (cargo handling capacity, their sizes, depths, storage facilities, inland transportation, etc.) and requirements of the line(s) (availability of cargo flow, demand for it, their stabilities, competition etc.) are factors (variables) considered by the Soviet specialist in the selection of required ships and their number to be constructed or ordered.

During the decade of the 1960's the size of tankers delivered grew from 20,000 dwt to 50,000 dwt.

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[71] M. A. Gnatkov, <u>Giants of the Ocean Roads</u>, Znanie P.H., Moscow, 1969, p. 4.

Class (Country of Construction)	Cargo Capacity, 1,000 tons	Power (1,000 H.P.)	Speed (knots)	Draft (meters) m.
Velikii Oktyabr' (USSR)	15.0	9.9	16.0	8.5
Bauska (Poland)	19.0	7.8	15.5	9.2
Split (Yugoslavia)	20.8	12.0	17.1	9.2
Warshava (USSR)	30.5	19.0	18.5	10.65
Leonardo DeVinchi (Italy)	48.9	19.0	17.4	11.65
Sophiya (USSR)	49.4	19.0	17.2	11.6

Source: M. A. Gnatnov, op. cit., pp. 24-26.

At the beginning of 1969, the Soviet tanker fleet was composed of: about 20% of tankers with 10,000 dwt or less cargo capacity; about 30% of 15-25,000 dwt cargo capacity ships; and about 50% of 30-50,000 dwt cargo capacity ships.[72] Meanwhile, the process of average tonnage growth in the world tanker fleet had started during the second half of the 1950's. Most of the giant tankers in the following decade (with the exception of Manhattan, built in the U.S.) were built in Japan:

Sinclair Petrole - 56,089 Tons - 1956
Universe Apollo - 104,520 Tons - 1959
Nissho Maru, 130,250 Tons - 1962
Idemitsu Maru, 206,000 Tons - 1966

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[72] *Ibid.*, p. 24

This trend was accelerated by the closing of the Suez Canal. With more than 50% of the oil imported by Europe coming from the Middle East, cheaper transportation had to be found, and was. The answer was even larger tankers with huge capacities making it economical to go around Cape of Good Hope (approximately 11,000 miles) to Europe or America. These tankers outgrew both the Suez and Panama Canals. Even if previously announced plans to deepen the Suez Canal materialize, no more than 200,000 tonners would be able to navigate it. (In 1968, 326,000 tonners - Universe Island were built in Japan, 400,000 tonners were designed and a plan to design a 1,000,000 ton tanker was announced.) Such a trend, could not help but influence the leader of the Soviet Merchant Marine and its scientific-research and design institutions, and subsequently probably speed up the consideration for the larger tanker construction. Initially, in 1968, the 100,000 dwt tanker was favored. Even the name of the head-ship in the class, Moskva, was selected, which indicates the completion of at least preliminary design. However, at the end of that year a number of articles appeared arguing for a larger tanker and debates under the general headline: "What the new large tanker shall be?", lasting a whole year, started. Among the participants were representatives of practically all branches of the Soviet Merchant Marine, shipbuilding industry, and a number of scientific-research institutes and design bureaus. Many meetings

and conferences at scientific and technological councils of various organizations, including the participation of hundreds of officers of the merchant marine, designers and scientists, were held. While tens of various conclusions and opinions which were published indicated different approaches to the technological details of the proposed ship, the same concerning the size and its justifications were quite, and even surprisingly, similar. Leaving the technological arguments aside, the arguments of the second group concerning the size can be summarized as follows:

- the tanker should be able to enter major domestic oil ports;[73]

- the tanker size and its draft should present no problem in the passage of major canals (Suez, Panama);

- the tanker must be able to navigate through major straits, particularly Bosphor, safely, without assistance from tugs and interruption of other traffic;

- the ship should be able to profitably participate in foreign trade, transportation of oil among domestic ports and while being chartered.

The following arguments were submitted by the TSNIIMF:

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[73] The approved Souzmorniiproekt plan visualizes the increase of guaranteed depths of many Soviet ports, assuring entrance of ships with the draft up to 17 meters. Morskoy Flot No. 12, 1969, p. 20.

In spite of the fact that giant tankers will definitely be built during the decade of the 1970's and will carry a substantial portion of crude oil, there is no reason to expect that they will represent the basic nucleus of the tanker fleet of the future, because "they are vulnerable during the war" (emphasis added - N.S.) for their low speed, poor maneuverability and the huge target area they present for the submarine and aviation;

possibility of catastrophic consequences in case of accident (damage or wreck);

they cannot comply with the existing International Rules of the Road (they are not maneuverable at less than five knots, cannot be stopped in less than two to three miles and hence, can do little by themselves to avoid collision in the event if another ship is negligent);

they can be used only among few ports, which are specially equipped and require a depth of not less than thirty meters;

the losses of time for any reason are too costly;

the construction cost, per ton of deadweight while decreasing with the growth of tanker tonnage up to 300,000 dwt, with further increase in size begins to increase (because the necessity to assure longitutinal strength, non-optimum coefficients dictated by the desire to reduce the draft).

The institute draw the conclusions, that during the 1970's, the basic deadweight of tankers will be between 100,000 to 300,000 tons. Tankers with 125,000 - 150,000 dwt will have the advantage of passing the Suez Canal being loaded, while tankers up to 250,000 dwt will be able to navigate it while in balast.[74]

At the end of 1969, the Collegium of the Ministry of Merchant Marine considered the arguments, and "mainly, on the basis of economic considerations", selected the tanker designed by the group headed by chief-designer, N. N. Rodionov. The main characteristics of the tanker are as follows:

150,000 dwt (about 180,000 tons displacement);

propulsion plant - steam-turbine, 30,000 h.p. with the reduction gear and variable pitch propeller;

speed - 16.5 knots;

dimensions - L=293 meters; B=45 meters; L/B ratio around 6;

draft 16-17 meters;

endurance - 20,000 miles (80 days);

unloading time approximately ten hours, considerable degree of automation (machine watch - one man) and computerized navigation, crew 36.[75]

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[74] TSNIIMF, Transactions, Vol. 133, 1970, pp. 60-63.

[75] Morskoy Flot No. 12, 1969, p. 20; Nedelya No. 48, 1969; Izvestiya, 4 December 1969; Leningradskaya Pravda, 1 January 1971; Sovetskaya Rossiya, 21 February 1971; Sudostroyeniye No. 4, 1970, p. 18; Vodnyy Transport, January 8, 1971.

The design incorporates the typification of general solutions and larger variations of the tanker, in definite limits, can be built after experience in building and service is obtained. This would probably not happen before the second half of the 1970's. So far, the MIR will be the largest ship ever built in the Soviet Union.

A similar approach has been taken in consideration of other types of ships, particularly ore carriers. The Soviet Merchant Marine, up to the end of the 1960's, in reality did not have bulk carriers. Their role has been assigned to the universal ships, such as the 23,000 ton Zvenigorod class.[76] The first relatively large bulk carrier, Baltika with 35,800 ton cargo capacity was built in the Soviet Union in 1968. The larger bulk carriers are presently being built and bulk carriers up to 80,000 tons are planned.

In the dry cargo ships category, the largest ship up to the end of the 1950's, was the American built Liberty class. During the decade of the 1960's in addition to foreign deliveries (14,150 dwt Omsk class - Japan; 14,480 dwt Beloretsk class - Denmark; 12,375 dwt Vyborg class - East Germany), the Soviet shipbuilding industry built several classes of dry cargo ships:

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[76] M. A. Gnatnov, op. cit., p. 18 and 33.

Leninskii Komsomol - 16, 080 dwt
Bezhitsa - 12,640 dwt
Kapitan Kushnarenko - 15,768 dwt
Slavyansk - 12,680 dwt

all with speeds of 17-18.5 knots.

Both domestic and foreign built ships were produced by a large series. The optimality concept, i.e. size, power, degree of automation, determined by the concrete conditions of operation with the goal to achieve maximum possible profitability, has been fully applied.[77]

In the never ending search for the improvement of various modes of propulsion at sea, nature gives man a good indication for optimality: among the many thousands of sea founa, none lives permanently on the surface. At the present, there are two general tendencies in the development of sea transportation (the naval, carrying weaponry, should be included in such general term) in order to increase speed and to achieve optimum utilization of consumed power - to go up, above the surface, or down, below it - both clearly indicating the attempt to break away from the service. Following the first principles, hydro-foils and air-cushioned ships have been under development. As for the hydro-foils, tens h.p.'s per each ton of its weight is needed to maintain it above the surface and there is no noticeable decrease in the

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[77] M. A. Gnatkov, op. cit., pp. 33-35.

specific power requirement with an increase in the size of the hydro-foils. For the large hydro-foil ships hundred of thousands, and maybe millions horsepowers will be required and the weight of machinery and necessary fuel will exceed many times the cargo capacity of such ships. It is logical to conclude that the application of the hydro-foil principle will be limited mainly for passenger ships with displacement not exceeding 1,000 tons or for small amount of valuable cargo, speedy delivery of which is required (including relatively light packages of weapon systems on board of naval hydro-foils).

A somewhat similar, although more promising situation, exists with air-cushion ships whose initial specific power requirement per ton of weight does not differ much from the hydro-foils. However, with the increase in size and weight of air-cushion ships, specific power requirements are diminishing, raising the expectation that in the future, construction of relatively large air cushion ships can be achieved.

The second tendency in the development of sea transportation is more promising. To begin with, the submerged ships are not handicapped by weather, their propellers work under more favorable conditions, and the propulsion coefficient is higher. The low speed submersibles are less economical than the high speed in

comparison with the surface ships. The high cost of construction of submarine transports, particularly the cost of nuclear propulsion systems and more complicated navigational equipment, coupled with the absence of urgent need for high speed sea transportation for the majority of cargoes, are at the present the major obstacles for wide application of submarine transports in the mercantile practice. The situation, however, might be different 10-20 years from now. Various pronouncements in the Soviet specialized press give reason to believe that the Soviet shipbuilding industry is working on the solution of submarine transport navigation, particularly for certain areas such as Arctic, and for highly specialized ships, such as the submarine tanker, and perhaps the submarine container carrier. An original proposal for the solution of the problem was presented by Soviet scientist U. Plenkin (Nikolaev Institute of Shipbuilding) for which two patents were granted.[78] Even the construction of submersible fish catching ships is not excluded in the future and the concept has been under discussion accompanied by some drawings.[79] As for the under the surface submersible, in spite of the obvious attractiveness of conventional power plant utilization and some savings in construction

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[78] Trud, 3 August 1968.

[79] Shipbuilding No. 4., 1970, pp. 12-14.

cost, the large wet surface of such ships and considerable volume of displacement requiring use of ballast greatly reduces the propulsion advantages. In spite of the fact that the idea was discussed by the Soviet specialist, its application is doubtful.[80]

In summary, the development of larger air-cushioned ships and submarine transport can logically be expected by the Soviet Union, and the appearance of experimental ships of this kind somewhere in the mid 1970's would not be surprising.

The efforts of Soviet shipbuilding research and development institutions is supported by a good experimental base which includes some specialized ships. In 1968, a small 600 ton ship, Issledovatel' (Researcher), made an equatorial voyage testing various equipment in tropical climates. The results of the voyage, according to a number of articles, exceeded all expectations and a decision was made to build a "floating base for comprehensive research which will permit sharp acceleration in the process of introduction of new equipment to shipbuilding". Named Izumrud, the ship was designed by Kherson Tskb (Central Design Bureau) "Morsudoproekt" and built by the Nikolaev Ship Yard. The ship has 10 scientific-research laboratories, 27 research sections (groups), and was designed to test main engine and auxiliary mechanisms,

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[80] Morskoy Flot No. 6, 1971, pp. 49-53.

various electronic equipment, crew living conditions, vibration, new shipbuilding materials, structures, etc. The ship is the only one of its kind in the world shipbuilding practice known to this writer.[81]

The specialists of the Soviet shipbuilding industry presently are often used to provide technical assistance to other countries' shipbuilding industries. The methods employed can be well illustrated by the example of Egyptian Ship Yard in Alexandria - a modern shipbuilding enterprise incorporating some of the latest achievement in the Soviet and world shipbuilding practice - built with Soviet assistance. The assistance was provided by a group of Soviet specialists from various enterprises, but mainly from Kherson Ship Yard. In addition, the main effort in the assistance was devoted to the training of Egyptian specialists and workers through three methods: by sending them to the Soviet Union for training on the Soviet yards, educational and research institutions; by organizing Alexandria's ship yard training center with the capacity to train 600 people per year; on the job training (350 men were trained in 1969-1970). With the participation of Soviet specialist, the first ship Alexandria (13,000 ton dry cargo ship) was built over a two year period and launched 23 May 1971.[82] Similar assistance has been granted to other countries.

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[81] Nedelya No. 29, 1969.

[82] Trud, 10 June1971.

Conclusions

The Soviet shipbuilding industry is centrally controlled by the Ministry of Shipbuilding Industry and builds naval, merchant, fishing, river, and research ships. Historically the Russian, and up to the middle of 1950's, the Soviet shipbuilding industry was heavily deviated toward naval construction with only 15-30% allocated for civilian production. Starting with the late 1950's, considerable shipbuilding capacities have been allocated to civilian construction and the appearance of a reverse trend is unlikely. In addition to achieved levels of technology and experience, the capacity of the Soviet industry in general and the shipbuilding industry in particular have been playing a crucial role in determining the output of the Soviet shipbuilding industry in a quantitative as well as a qualitative sense. The intensity and the composition of the Soviet naval construction, in turn, has been dependent upon the availability of weapons systems, occasionally producing a temporarily available capacity for the additional civilian construction. Orders abroad have been crucial for the civilian, i.e. merchant marine, fishing, and research ship construction, and in certain times important (particularly for propulsion systems) for naval construction. Together with the Soviet Bloc countries, shipbuilding industries of practically all European countries and Japan have provided the

Soviet Union with massive deliveries of hundreds of various ships and assistance (particularly in propulsion - diesels). As a corollary to this, the utilization of foreign yard capacities seems to guarantee avoidance of a possible future over capacity of the Soviet shipbuilding industry. The industry has a powerful scientific research institutions supporting it. A number of innovative methods in shipbuilding, production technique, and original solutions have been implemented. Future growth of both naval and mercantile fleets should further stimulate the production and experience of the industry resulting in the construction of better and more sophisticated ships.

CHAPTER IV

OCEANOGRAPHY[1]

Introduction

Besides the number of geographical discoveries by the Russians, many of which were associated with commercial undertakings, the first Russian expedition to study the northern and eastern shores of the country and to describe the seas, the Great Northern Expedition, was ordered by Peter the Great and conducted after his death (1725-1730 and 1733-1743). Around-the-world voyages of the Nadezhda and Neva, under the command of Kruzenshtern and Lisyansky (1803 and 1806 respectively) also produced oceanographic work which was of considerable importance for the time.

During the around-the-world voyage of the Predpriyatiye (1823-1826), the physicist Lents measured water temperature,

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[1] In the Soviet literature on the subject, the terms oceanography and oceanology are used interchangeably and are synonomous. The latter seems to be preferred by Soviet scientists.

salinity, and density.[2] The famous scientific cruise of the British research ship Challenger (1872-1876) had a considerable influence upon the development of oceanography and especially the Russian approach to it. The Challenger expedition, in effect, established a methodical approach which has been used in general up to the present time. The Russian expedition aboard Vityaz, in which a young S. Makarov participated, was the first Russian attempt to follow it.

The collection of data and facts mainly through expeditions is still considered to be one of the major tasks at this stage of development of oceanography. Up to the quite recent past, hydrography and meteorology were the two best developed disciplines, for they were in fact the ones needed most for navigation. The level of development of science and technology, particularly the latter, had been the major limiting factor to the scope of oceanographic work. The growing world population, increased industrial output, the scarcity of various raw materials, the rapid development of sea transportation, military requirements and man's unrelenting drive to discover the new have been the major factors stimulating the development of oceanography.

After World War II, particularly during the 1950's, it

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[2] N. F. Medvedev, Suda dlya Issledovaniya Mirovogo Okeana (Ships for the Research of the World Ocean), Sudostroyeniye, Leningrad, 1971, pp. 215.

became clear that in addition to making the traditional ocean surveys to produce maps and charts, including those of the bottom, oceanography had to find, or help to find, ways to solve a number of problems: a fresh water from the sea, which contains 96-97% of all the water on our planet; power from the sea, where considerable energy sources (waves, tidal, nuclear - deuterium) exist; protein to feed humans and animals; extraction of minerals from the world ocean, where they have hardly been exploited at all (with the exception of off-shore oil). In addition to the 36 different elements claimed to found in solution in sea water in quantities known to exceed those in land deposits (gold, nickel, silver, molybdenum, iodine, etc.), the surface of the bottom is covered with a layer of iron-manganese nodules (concretions), estimated by some Soviet scientists to total hundreds of billions of tons for the Pacific Ocean alone.[3]

It was also claimed that the world resources of cobalt on land are about a million tons. There are about a thousand million tons of it in nodules alone. The most logical way to reach the mantle is from the ocean plateaus, where the earth's crust dwindles to five-six kilometers compared to 35-40 kilometers on the continent.[4]

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[3] Academician L. Zenkevich, The Wealth of the Oceans, Nauka i Zhizn', No. 3, 1967, pp. 16-22.

[4] Ibid.

The enormous effect of the ocean on the thermal conditions in the atmosphere and, hence, climate is well known. By comparison, the thermal effect of the surface layer of land is negligibly small. On the other hand, the circulation of ocean water depends to a great extent on the movement of masses of air above the ocean. Many Soviet scientists call the climate of the earth an oceanic climate. Man has started to explore the expanses of both outer space and the ocean, inner space, at nearly one and the same time, in the second half of the 20th Century. It is safe to assume that the world ocean has greater significance for the life of man than outer space.

The first International Geophysical Year of 1957-1958, and particularly the second International Oceanographic Congress held in Moscow (30 May - 9 June 1966) provided detailed information on the scope of Soviet oceanography, and attracted world attention to the Soviets' intensified efforts in the field. During the Congress, the Soviet Union proudly announced the creation of "the first system in the world which fully automates the process of obtaining and processing oceanographic data right on board ship". They refer to the new Soviet research ship, Akademik Kurchatov. The reports by Soviet scientists on research in the Arctic and the Antarctic dominated the Congress. Considerable progress achieved by Soviet oceanography was evident in the

relation to the Atlantic Ocean basin (particularly the physical oceanography of the Mediterranean, and the Black, North and Baltic Sea), the Pacific Ocean and, to a lesser degree, the Indian Ocean, although the Soviet Indian Ocean expedition (starting with the cruise of Vityaz in 1959) was among the first, if not the first, to begin work in the Indian Ocean.[5]

At the end of 1968, a U. S. Congressional source reported, in somewhat alarmed tone, that in the Soviet Union "200 oceanographic vessels are assigned to applied and basic ocean research. Nine thousand scientists are utilized in a variety of oceanographic programs".[6] The continuing construction of new scientific vessels by Soviet, Polish, and East German yards was emphasized. The study also referred to the requirement for all Soviet ships (naval, merchant, and fishing) "to contribute to the country's overall oceanographic effort", a requirement as old as sea navigation. One of the study's conclusions was noteworthy; "The Soviets also have been in the ocean studies business in a more serious fashion for a longer time than the United States or its Western allies".

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[5] Morskoy Sbornik, No. 8, 1966, pp. 74-78.

[6] "The Changine Strategic Naval Balance; USSR vs. USA", Committee on Armed Services, House of Representatives 90 Congress, December 1968, U.S. Government Printing Office, December 1968, Washington, D. C., p. 38.

Soviet oceanographers were the first to collect data for, and to publish a detailed bottom map, of the Pacific Ocean and to prepare basic data for a biological atlas of the Indian Ocean.[7] Extensive writings in Soviet specialized literature and, more important the Party and government press, arguing for the intensified exploration of minerals and oil from the ocean, and the directives of 24th Party Congress for the 1971-1975 plan, setting tasks for the work on the Continental Shelf, are testimony that the Soviet Union is on the verge of extensive efforts to explore the ocean wealth.

The Soviet Union is already engaged in researching the super-deep areas of the earth. More than 20 wells over 5,000 meters deep have been drilled. Preparations are underway for drilling five 15,000 - 18,000 meter wells; one of them will be sunk in the Kuriles.[8]

Soviet oceanography will be considered according to the following outline:

(1) The development and major work of Soviet oceanography;

(2) Oceanographic vessels;

(3) Underwater research and equipment;

(4) Research and plans for the exploitation of minerals

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[7] Nedelya No. 11, 1971.

[8] Science and Technology - 71, APN, 1971, Moscow, p. 21.

in the sea;

(5) Organization

The Development and Major Work of Soviet Oceanography

During the first few years of Soviet power, the activity of Soviet oceanography was, for obvious reasons, very limited, and centered around hydrography. The desperate food situation in the country generated the necessity for Kara Expedition of 1921, the success of which was assured by a well organized hydrographical support. In 1922 the Soviet flag was raised over the first scientific research ship, the modernized schooner Persey, which became the center of the newly organized Polar Floating Marine Research Institute (Plavmornin).

Naval (military) hydrographers, whose corps was established in Russia in 1827, formed the backbone of early Soviet work which was performed mainly in the northern seas. During the summer of 1920 they performed a series of current observations in the Kara Straits and Yogorskiy Shar. In 1923 a polar observatory on the shore of Matochkin Shar was opened. The use of aircraft, in addition to ships, for ice observation began in 1924 along the track of the Kara Expedition. During the Second International Polar Year (1932-1933), rather extensive oceanographic

research was conducted by the Soviet Union. The study of the White Sea by naval hydrographers resulted in the publication of two atlases, <u>Tidal Currents</u>, 1929, and the second on the <u>Ice Conditions</u>, 1932.[9]

Work in the Black Sea started in 1923, where the Black Sea Oceanographic Expedition was organized and conducted its work up to 1935. The promoters and the first leaders of the expedition were well known Soviet oceanographer Academician Yu. M. Shokal'skiy and naval hydrographer (later engineer - rear admiral) V. A. Snezhinskiy.

In the Far East, oceanographic research started in 1924. In 1928 the work was enlarged, and a joint expedition of Soviet Navy hydrographers and the USSR Academy of Sciences, headed by L. F. Rudovits, was organized. The expedition, using two ships assigned to it, made oceanologic stations in various seasons of the year in depths between 3,000 and 3,500 meters. In 1932-1933 the Bering Sea party of the Pacific expedition made instrument measurements of the currents in Bering Strait to determine the water exchange between the Bering and the Chukchi Seas. In 1936-1937 the expedition made the first hydrological survey of the entire Kara Sea.

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[9] <u>Morskoy Sbornik</u> No. 7, 1967, pp. 42-50.

During the second half of the 1930's a number of Soviet expeditions in the Greenland and Norweigan Seas began seasonal hydrological surveys of the ice-free regions of these seas. The work was of great importance in providing the basis for ice forecasts along the Northern Sea Route.[10] The first Soviet drift station began its work in May 1937 in the vicinity of the North Pole.

During the 1930's Soviet oceanographers undertook the study of wind waves, and surveys of the coastal wave motion in the Black Sea and in the Gulf of Finland were conducted. Prior to World War II, two Soviet scientists, V. Makkaveyev and V. Shuleykin were involved in the theoretical study of wind waves. The Makkaveyev method for wave forecasting has been widely used since. Shuleykin's experimental study of the action of wind on waves included a method employing a model of a storm basin (after the war, the basin was built in the Crimea). During the 1930's the knowledge of currents in the seas around the Soviet Union was expanded considerably. The so-called dynamic method for compiling current charts, promoted by Professor Zubov, was widely used.

The observations of tidal phenomena expanded considerably,

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[10] Morskoy Sbornik No. 7, 1967, p. 46.

resulting in the publication at the end of the 1930's of tables and handbooks containing the characteristics of tides for all the tidal waters around the Soviet Union. In 1941 the Hydrographic Directorate of the Soviet Navy published tide tables for all the oceans and seas in the world.[11]

Soon after the war, Soviet oceanographic work began to be intensified. In 1947 Soviet scientists began their work aboard ships of the Slava Whaling Flotilla during its operations in the Antarctic. Almost 1,000 hydrologic stations were made in Antarctic waters during the period 1947-1957. In 1948, the then largest research ship, Vityaz, entered into service. In 1949 Vityaz operated in the Japan, Okhotsk, and Berking Seas. In the following seven years, the ship made 3,500 oceanologic stations, mainly in the Pacific.

Soviet oceanographic research in the North Atlantic began in 1951, utilizing fishing trawlers. It was sharply increased in 1954, when the observations began to be conducted simultaneously by several ships, assuming the character of oceanographic surveys. Soviet oceanography was very active during the International Geophysical Year, 1957-1959. The research performed from Vityaz resulted in detection of the mixing

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[11] Morskoy Sbornik No. 7, 1967, pp. 47-49.

of the various layers of water in the Pacific Ocean, resulting in an intensive propaganda campaign launched by the Soviet Union against burying radioactive wastes in the deep water depressions.

The achievements of Soviet oceanography were noted at the first and second International Oceanographic Congresses (1959 and 1966 respectively), where Soviet scientists were among the most active participants. Congresses and various international programs helped to extend the international scientific and professional connections of Soviet oceanographers, who, thanks to the extensive Soviet oceanographic work, were becoming more and more authoritative and competent.

In 1959 the expeditionary ship M. Lomonosov discovered the subsurface current named Lomonsov in the low latitudes of the Atlantic.[12] Later in 1963-1964 the study of the Lomonsov current as well as of the subsurface Brazil current was continued by the ship.

In connection with another international program, the Soviet ships, Shokal'skiy, Gromova, and Zhemchug (later joined by Vityaz) in 1965 began the study of the Kuroshio. The material collected during the expeditions provided Soviet oceanographers not only with vast amount of data, but it stimulated the

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[12] The current crosses the Atlantic from west to east in the region of the Equator, is about 2,600 miles long and has a maximum speed at the depth of 100 meters of almost 80 centimeters per second.

development of the theoretical basis of oceanography. The so-called energy method for calculating the elements of wind waves, worked out during the war, was further developed at the end of 1950's by the addition of the statistical approach. The theory of oceanic circulation was also implemented by a new approach, dealing with the interaction of speed of flows and density of waters in the ocean and the mechanism of their mutual accommodation, called the dynamics of the sea's baroclinic layer. A number of basic works was published, including N. Zubov, Dynamic Oceanology; Berezkin, Dynamics of the Sea; Shuleykin, Physics of the Sea (Third Edition); Morskoy Atlas (Maritime Atlas), and the new Soviet Physical-Geographic Atlas of the World, 1964.

A method for computing the vertical distribution of the speed of the tidal current (a mean vector from the surface to the ship's keel) was proposed for application in shallow seas as a practical aid to navigation. Later, an equation was obtained for determining the vertical distribution of a tidal current speed at any point of the seas as well as for determining the speed and direction of ice tidal drift.[13]

The Soviet contribution to the studies of the equatorial system of countercurrents in the world oceans is considerable.

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[13] Morskoy Sbornik No. 3, 1971, p. 73.

During the 1960's, seven years of continuous study of the Lomonosov current employing 94 buoy stations with automatic current meters produced 1.5 million readings. About 1,000 deep-water hydrological stations, with observations at 22 levels, have been established.[14] In 1969 the research ship Akademik Kurchatov observed a new powerful undercurrent more than 3,500 miles long moving in a southeasterly direction along the Antilles Islands.

A method developed by A. Sarkisyan permits computer calculation of stable currents (mean - annual and seasonal). It was reported that attempts to calculate the stable currents for all the world's oceans on computers were made in Moscow, Leningrad, and Sevastopol. The differential equation of mathematical physics for an entire energy interdependent "atmosphere - ocean-earth surface" system were used.[15]

The findings of the oceanographic research effort also have important military implications especially in undersea warfare, where underwater acoustics continues to be the major means for detecting submarines. The sound propagation in the water depends to a large degree on the velocity of sound. The

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[14] Morskoy Sbornik No. 3, 1970, pp. 81-82.

[15] Morskoy Sbornik No. 3, 1971, p. 81.

velocity, in its turn, is a function of water temperature, pressure (which increases with the depths), and salinity. While the salinity is more or less uniform through various layers of water and the pressure increases uniformly with the depths, the changes in the temperature in various layers of water are not uniform. So, the temperature is a major factor which in certain layers violates the general rule of increased density with greater depths.

The surface (upper) layer of the ocean waters mixed by atmospheric influences has a more or less even temperature. The deep layer, not being subject to atmospheric influences, also has a practically uniform temperature. Between these two layers there is an intermediate layer, whose depths and vertical dimensions vary, with a rapidly decreasing temperature, and, correspondingly, rapidly increasing density. Russians call this phenomenon the density jump, or density leap layer. It is also known as the thermal barrier, thermal layer, and thermocline. It has a complex multiple-stage structure, whose individual sections, in which the density increases sharply with depths, are mixed with sections having constant density values. Knowledge of the depths of the upper limit of this layer, its vertical dimension, or at least the thickness of the ocean's upper layer is very important in antisubmarine warfare (ASW).

Soviet oceanographic expeditions have in recent years collected considerable data on water density. A dense network of temperature and salinity observations has been made for the North Atlantic, the northern and southern regions of the Pacific Ocean, the southern part of the Indian Ocean, and the Carribean Sea.[16] Based upon previously collected data and current weather observations, the Soviet hydrometeorological center makes up to two-day forecasts of the information necessary to determine the depths of density or temperature layers in the various areas of the ocean.[17]

The systematic investigation of the Baltic Sea in accordance with a unified international program began in 1964, when a synoptic hydrological survey of the sea basin was first made. The work continues in cooperation with several countries (Finland, Sweden, East Germany, West Germany, and Poland).

Soviet expeditions are not only becoming more numerous and of longer duration, but are involving sizable groups of ships for the fulfillment of given tasks. For example, a 1968-1969 Soviet Navy expedition headed by Admiral Vladimivskiy aboard the hydrographical ship Polyus lasted 273 days. During the 54,000

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[16] <u>Morskoy Sbornik</u> No. 3, 1971, p. 80.

[17] <u>Ibid.</u>, p. 78.

mile cruise, the Soviets studied currents, the chemical composition of water at various depths, surface phenomena, winds, rain-squalls, etc., in many areas of the world ocean.

During 1970 the Soviet Union staged an unusual experiment at the center of the Atlantic Ocean, involving the simultaneous participation of six ships, Akademik Kurchatov, Dmitry Mendeleyev, Sergey Vavilov, Akademik Vernadskiy, Petr Lebedev, and Vilkitskiy, representing various Soviet oceanographic institutions (the Institute of Oceanology, Acoustics Institute, Marine Hydrophysics Institute, and Hydrographic Service). In the area of study, which was 120 x 120 miles, seventeen buoy stations carrying automatic instruments were anchored. Every 10 to 30 minutes, the buoys measured the speed of the current and the temperature of the water at various depths up to 1,500 meters. All information was relayed to the computer centers of Dmitry Mendeleyev and Akademik Kurchatov. The belief widely held prior to the experiment of the existence of stable currents in the area, and particularly of a current driven by the northern tradewinds was not confirmed.

A similar study on a smaller scale was carried out by Soviet scientists in the Indian Ocean in 1967.[18]

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[18] The experiments were reported in detail during a joint assembly of the five leading international oceanographic organizations which was held in Tokyo on September 13-25, 1970, and also in Sovetskaya Rossia, 27 October 1970; New Times No. 42, 1970; and Pravda, 4 May 1971.

Since 1968 the Soviet Union has been conducting research under the Polar Experiment (Polyarny Eksperiment) program. The Polar Experiment is an independent Soviet program within the framework of Soviet participation in an international program for the research of global atmospheric processes, and is planned to continue for several years. The program, which is being conducted in areas located north of the 50th parallel, includes a series of general expeditions in the northern areas of Atlantic and Pacific Oceans by the research ships of the Soviet Hydrometeorological Service and other organizations, expeditions to the central Polar Basin, satellites and aircraft observations, and also standard observations from meteorological and aerological stations of the Hydrometeorological Service.[19]

It was reported that the Leningrad branch of the Central Economic-Mathematical Institute of the Soviet Academy of Science and the Institute of Oceanology are working at creating a mathematical model of the world oceans. The basis of the model is a system of special equations for determining horizontal and vertical currents, temperature, and salinity of the water. Initial tests of the model on the BESM-3 computer in 1969 produced satisfactory results when checked against known paramenters.[20]

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[19] Morskoy Flot No. 1, 1971, pp. 44-48.

[20] Vodnyy Transport, 12 April 1969.

Satellites and orbital stations are destined to play an important role in oceanography, in that they could determine the state of the sea, the ice condition, the degree of water pollution, location of schools of fish, etc. Their role in ocean reconnaissance and ASW may already be significant. The work connected with the study of the oceans were performed during flights of the Soyuz space ships.[21] In 1970 the processes in the ocean depths and in the lower and upper layers of the atmosphere were studied simultaneously for the first time from the Soviet research ship, Akademik Shirshov, by the crew of space ship Soyuz-9 and the meteorological satellite Meteor.[22]

During the last sixteen years the Soviet Union has been involved in an extensive program in Antarctica. The Russian expedition of 1818-1821 with two sailing ships, Vostok and Mirnyy, commanded by Bellingshausen and Lazarev, claimed to have discovered Antarctica.[23] The first Soviet Antarctic Expedition took place during 1955-1956, when the first Station Mirnyy was established. Annual expeditions usually take place between November-February.

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[21] Aviatsiya i Kosmonavtika (Aviation and Cosmonautics) No. 12, 1970, pp. 34-35.

[22] Komsomolskaya Pravda, 26 December 1970.

[23] It is very difficult to prove or disprove the claim, since, in addition to the Russian ships, American and British ships were sailing off Antarctica during 1820.

In addition to Mirnyy, the following stations were subsequently established by the Soviet Union: Vostok, Pionerskaya, Oasis, Sovetskaya, Lazarevskaya (later superseded by Novolazarevskaya), Bellingshausen, Molodezhnaya, and Leningradskaya. As of the fall of 1971, a new Soviet Antarctic Expedition, the 17th, including three ships, the veteran, OB, an icebreaker, and research ship Professor Vize had been under preparation.[24] Not all stations are manned permanently and the personnel are replaced each year upon the arrival of the expedition. The stations are well equipped and there have been wide use of aircraft, helicopters, and sled trains.

While the overall scientific research in Antarctica is supervised by the Soviet Academy of Sciences, a few dozen Soviet scientific research institutions are involved in the work, of which the Arctic and Antarctica Scientific Research Institute, the Scientific Research Institute for Geology of the Arctic, are the most active. The Hydrographic Service of the Soviet Navy also sends its ships to participate in expeditions on occasion. Wide ranging and apparently high quality research has been conducted, and the Soviet rich experience in the Arctic has been put to broad use.

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[24] Leningradskaya Pravda, 21 August 1971.

A certain degree of specialization was established among the stations mentioned above. For example, Mirnyy Station conducts extensive meteorological research and Molodezhnaya and Vostok Stations, aerological research, including rocket probes of the atmosphere. The meteorological data from the satellites, related to the Mirnyy Observatory and the Molodezhnaya Station, are being used. The data are transmitted to Moscow and other meteorological centers of the world. At Molodezhnaya in 1969 a study was made for the first time of the atmosphere's electron density with the aid of artificial satellites. The glaciologists and geographers at the Vostok Station carried out deep drilling in the ice to a depth of 509 meters, obtaining unique samples of ice said to be formed from snow which fell 30,000 years ago. A quite extensive study of the Continental Shelf, the Continental Slope, and the geology of the sea floor has also been conducted. An assessment of mineral resources for future utilization was probably done through geological prospecting. While doubting Antarctica's immediate value for such resources, Soviet specialists do not exclude their exploitation in the future.[25]

Undoubtedly, some military application can be made of the Soviet research in Antarctica. For example, gravimetric and

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[25] Pravda, June 15, 1969.

geodetic data collected can be of value to missilery. Up to the present, however, nobody accused the Soviets of any violation of 1960 Antarctic Treaty. The Soviet Union research in Antarctica (at least that selected to be published) has been widely publicized in various periodicals and special reports.[26] In general, the research work in Antarctica is marked by satisfactory cooperation among Soviet-American-French-Japanese-Australian teams.

The research in the Arctic has continued, too, with the largest Soviet expedition, Sever-22, being made in 1970. A study of the ocean floor which included geological prospecting was conducted from a drifting ice field not far from the Pole named the "Little Scientific Town on Ice". Helicopters flying 150-200 kilometers from the camp were employed to deliver research parties.[27] Starting in May 1970, a group of skin divers participated in under-the-ice observations.[28] An air expedition,

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[26] See, for example: A. V. Nudelman, Soviet Antarctic Expeditions 1961-1963, PH Nauka, Moscow 1965; A. G. Chernov Desyat'let sovetskikh issledovaniy v Antarktide (Ten Years of Soviet Antarctic Research), No. 8, Znaniye, Moscow 1966; Trudy Sovetskoy Antarctecheskoy Ekspeditsii (Works of the Soviet Antaractic Expedition), edited by V. M. Driatskiy, Vol. 18, Leningrad, Hydrometeorological Publishing House, 1965.

[27] Nedelya No. 11, 1971.

[28] Izvestiya, 26 March 1971.

Sever-23, was planned for the end of 1971, which, in addition to resupplying drifting stations SP-16, 18, 19, and 20, was to establish twenty automated radiometeorological drifting stations.[29]

Oceanographic Vessels

The first Russian research ship, Andrey Pervosvannyy, was built in 1898 in Germany for research in Barents Sea. Renamed after the Revolution, Murman, and later Mgla, the ship was used by Soviet hydrographers for more than thirty years. Two other ships, Taymyr and Vaygach, were built domestically prior to the Revolution to study the Northern Sea Route. The first Soviet hydrographic ships, the Okean class, the Kamchadal class, and the Ost class were built prior to World War II. At the beginning of the war, the Soviet Union had 73 hydrographic vessels, many of which were later used in combat for minelaying, amphibious operations, and transportation of military cargoes. While close to fifty of them survived the war, the condition of most of them was poor.[30] During the 1950's, many surveying vessels of the Soviet Hydrographic Service were ex-German minesweepers, converted ex-Japanese naval ships, and even a number of former United States steel-hulled fleet minesweepers of the Admirable class. The

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[29] Leningradskaya Pravda, 16 August 1971.

[30] Sudostroyeniye No. 1, 1970, pp. 63-66.

Soviet hydrographic fleet was considerably reinforced during the decade of the 1960's. 18 units of the Samara class with a displacement of about 1,000 tons and a speed of 16 knots were built in Poland (1962-1964). Later, 9 units of the Moma class with a displacement of 1,800 tons and a speed of 16 knots were added (1967-1968).[31]

In 1957 the Mikhail Lomonosov was built in East Germany. The ship, with a 5,960 ton displacement, is equipped with 16 laboratories and is operated by the Soviet Academy of Science. The first oceanographic vessel designed and built in the Soviet Union after the war was a naval hydrographic survey ship, the Nevel'skoy. During the first half of the 1960's, a large number of oceanographic vessels was built: three naval surveying ships of the Polyus class, 11 oceanographic research ships of the Nikolay Zubov class, and 5 or 6 hydrographic surveying and research ships of the Zenit class. All were built abroad, mainly in East Germany.[32] The construction of the Nikolay Zubov class series was of particular importance, for, regardless how the ship is viewed, whether as a hydrographic survey vessel or as an oceanographic research vessel, her laboratories and equipment

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[31] Soldat und Technik No. 9, 1971, pp. 522-524.

[32] Soldat und Technik No. 8, 1971, pp. 460-464.

permit a variety of tasks to be performed, including measurements of waves and currents, geological sampling and analysis, meteorological studies, and hydroacoustic research.

In 1959, two expeditionary ships, A. I. Voeykov, and Yu. M. Skokalskiy, were added to the Soviet Hydrometeorological Service. The ships are suited not only for the traditional oceanographic observations, but "for broad general meteorological research as well".[33]

The growth of the Soviet Navy, the Merchant Marine, and the fishing fleet required an intensification of hydrometeorological research and better support from the Hydrometeorological Service, which, in 1966, had little more than 40 ships.[34] A series of research ships of the Akademik class were ordered and at least eight were built in East Germany. Originally called the Professor Vize class by Soviet Hydrometeorological Service, which received four of them, the ships have a displacement of close to 7,000 tons. Each ship can launch meteorological rockets and has 21 laboratories. The Soviet Hydrometeorological Service calls them "weather ships", capable of conducting prolonged hydrometeorological and aerological observations at permanently assigned points of

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[33] Vodnyy Transport, 26 June 1969.

[34] Pravda, 6 January 1969.

world ocean. Two such points were planned for the Atlantic Ocean, two for the Pacific, and one for the Indian Ocean.[35] In addition, nine weather ships of the Passat class (3,700 ton displacement) with 22 laboratories each were built in Poland. The ships have complex electronic equipment and an automatic device for launching meteorological rockets to altitudes up to 80 kilometers, and simultaneously perform hydrological observations.[36] All weather ships are also assigned to study air and water pollution and have the corresponding equipment.

An extended network of weather stations in the world ocean, and the use of meteorological satellites and computers permitted a computer-controlled weather routing system to be introduced at the end of 1960's.[37] It was claimed that during 11 months of 1969, 1, 120 merchant ships were tracked by the system with a savings of 318 ship days and more than 5 million rubles.[38]

A large number of specialized ships were employed since the end of 1950's, mainly by the Soviet Academy of Sciences, to support missile testing in the oceans, projects relating to the

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[35] Pravda, 6 January 1969.

[36] Vodnyy Transport, 26 June 1969.

[37] Undoubtedly, it is used by the Soviet Navy in addition to the Soviet Merchant Marine and is probably similar to the U. S. Navy's Optimum Track Ship Routing System.

[38] Vodnyy Transport, 7 February 1970.

study of the upper atmosphere and space and to observe satellites. First were four Sibir' class missile range ships, converted ore carriers. At the beginning of the 1960's two Desna class ships designated as missile range instrumentation ships were added. In mid 1960 the Soviet Academy of Sciences acquired the following vessels: Dolinsk, Bezhitsa, Ristna, Aksay, Kirishi and Borovichi classes, all of them either converted former merchant ships or built on the basis of an existing merchant ship design. Eight units of the Kirishi class and four units of the Borovichi class were built in Soviet yards on the basis of Vytegrales class timber carriers.[39] In 1967, the Kosmonavt Vladimir Komarov was added to the fleet. The ship displaces 17,580 tons, is 140 meters long, and in addition to 114 crew members, accomodates 126 scientific and technical personnel.

In 1970 a new Soviet vessel, Akademik Sergei Korolyov, was commissioned. The ship built in the Nikolayev Shipyard is 182 meters long and displaces 21,250 tons. Accomodating 300 crew and scientific personnel, the ship is well equippedfor the research of the upper layers of the atmosphere, independent guidance of earth satellites and space craft, and launching of scientific

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[39] Soldat und Technik No. 8, 1971.

rockets.[40]

Akademik Sergei Korolyov did not long enjoy the title of world's largest research ship, for during the summer of 1971, a new Soviet research ship, Kosmonavt Yuriy Gagarin, built in Leningrad, joined the service and became the flagship of the Soviet expeditionary fleet. Built essentially for the same purpose as Akademik Sergei Korolyov, the new ship is more than twice as large, with a displacement of 45,000 tons and a length of 231 meters. She is by far the world's largest scientific ship with 120 laboratories and the newest equipment coming not from the production line, but from research and development institutions, and is capable of controlling not only earth satellites, but space ships flying to the moon.[41]

Also, during the summer of 1971 the Soviet Far Eastern research fleet was augmented by the new ship Moskovskiy Universitet (Moscow University). In addition to a number of laboratories, the vessel has its own computer center, and is equipped with two underwater port holes and powerful lighting devices, for the visual study of marine life. More than 30 departments of the Moscow State University are participating in

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[40] Vodnyy Transport, March 2, 1971.

[41] Nedelya No. 36, 1971.

the scientific research aboard the vessel. It was reported that the Soviet Union is building or is planning to build a special ship for drifting in the Arctic ice. The ship's hull would be able to withstand the pressure of ice, and have a high-capacity (possibly nuclear) propulsion plant, a number of laboratories, rocket launching devices, and a computer center as its main features.[42]

Presently, there are no universally recognized standards for research ships. There is tendency in the Soviet Union to divide research ships into two broad categories, expeditionary ships and so-called universal ships. The former are capable of performing comprehensive oceanographic research in any area of the world ocean, particularly in the less known areas. It is recognized that such ships are very expensive and, apparently, their number would be limited. The latter are divided into two sub-categories: scientific-research and oceanographic ships. They are said to be capable of performing both basic and applied research according to a prescribed program. The main feature of this type of ship is their equipment, which permits not only universal application, but replacement upon the fulfullment the task of a program. Apparently, cost considerations are forcing

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[42] Science and Technology, Znanie, APN, 1971, Moscow, p. 21.

the Soviet Union to adopt a more rational approach to the allocation of funds and to assure better utilization of existing and future ships. A number of published proposals dealing with the design and construction of research ships bear good testimony to that fact.[43]

Underwater Research and Equipment

In general, there are two approaches to man's living and working underwater for prolonged periods: adaptation to the underwater enviroment or complete isolation from its influence, mainly pressure. Both approaches have a long history of development, but only recent technological progress has registered some noteworthy achievements. While the second approach has been represented by the development of various sizes and designs of submarines, the first approach essentially has been the sophistication of various diving techniques and equipment. The American "Men in the Sea Program" is the most illustrative of the latter.

Soviet experimentation in this field started in the middle of 1960. For years a number of amateur "underwater research" clubs were arguing for the need for such a program. One of them,

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[43] N. F. Medvedyev, "Suda dlya Issledovaniya Mipovogo Okeana" (Ships for Research in World's Ocean), Sudostroyenie, Leningrad, 1971, pp. 215.

the Donetsk Club, built the underwater habitat Ikhtiandr-66, which was tested in August of 1966 off the Crimean peninsula at a depth of 11 meters. Three aquanauts worked in this habitat for a total of 168 hours. In the following year, a somewhat improved version, Ikhtiandr-67, was also successfully tested.[44]

Simultaneously, the Leningrad Hydrometeorological Institute in cooperation with Acoustical Institute of Soviet Academy of Sciences built the underwater laboratory Sadko. The spherical laboratory has a diameter of 3 meters and a volume of 14 cubic meters, and is suitable for two men working at depths of up to 50-60 meters. The laboratory was tested in the Black Sea, 120 meters from shore at the depth of 42 meters.[45]

During the summer of 1967 a more sophisticated underwater laboratory, Sadko-2, was tested. Sadko-2 is composed of two spherical bodies 3 meters in diameter joined by steel cylinder with a hatch. The upper sphere is used as a compartment for the aquanauts and the lower, as an auxiliary compartment. During the initial test, the laboratory was secured at the 25-meter depth, and two aquanauts spent six days in it.

The Sadko-3 laboratory, designed by the same organizations,

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[44] Sudostreyeniye No. 1, 1968, pp. 26-28 and No. 5, 1970, pp. 18-22.

[45] Sudostreyeniye No. 8, 1967, pp. 16-19.

was tested in October 1969. Compared to the previous two, the Sadko-3 is more sophisticated and has more reliable means for decompression as it permits docking with a decompression chamber ashore.[46] It has three chambers joined together, one above the other, and accomodates four aquanauts. Three men worked in it for four days during the initial tests, followed by two days of decompression.

During the summer of 1968 the southern branch of the Shirshov Institute of Oceanology of the Soviet Academy of Sciences tested another underwater laboratory, Chernomor, an 8.4 meter long horizontal cylinder with a diameter of about three meters and an underwater displacement of 62 tons. The laboratory accomodates five men and is capable of operating in depths of up to 30 meters. Research was conducted within hydro-optical, hydro-physical, geological and biological programs. Five crews spent a total of 140 man-days in the laboratory, leaving it for up to 3.5 hours to the distance up to 100 meters.[47]

In the summer of 1969 an improved version of the underwater laboratory, Chernomor-2, was tested. It was 12 tons heavier than the prototype, the capacity of its electric batteries was 100

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[46] Sudostroyeniye No. 7, 1970, pp. 19-21.

[47] Sudostroyeniye No. 5, 1969.

times greater (Chernomor-1, due to the low capacity of its battery, could sustain the work of the crew for only two days), gas-mixture reserves were increased fifty times (Chernomor-1 had an oxygen reserve for three days), and water reserves were increased six times.

The Chernomor-2 is a self-sustained underwater habitat connected with a ship or the shore only by telephone cable, which also can be abandoned and communication maintained via radio buoy. The habitat can be placed under the water at depths of up to 35 meters, but aquanauts can work down to depths of 60-70 meters. During August-September 1971, Chernomor-2 was used for a 52-day experiment involving 4 men at a depth of 15 meters.[48] It has been considered as a "lead prototype" which can be mass produced. The cost of the first mass produced habitat was given as 100,000 rubles, which would drop to 65-70,000 rubles in mass production.[49]

The opinion was expressed that the application of such underwater laboratories or habitats is not limited to oceanographic research. It was stated also, that, whenever underwater work at depths of 30 meters and below required sixty man hours or more

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[48] Izvestiya, November 12, 1971.

[49] Izvestiya, October 11, 1969.

of labor, the use of an underwater habitat similar to Chernomor-2 is economically justified.

In August 1970 an underwater laboratory, Ikhtiandr-70, was used for extensive tests on special diving suit designed for a prolonged stay underwater. Medical physiological research on the condition of divers during a prolonged underwater work was conducted at the same time. A special diving suit designed for this purpose has a dual life sustaining system. The main one sustains breathing by a hose connected to an external breathing mixture source. The second, which is autonomous, is carried by the divers and is incorporated in the suit. Special clothing worn under the suit provides good ventilation of the body as well as warmth. The diving suit incorporates a sanitary system as well as a communication system. During the experiment, two tests, one with a duration of 26 hours 15 minutes and a second of 37 hours 40 minutes, were conducted.

Medical-physiological tests confirmed the possibility of a prolonged (up to 38 hours) stay underwater in such a diving suit. The opinion was expressed that such a diving suit system can be used for underwater work for a period of two or three days, when the installation of an underwater habitat is impossible or economically not justified. A plan was announced to build and test a completely self-sustained system, without a hose, which

will permit work at greater depths.[50]

A number of submarine-like devices have also been developed. Sever-1 (the Soviets call it hydrostat) is an apparently one-man submersible which is towed by a cable from a mother ship. The apparatus was used in the Barents Sea by the PINRO Institute for extensive geological observation of the bottom. Maintained at .5 to 1 meter from the bottom, the observer was able to observe a strip 10-20 meters wide, to photograph it and to take geological samples. It was claimed that the experiment produced rich results and is being used for the geological mapping of the Barents Sea bottom.[51]

Another Soviet underwater apparatus, Sever-2, was developed in the late sixties, and was tested in the Black Sea. During the test, the apparatus reached a depth of 2,185 meters. The apparatus is delivered to the operations area by a parent ship. It is self-propelled, and one vertical and two horizontal screws give the apparatus good maneuverability, with a horizontal speed of a running man. A crew of three can observe the enviroment through several port holes, take samples by means of manipulators, and store them in special extendable containers. The instruments

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[50] Sotsialisticheskaya Industriya, 11 March 1971.

[51] Leningradskaya Pravda, 19 January 1971.

carried aboard permit testing of the water, photography, and tape recording of sounds emitted by marine life. The apparatus was designed by the Leningrad Institute, Giproryhflot.[52]

Another apparatus for the observation and photography of underwater objects, the two-man AMS-200 with maximum submersible depths of 450 meters, was developed by the same institute.[53] The AMS-200 appears to be a further development of Atlant-1, widely tested in 1965-1966.[54]

The underwater laboratory Bentos-300 has been under development since 1966. Designed by Giprorybflot Institute, the self-propelled laboratory is 20 meters long and displaces 360 tons. It has crew of ten (a 15-man crew was also reported) which can stay submerged for ten days at depths up to 300 meters. After being towed to the area of operation, the laboratory can submerge independently, stay at the prescribed depths for prolonged period of time or lay on the bottom. A battery-powered motor provides a speed of 1.5 knots. A special compartment which can be separated from the laboratory provides crew with an emergency rescue capability. The Bentos-300 can be used for

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[52] Pravda, March 22, 1969.

[53] Sudostroyeniye No. 2, 1968.

[54] Sudostroyeniye No. 7, 1967.

oceanographic research in cooperation with another submersible apparatus, TINRO-1 or TINRO-2, designed by the Pacific Research Institute of the Fishing Industry. Both were called submarines by a Soviet source. TINRO-1 can reach the area of research under its own power, while TINRO-2 has to be delivered by a mother ship. Another apparatus, similar to TINRO-2 and called a midget submarine, Gvidon, was developed by the VNIIRO Institute and tested in 1970 in Black Sea.[55]

The Moscow Aeronautical Institute also developed and built a miniature submarine, MAI-3. A crew of two can conduct the research in depths up to 40 meters. The apparatus is made of aluminum alloys and plastic. Two propellers driven by battery-powered motors can develop speeds up to three knots; the operating time is 1.5 hours.[56]

The design for an underwater automobile "Makrel", capable of carrying divers and with a speed of 6 KM/h sustained over several hours at depths up to 40 meters, has been developed by Giprorybflot Institute.

The number of manned underwater apparatuses the Soviet Union

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[55] Sudostroyeniye No. 8, 1965 and No. 2, 1967; Ekonomicheskaya Gazeta No. 32, August 1967; Komsomolskaya Pravda, November 23, 1967, and March 20, 1971; Vodnyy Transport, April 17, 1971.

[56] Seewirtschaft (Maritime Economy), Leipzig, July 1967, p. 578.

has been developing is, to say the least, proof that the problem has been recognized. Obviously, not all of them are either very sophisticated, nor will they be mass-produced and find wide application. But at this, still embryonic stage of the development, the number of organizations involved and the variety of models produced is impressive. Following the pattern of the usual Soviet approach, it is logical to expect that the development of such apparatuses will be centralized in a few specialized organizations. The decision to centralize the construction of the accepted apparatus in one ministry, the Ministry of Shipbuilding, has already been made.[57]

In December 1958, Severyanka, a W-class submarine converted into a research submarine, became operational. The torpedo compartment, converted into laboratory, has a number of port holes, searchlights, and electronic sensors. The Soviet Navy has two research submarines, Lira and Vega. Both are called hydrographical submarines and are in extensive use. During the summer of 1969, Vega, accompanied by a tanker and motor ship, made a cruise of 249 days' duration through 8 seas, and the Pacific and Indian Oceans. Apparently, the submarine is assigned to the Soviet Pacific Fleet.[58] Another submarine, Lira, assigned to

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[57] Komsomolskaya Pravda, 23 November 1967; Trud, 20 November 1971

[58] Soviet Military Review, No. 10, 1970, p. 31.

the Northern Fleet, was also involved in research cruises, one of eight months' duration in 1970.[59]

In the fall of 1970 the existence was reported of one more Soviet research submarine designed to be "mobile, autonomous, independent of weather and service" underwater laboratory. It is probably the result of the conversion of one more Soviet Navy combat submarine into a research vessel operated by one of the Soviet Oceanographic organizations. The crew of the vessel, composed of "several tens of experienced specialists, the majority of whom serve on submarines". The first (torpedo) compartment of this submarine has a special chamber for aquanauts. A special system of hatches and a lock permits the aquanauts to leave the chamber and, hence, the submarine, and return to it. Aquanauts used various diving suits, and during the experiment performed a variety of tasks around the submarine and on the sea bottom.

The helium breathing mixture and all the power for the life support system are supplied by the submarine. The chamber is also used for decompression, after which the aquanauts leave it and enter the first compartment of the submarine. During decompression, the aquanauts can communicate with the crew and, through a special port hole in the chamber, can see their colleagues and can be seen by them. The chamber accommodates

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[59] Krasnaya Zvezda, 21 July 1970.

at least four aquanauts. Hot and cold food can be supplied from the submarine compartment through a special arrangement. Apparently, the experiment was very successful and met all expectations. The wide use of the submarines with similar arrangements for aquanauts in the near future was predicted.[60]

Concurrently with their own development, the Soviet scientists are eager to obtain foreign technology. After an unsuccessful attempt to buy an American research submarine, the Soviets turned to Canada. An agreement was signed between Sudoimport, purchasing agent for the Soviet Union, and International Hydrodynamics Company, Canada, to build a midget submarine called Pisces, capable of diving to 6,000 feet.[61]

A variety of new instruments for the oceanographic research and apparatuses have been recently developed. Two devices for measuring hydrophysical parameters, the LKI-3 and LKI-4, the former for depths up to 200 meters and speeds up to 18 knots, and the latter for depths up to 300 meters and speeds up to 15 knots, were developed by Leningrad Shipbuilding Institute.[62]

At least two deep submergence apparatuses with television

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[60] Krasnaya Zvezda, 19 and 20 August, 1970.

[61] New York Times, March 17, 1971.

[62] Sudostroyeniye No. 11, 1968.

cameras and manipulators were developed. The first one, Krab, used primarily for examining underwater structures, was developed in 1967.[63] The second one, called Underwater Geologist, is used primarily for geological sampling to the depths of 4,000 meters (originally the depth was limited by the cable lengths to 3,200 meters).[64]

Istok, a probe for depths up to 2,000 meters with "supersensitive instruments" for measuring hydrophysical parameters of the water, was developed by the Marine Institute of Hydrophysics, an affiliate of the Ukrainian Academy of Science. The readings are instantaneously transmitted via cable to the Dnepr-1 or Minsk-22 computers, where they are processed and stored.[65]

The Special Design Bureau of the Sakhalin Scientific Research Institute developed a number of automatic devices for underwater seismological soundings. For example, an automatic buoy station can either store the information or transmit it to the ship, where it is processed. Considerable savings in the cost of the research work are expected thanks to the use of such devices.[66]

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[63] Trud, 12 November 1967.

[64] Sudostroyeniye No. 1, 1969.

[65] Sotsialisticheskaya Industriya, 18 June 1970.

[66] Sotsialisticheskaya Industriya, 26 August 1971.

Many devices used by Soviet oceanography are powered by radioactive element as energy sources. A number of such generators, using Cesium-37, were built during the period 1963-1967.[67] Another series of isotope generators using mainly Strontium-90 was developed in the late 1960's. For example, Beta-3, with a capacity of 880 kilowatt hours, can be used for ten years in areas with temperatures down to -70 degrees centigrade. Another generator, Ephir, can operate in an enviroment with temperature ranges from plue 60 to minus 60 degrees centigrade.[68]

Research and Plans for the Exploitation of Minerals in the Sea

While the growing world industrial output has generated an increased demand for minerals, only a tiny fraction of 1% of them come from the sea. Off-shore extraction of oil, on the other hand, already represents close to 20% of world oil production. In addition to the hundreds of millions of tons dissolved in the sea water, there are known deposits of minerals in the bedrock of the subsoil and right on the sea floor in quantities estimated to far exceed anything known on land. Up

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[67] Sovetskaya Rossiya, 10 January 1970.

[68] Sotsialisticheskaya Industriya, 18 March 1971.

to the recent time, the level of technological development represented the major obstacle. The present, and particularly near-future, technology should be capable to provide accelerated process of extracting minerals from the sea.

The Continental Shelf is bound to be the first place where there will be wide extraction of minerals. However, the distribution of manganese nodules (concretions), is, in general, beyond the Continental Shelf. Soviet oceanographers have been working for years to determine the distribution and concentration of manganese nodules, particularly throughout the central Pacific Ocean. These strange concretions, which look like tubers, are not large, ranging in length from a fraction of a millimeter to 15 centimeters. The biggest sample found by the Soviet oceanographers weighed 136 kilograms. Their concentrations on the ocean floor are variously estimated to be from 100 to several hundred billion tons. Copper, cobalt, and nickel are also found in addition to manganese.

The Continental Shelf of the Soviet Union, representing close to 1/3 of the world's total, covers 6.6 million square kilometers. What is more important, approximately half of it lies in depths not exceeding 50 meters. However, the greatest part of the waters over the Soviet Continental Shelf is frozen over during the winter, and in some areas ice is found eight or

nine months out of the year.

During the last several years, research and development on the exploitation of minerals in the sea has been considerably intensified in the Soviet Union. Some initial steps toward actual extraction have already been taken. Experimental exploitation and enrichment of titanium ore has been undertaken in the Baltic, and a marine geological enterprise scheduled to start operation in 1972 was formed.[69] A special expedition to the Laptev Sea in 1967, after extensive prospecting, made experimental exploitation of cassiterite and its enrichment possible. The decision was made to form a marine geological enterprise for cassiterite extraction, with operations starting in late 1971 or early 1972. To speed up the exploitation of cassiterite, a special vessel dubbed "Floating Geological Combine" was proposed which was to have all necessary equipment and living quarters for workers aboard and be powered by nuclear energy.

The training of marine geologists in the Soviet Union accelerated. Odessa University in 1971 graduated the first group of marine engineer-geologists. A special laboratory dealing with problems of engineering geology was organized at the university. Conducting experimental work on the floor of the Black Sea, the

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[69] Izvestiya, 2 September 1970.

scientists of Odessa University are using the theory of geological similitude and modeling, developed by them. To improve methods of geological prospecting, a model of the Black Sea Continental Shelf and computers have been used.[70]

The Scientific Council of Moscow State University coordinates the efforts of several departments involved in geological research in the Pacific Ocean. A special laboratory of the Moscow Geological Institute is working on the solution of technological problems connected with underwater extraction of minerals, and is developing special equipment to that end. The departments of 13 universities, the Ministry of the Non-Ferrous Metal Industry, and several other Soviet institutes were cooperating in this endeavor. A specially equipped vessel, the Tura, which is suitable for experimental exploitation and enrichment of minerals, has been used in the Pacific. Experimental exploitation of cassiterite and gold has been conducted, and new technology tested aboard the vessel.[71]

In the Soviet Far East, a new research center, the Sakhalin-General Scientific Research Institute, subordinated to the Far Eastern Scientific Center, was organized and is very

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[70] Vodnyy Transport, 6 October 1970.

[71] Izvestiya, 2 September 1970.

active in marine geology.[72]

The need for close cooperation between land and marine geologists has been stressed in the Soviet Union. It was also emphasized that under certain conditions, the sea extraction of minerals might be cheaper than the land extraction, for in the former, there is no need for the roads, and, hence, considerable savings in transportation can be achieved. The high cost of development in Siberia is probably a factor in such considerations.

The Soviet Union has intensified off-shore oil prospecting particularly in the northern seas and the Far East, in addition to the Caspian Sea, where off-shore oil extraction has been conducted for many years. In the north, the most extensive soundings to date for oil and natural gas were conducted in the Barents and Kara Seas. The area of Pechora Guba is viewed as the most promising for both oil and gas.[73]

The possibility of Arctic oil exploitation is being seriously considered, despite the unfavorable climatic conditions, the only restraining factor named so far being cost. The solution of the technological problems which would be associated with such exploitation is being approached optimistically. It

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[72] _Sotsialisticheskaya Industriya_, 26 August 1971.

[73] _Trud_, 20 February 1971.

has already been proposed to consider the use of automated installations which are being developed by Kominepht' for the off-shore oil extraction in the Arctic. The construction of special ships, including submarines, for the Arctic oil industry has also been considered.[74]

An intensive search for oil has been conducted in the Sakhalin area for ten years. Directional drilling, a method of drilling wells with a deviation from the vertical of up to several thousand meters, was developed and is in wide use in northern Sakhalin.[75] The Gipromornepht' Institute designed a special piece of equipment which would permit concentrating up to 200 wells made by directional drilling on a relatively small oil island.[76] A floating drilling rig, Khazap, for off-shore drilling in sea depths up to 100 meters is being used.

In addition to the Northern seas, the Far Eastern waters, and the Caspian Sea, certain areas of the Baltic Sea, the Azov Sea, and the Black Sea are viewed as promising for future oil and gas exploitation. The results of a number of test drillings in the Black Sea were encouraging.[77]

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[74] Ibid.

[75] Izvestiya, 14 May 1971.

[76] Pravda, 12 July 1971.

[77] Pravda, 3 October 1970.

The 24th Party Congress Directives for the Five-Year Economic Plan included a call "to enlarge prospecting work in the Shelf zones of seas and oceans for discovering oil and gas deposits". The general goal seems to be to start exploitation on the Continental Shelf at depths where existing technology permits and over the next two decades to push exploitation on the Continental Shelf to the depths of 200 meters, while concurrently conducting soundings of considerably larger depths.[78]

The tidal energy of the world ocean is conservatively estimated at one billion kilowatts, and the energy of all rivers, 850 million kilowatts. The potential tidal energy of he seas around the Soviet Union is estimated of 200 billion ilowatt hours per year. In 1968, the first Soviet tidal power tation, the 5000-KW Kislogubskaya, near Murmansk, was built. he projected Mezenskaya tidal power station is supposed to enerate 1.5 million kilowatts with a total annual output of 6 llion kilowatt hours. The potential tidal energy in the White a area is assessed at 36 billion kilowatt hours per year.[79]

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[78] *Pravda*, 12 July 1971.

[79] *Morskoy Flot* No. 6, 1970, pp. 23-26 and *Izvestiya*, January 1970.

The Organizations

The overall coordination of Soviet oceanographic and related work is centered in the State Committee for Science and Technology under the Gosplan. The Committee has a Scientific Council for the study of oceans and seas and the utilization of their resources. The Council, together with other specialists of the State Committee, is directly involved in the coordination of oceanographic research and its application. The research itself, however, is directed by the Academy of Sciences of the USSR, the Ministry of Fishing Industry, the Ministry of Merchant Marine, the Hydrometeorological Service, and the Hydrographical Service of the Soviet Navy. Basic research is conducted and supervised mainly by the Soviet Academy of Sciences through its Oceanographic Committee in the Earth Science Department.[80]

Most of the basic oceanographic research is conducted in various specialized institutes of the Soviet Academy of Sciences, such as the Shirshov Institute of Oceanology, the

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[80] It was widely claimed in Soviet scientific circles that, in view of the vastly broadened scope of oceanographic research, neither the Scientific Council of the State Committee nor the Oceanographic Committee of the Academy of Sciences could effectively control and coordinate the efforts of Soviet oceanography, and that new organizational principles should be applied. See, for example, *Pravda*, 25 March 1971, and 11 May 1969.

Institute of Marine Geophysics, the Institute of Earth Physics, the Zoological Institute, the Acoustics Institute, and others. Various state universities, such as Moscow and Leningrad Universities, and the Academy of Sciences of the Republics, particularly the Ukrainian Academy, are also contributing heavily. Almost all scientific research institutes of the Fishing Industry are also oceanographic institutes, and their contribution is substantial and in many areas crucial. A number of Soviet Navy scientific research institutes are also working in the field of oceanography, independently as well as jointly with their civilian counterparts, particularly in the interest of submarine operations, anti-submarine warfare, and the employment of various weapons.

In addition to the specialization of some scientific institutions, such as the Arctic and Antarctic Scientific Research Institute, there is trend toward a geographic distribution and regional orientation of the research institutions. For example, the recently organized Far Eastern Scientific Center specializes in oceanographic research of the Northwestern Pacific and the Okhotsk Sea, and has its own fleet of research vessels. The following institutes are subordinated to the center: the Geographical and Oceanographical Institute, 4 biological and 5 eologic-geophysics institutes, and the Sakhalin General Scientific

Research Institute.[81]

In 1967 the All-Union Scientific Research Institute of Marine Geology and Geophysics was organized in Riga, Latvia. The institute has 12 expeditionary ships incorporated in the Baltic Expedition.[82] A branch of the Oceanographic Institute of the USSR Academy of Sciences was recently established at Odessa with its own expeditionary fleet. The Institute of Biology of the Southern Seas has its branch in Odessa, too. Branches of the Hydrometeorological Service and of the Hydrographic Service of the Navy are also found in all major basins. Considerable applied research is conducted by the fishing and the shipbuilding industries and the Merchant Marine.

The Geographic Society of the USSR, one of the oldest in the world (it was founded on August 6, 1845) should be mentioned. The Society consists of the geographic societies of 14 union republics, 160 branches and departments and three scientific research institutes, and incorporates 18,600 members.[83] The society has a long record of association with the Soviet Navy. During its Fifth Congress in December 1970, Commander-in-Chief

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[81] Pravda, 25 March 1971 and Sotsialisticheskaya Industriya, 26 August 1971.

[82] Vodnyy Transport, 7 June 1969.

[83] Morskoy Sbornik No. 5, 1971, pp. 93-95.

of the Soviet Navy S. G. Gorshkov stated that "the problem of studying and mastering the world ocean is becoming one of the greatest scientific-technical problems of the 20th Century", and that the Navy's direct link with marine geographic research "is still far from complete". Several Navymen, including Gorshkov, were elected to the Scientific Council of the Society.

It can be seen that the extensive organizational network incorporates numerous scientific, industrial, and operational bodies dealing with the oceanography.

Conclusions

Between the Revolution and World War II, Soviet oceanographic research, primarily hydrographic in nature, was conducted mainly in the contiguous seas. Although not far behind the world level of that period, Soviet oceanography did not distinguish itself, except for the scope of the Arctic research and the resulting knowledge. After World War II, however, the Soviet Union gradually and steadily intensified its oceanographic efforts, placing initial emphasis on expeditions and the collection of much needed data. The Soviet research fleet has been considerably enlarged. While the fleet was previously composed of modified cargo, fishing, and ice-breaking ships, during the decade of the 1960's a considerable number of specially designed oceanographic research ships were built, and modern, often unique equipment was installed in their laboratories. The scope of Soviet expeditions was greatly increased, and Soviet research ships are now operating in all areas of the world oceans. The expansion of both basic and applied research has been accompanied by an increase in the number of scientific organizations involved in it and in the number of scientific workers employed and of those graduated from the educational institutions. In the applied research field, Soviet oceanography

has probably been able to satisfy the demands of an expanding navy, merchant marine, and fishing fleet. During the last decade, considerable attention has been devoted to the Continental Shelf and the exploration and exploitation of mineral resources. There are indications that efforts similar to the "Man-in-the-Sea" program are underway in the Soviet Union.

While it is difficult to differentiate between what is purely military and what is purely of civilian interest in oceanography, Soviet attention to particular ocean areas, the participation of the hydrographic ships of the Soviet Navy, and the nature of the research suggests the fulfillment of Soviet Navy requirements, particularly for submarine operations. It is difficult to judge whether the Soviet Union is ahead of the United States in oceanography, but the near future will tell. The scope of Soviet oceanographic research and their extensive cooperation with other countries in the field have resulted in wide international recognition, and have placed Soviet oceanography in one of the leading positions in the world. There is every indication that Soviet oceanographic efforts will be intensified in the future.

CHAPTER V

FISHING INDUSTRY

General Developments

Fish has always been an important part of the Russian diet. Prior to the 1917 October Revolution, fishing was rather well developed in Russia, especially in the areas adjoining seas and along large rivers and lakes. Expensive fish such as sturgeon and fish products such as caviar were among the famous Russian export items. Most of the catch was brought by individual fishermen, though fishing by specially formed communes and fishing villages was also quite common. The amount of "fresh water" fish far exceeded "salt water" catch. Immediately following the Revolution, the Soviet Government initiated a number of measures designed to increase the supply of fish. By special decree of the Council of People's Commissars, dated December 9, 1918, the Main Directorate for Fishing and the Fishing Industry known as Glavryba, headed by a special collegium, was organized. Soon, however, due to the ineffectiveness of that organization and the urgent need to increase the fish supply, another decree of the

Council of People's Commissars of May 31, 1921, liquidated the state monopoly on fishing and gave Glavryba greater independence in the administrative, financial, and business aspects.

Starting in 1926, Gosplan issued the first "control figures" for developing the fishing plan. In 1928, the first Five Year Plan for the development of the fishing industry was worked out. The main goals of the plan were: accelerated catch growth, reduced cost of fishing, development of fishing fleet, and complete removal of private Soviet capital from the fishing industry (foreign concession rights were left temporarily untouched). Under a new order from the Soviet Government, however, the Five Year Plan for the fishing industry was drastically changed in 1929. The new requirement was to increase the catch more than two times over original plan and by 1933 to achieve a 2.6 times higher catch than the pre-revolutionary level.[1] Obviously, the plan was not fulfilled. However, the very intensive work of many enterprises and organizations resulted in some increase in the fish catch, in modest introduction of of new technology and in the building of a considerable number of fishing vessels.

In 1930 the first Soviet steel fishing trawlers were built

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[1] Rybnoye Khozyastvo (Fishing Industry) No. 2, 1971, pp. 6-8.

in Leningrad. They had installation for the production of fish meal and canning, as well as storage capacities for salted and fresh (refrigerated by ice) fish. In 1934 the first Soviet floating canning factory, Lagan', was built for service in the Caspian Sea. The ship was capable of receiving fish from trawlers and processing it. In 1937 the first fish processing factory ship was built for the Northern Basin.

During the second half of the 1930s, the construction of fishing vessels was slowed down due to the lack of shipbuilding capacities, which were taken up by naval construction. The total catch for 1940 was 1.4 million tons.[2] During the war many fishing ships were mobilized by the Soviet Navy. However, fishing continued even during the war, though at a lower intensity.[3]

After the end of World War II, the Soviet Fishing Industry was in a bad state. Many fishing vessels had been lost in the war, and those which remained were in poor condition, with worn machinery and hulls in need of repair. The problem was aggravated by the fact that a considerable portion of the Soviet shipbuilding and ship repair capacities, was either destroyed or severely damaged. Moreover, the agricultural sector of the Soviet economy

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[2] Vodnyy Transport, July 10, 1971.

[3] Shipbuilding No. 12, 1969.

was also in extremely bad shape, and the country was in dire need of foodstuff. Consequently, the fishing industry was once again presented with an extensive plan for a fish catch.

Starting in 1947, the Soviets succeeded in building a series of medium trawlers (SRT) for side trawling and for use of drift nets. In the late 1940's the pre-war catch level was achieved. The greatest portion of the catch was obtained from internal waters (rivers, Lakes) and close, off-shore, waters of the adjoining seas. Most of the fishing vessels of that time were represented by small seiners, employing fishing methods and gear which were not very productive.

The turning point occurred about 1950, after which there was an accelerated development of high sea fishing, resulting in steadily growing catches. Restoration of the war-damaged industry and achievement of pre-war level of production together with growing shipbuilding capacities in East Germany and Poland assured rapid build-up of the fishing fleet.[4]

It is well known in the Soviet Union that for the same amount of protein, fish product requires considerably less capital.

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[4] Emerging capability of the Satellite countries to build ships, particularly fishing vessels, were very important for the Soviet Union because its own shipbuilding industry, though mainly restored and even growing, was busy fulfilling orders of a extensive naval shipbuilding program, initiated in 1947.

investment than that needed for meat products. It was also recognized that in order to achieve a large increase in the Soviet catch, the high seas fishing operations would have to be expanded. To be efficient those operations required a special fishing fleet consisting not only of trawlers, but mother ships, factory ships, refrigerator-transports, and support ships such as tankers, tugs, etc.[5] A number of such ships were built in the second half of 1950's in the Soviet and foreign yards.

The Soviet fishing fleet appeared for the first time in the Northwest Atlantic near Newfoundland in 1956 and later on the Western Edge of George's Bank. The similar development took place in the Soviet Far East. These efforts resulted in the steadily growing Soviet catch: 1950 - 1,627,000 tons; 1955 - 2,495,000 tons; 1960 - 3,051,000 tons.[6]

The experience of operations in remote fishing grounds convinced the Soviet specialists that the larger trawlers with refrigerating or freezing facilities were needed to improve the efficiency of the fishing operations. Also, the absence of any overseas bases and the remoteness of fishing areas forced the Soviets to develop methods for processing the catch on the fishing grounds. The decade of the 1960's witnessed a steady increase

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[5] Sudostroyeniye No. 12, 1969.

[6] FAO Year Book of Fishing Statistics, 1962.

in the size and capability of Soviet trawlers and the development of the auxiliary fleet, capable not only of supporting a large group of such trawlers for months, thousands of miles away from the Soviet shores, but also of processing the fish afloat. The following measures were initiated to build such an efficient fleet: Soviet domestic yards continued to build medium trawlers, but their size was doubled compared to those built in the 1950's, all of them have either refrigerating or freezing facilities. In 1963 the Soviet Union started to build two classes of trawlers, the Mayak and the Pioner. Both trawlers have a displacement of over 900 tons. In 1967-1969 two more classes of trawlers, the Ol'ga and Sargassa, were built, both with a displacement of around 1,000 tons. All four classes are capable of using a variety of fishing equipment such as drift and seine nets, trolls, and purse seines. At the end of the 1960's the first series of Soviet stern trawlers was built.[7] The Sudoimport Agency ordered hundreds of vessels abroad. In the early 1960's a series of over eighty Soviet-designed Tropik-class stern-slip freezer trawlers were built by East Germany. This was followed by the Atlantic-class stern trawler, successor to the Tropik, also built in large series. Both classes of ships are equipped with the Vostra powered rudder, which gives them exceptional

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[7] Sudostroyeniye No. 12, 1969.

maneuverability, and sophisticated hydroacoustical gear for fish detection, in both the horizontal and the vertical planes.[8]

A Polish yard built a large series of Mayakovskii-class stern trawlers under Code B-26, designed and originally built by the Soviet Union.

During the 1960's, the five classes of stern-slip trawlers, the Pushkin, Mayakovskii, Leskov, Tropik and Atlantik, were delivered in large quantities to the Soviet fishing industry. They are called BMRT (Bolshoi Morozilniy Rybolovniy Trauler), or large freezer fishing trawler, and are capable of independent operation for sixty-seventy days in remote areas of the oceans. Supported by mother ships, not only BMRT's, but SRT's, can stay in the fishing area much longer, provided the crews are relieved.

In addition to freezing and refrigerating equipment, the trawlers have fish processing plants. On the fishing grounds, the trawlers are supported by factory-mother ships equipped with processing lines and refrigerated storage and able to supply the trawlers with food, fuel, water, and medical and recreational facilities for its crews.

Typical of the factory-mother ships is the Zakharov-class which displaces 16,400 tons, has facilities for canning and freezing fish and producing fish meal for animal and plant food. She is

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[8] For a detailed description of these fishing trawlers, see U. S. Naval Institute Proceedings, November 1970.

capable of receiving fresh, chilled or frozen catches simultaneously from up to eight fishing vessels, moored alongside. Another class of mother ships, the Severodvinsk, built in series by the Polish yards since 1955 (under modifications coded B-62 and B-64), is used as a mother ship for 20-30 trawlers. Construction of a more advanced class of mother ships, the Professor Baranov, in a Polish yard under Code B-69, started in late 1967. Displacing 10,000 dwt, the ship has a fifty per cent greater capacity than previous series, with twenty fewer men in the crew thanks to the high degree of the automation. Her processing plant is capable of preserving about 200,000 cans of fish per day in addition to packaging and processing fish paste and fish meal. Together with attached trawlers, she can operate at sea up to nine months.[9]

The fish transports also have fish processing lines and refrigerated storage and, in addition, deliver turn-around crews for fishing trawlers. Typical of such transports are the Bratsk-class with a 2,500-ton displacement and the Pervomaisk and Sevastopol classes, both displacing 5,000 tons.

The older whale factory ships, Slava and Aleut, were joined by newer ones, Sovetskaya Rossiya and Sovetskaya Ukraina, 33,000 tons and 46,000 tons, respectively. Whereas the former two were

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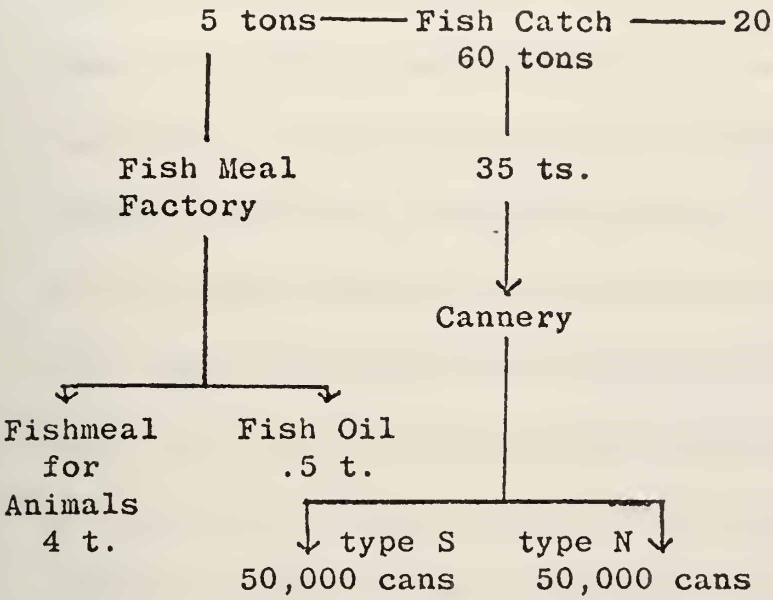
[9] U. S. Naval Institute Proceedings, March 1971.

built primarily to process whales, the latter two are a combination whale and fish factory. The experience gained in operating the whaling "flotillas", with the whale factory ship as command and mother ships, made a considerable contribution to the Soviet experience in developing the expeditionary type of fishing operations and in designing and constructing appropriate ships for that service.

The next step in sophistication in fishing methods and operations introduced into the Soviet fishing industry was the combination stern trawler-factory ship, Nataliya Kov'shova. Built by France as the lead ship in a series, she was the largest trawler in the world, with a very sophisticated production plant. The cannery is equipped with the PTU-100 Soviet-built industrial television system. She can remain at sea without replenishment for 120 days in independent operations. The diagram below illustrates one day's capacity of a fish processing plant of the ship and the types of product turned out:



Source: Sudostroyeniye No. 9, 1969.

All these measures brought about a considerable increase in the Soviet catch, which reached 6,030,000 tons in 1966. The Soviet high seas fishing fleet, the socalled Expedition Fishing Fleet, in 1966 accounted for more than 90% of the total Soviet fish catch. Forty-five per cent of all the Soviet fishing industry catch was processed afloat.[10] The Soviet emphasis on the larger trawlers and self-sustained fishing fleets paid off. When operating near the Soviet shore, e.g. the Barents Sea, one of the best Soviet trawlers would bring in one and one-half tons of fish per casting, while in the Atlantic a casting brings in fifteen or twenty tons. Therefore, the big trawlers could make a profit even if the trip to and from the fishing grounds takes a month, and costing from 2 to 2.5 million rubles to build were amortized in 2.5 years.[11]

The Twenty-Third Party Congress in April 1966 endorsed the recommendations to increase Soviet efforts in developing the fishing industry, and increased appropriations to that end by eighty-four per cent for the period 1966-1970. This was a powerful boost which accelerated the development of fishing industry even more. The direction taken was toward more sophisticate
and more specialized ships.

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[10] Morskoy Flot No. 7, 1967.

[11] Soviet Life, April 1966, and Morskoy Flot No. 7, 1967.

In August of 1968, the Soviet Union was host to the International Fishing Industry Fair, Inrybprom-68, held in Leningrad, in which twenty-two countries, including the USA, England, all the European countries, and Japan participated. Soviet participation in the fair was very extensive. Twenty-five ministries and directorates, more than fifty scientific research institutes and about 150 enterprises represented. The Soviets exhibited ten fishing ships, including the fish factory Uborevich, whose automated processing lines are capable of producing 300,000 cans per day.[12]

The Soviet search for more efficient and productive ships in the 1960's resulted in the building of the first and only catamaran fishing trawler, Eksperiment. The specially designed fishery system for Eksperiment has permitted combining two kinds of fishing, seining and trawling, and one of the trawl can be used constantly. While the ship is only 130 feet long, it has a beam of seventy feet, which gives an unusually large deck for its size, and permits a large working area for its crew of twenty-five. The extensive tests not only met, but exceeded, the design specifications, and the decision was made to have a special shipyard in one of the Baltic Republics to specialize in the

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[12] Sudostroyeniye No. 11, 1968.

construction of catamaran vessels.[13]

In 1969 the largest fishing ship in the world with a displacement of over 43,000 tons was launched in the Soviet Union. The Vostok factory ship combines in it the characteristics of at least five types of ship: dry cargo ship, with a storage capacity of over 13,000 tons; a fish factory ship, with the capacity to process 300 tons of raw materials, including the production of 150,000 cans and 180 tons of frozen fish, fishmeal and industrial oil; a passenger ship with a capacity of over 600; a tanker, and a refrigerator ship. She is able to spend four months in tropical waters without replenishment. But the most unique feature of the Vostok factory ship is the fourteen Nadezhda-class fishing boats carried aboard. The Nadezhda-class fishing boat displaces around sixty tons, and its hull is made of plastic. They can be deployed from a mother ship to their fishing stations and, while fishing, are supported by a helicopter from aboard the Vostok. The Vostok is capable of independent as well as expeditionary fishing in the most remote areas of the world oceans.

At the end of 1960's, the Soviets also increased the depth of the trawling. During the 1950s and the beginning of the 1960s,

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[13] Nedelya No. 9, March 1969, p. 21.

the trawling was being done to depths of 200-400 meters. In 1969 one-thousand-meter depths were fished, and the tendency since has been to ever greater depths. For this purpose a special large refrigerator trawler, the Meridian-class, was designed. A more powerful propulsion plant drives the ship at a speed of six knots while trawling. The trawl depth is increased to 1,200-1,500 meters.[14] The Meridian-class was followed by a number of super trawlers. The first, 8,000 tons Gorizont-class, has an underway speed of fifteen knots, is equipped with the processing plant producing thirty-five tons of fish per day, including twelve tons of fillet, 2,000 cans, and fish meal. Another super trawler, the Prometei, is designed for service in the tropics, while a third, the Barentsevo More, in northern waters.[15] According to the 1971-1975 plan, Soviet fishermen are to fish to depths of 5,000 meters, and the corresponding fishing vessels and equipment are being planned.[16]

A number of small and medium fishing trawlers for fishing in closed seas, such as the Baltic and the Black Seas, and also specialized shrimp trawlers have been designed and built. The

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[14] Sudostroyeniye No. 12, 1969.

[15] Leningradskaya Pravda, April 30, 1971.

[16] Nedelya No. 28, July 5-11, 1971.

increase in the trawler fleet has been accompanied by a corresponding increase and sophistication in fish processing factories and refrigerated transports. The fish factory, Korablestroitel' Klopotov, has a fish processing plant with a seventy-four percent higher productivity than that on the Zakharov-class. Displacing 15,300 tons, the ship has a crew of only 120, thanks to the high degree of automation. The ship is designed to operate only in northern and temperate latitudes. For work in tropics and equatorial waters, another ship, the Khabarov, displacing 22,600 tons, was built. The ship production plan is designed for specializing in expensive fish and producing high-quality canned fish. To satisfy the growing Soviet need for fish meal, a series of Pos'et-class fish processing factories is being built. Displacing 28,200 tons, the Pos'et is equipped with special submersible fish pumps, and is capable of receiving up to 800 tons of fish per day from the trawlers. Its plant turns out 120 tons of fish meal per day in addition to other varieties of fish products, including fillets and cans.[17]

A series of twelve 12,500 dwt refrigerated transports has been ordered and is under construction in France. The ship has a very powerful refrigeration plant providing a temperature of minus 30°C and a powerful propulsion system which drives the

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[17] Sudostroyeniye No. 12, 1969.

ship at a speed of nineteen knots. Some of the ships of the series, which have already been constructed, are planned to be used on the Soviet Far East-Black Sea line to deliver fish products to the European part of the Soviet Union.[18] A series of refrigerated transports, the Karl Libnekht class, is being built in East Germany for service in the Soviet Northern Basin.[19]

The world-wide extension of fishing by the Soviet Union through the socalled expeditionary method, which employs large fishing flotillas centered around and supported by factory mother ships, considerably reduces the unit cost of sea food by processing the catches afloat. Besides the obvious economic advantages, self-sufficient flotilla operations represent the most logical solution, for the geographic factor dictates it. The Soviet Union has no overseas bases from which fishing operations can be conducted.[20]

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[18] Vodnyy Transport, July 8, 1971, and November 24, 1970.

[19] Vodnyy Transport, February 18, 1971.

[20] During the decade of the 1960's Soviet efforts resulted in an agreement with Spain to use a port in the Canary Islands as an overseas operating base. Cuba can be mentioned as a second such place. A number of countries such as Nigeria and Mauritius, provide the Soviet fishing fleets with the right to make port calls, where some minor repairs can be performed. But, in general, those are rather minor exceptions compared with the magnitude of Soviet fishing expeditions, some of which involve up to several hundred vessels in a given area.

The operations of a large fishing flotilla, for example in the southeastern Atlantic, described recently resembled the operation of a large naval fleet headed by the commander (chief of the expedition) and divided into formations (flotillas) each headed by its own commander.

A captain's conference held via radio resulted in the decision to switch fishing grounds to an unidentified area nearby Walvis Bay. A number of ships were sent ahead for fish reconnaissance. After searching for fish with the help of hydro-acoustical gear and supported by data obtained earlier from research ships, oceanographic details, and fisheries exploration data, the reconnaissance ships reported its findings to the mother ship, which supplies direction and guidance to fleet operations. After schools of fish were found and caught, the trawlers headed to the mother ship or the refrigerated transport, where the catch was unloaded. According to a schedule, some fishing vessels went to Lagos, Nigeria, where their crews were relieved and flown back home. The expedition lasted for the six months.[21]

The operations of each expedition and fishing flotilla are controlled from Moscow, where the main information center

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[21] Sotsialisticheskaya Industriya, December 17, 1970, and January 27, 28 and 29, 1971.

of the fishing industry not only has the location of each fishing vessel, but collects and analyzes the amount and qualities of the catches and, hence, the effectiveness of the operations. The center was described as follows: behind the panels of computer there is a huge operational map of the fishing fleet. The information showed that in the distant waters there were 1,929 Soviet fishing ships, of which 1,420 were fishing, 103 were underway (to or from fishing areas) and 149 were in ports.[22] Their catches for a day, a week, and from the beginning of the fishing cruise, as well as loads including fish, fuel, and other supplies, were known. The center resembles the work of an operations department of a naval staff.

In 1970, 7.2 million tons of fish was caught in the seas and the oceans (not counting the catch in the internal waters) - an increase of close to fifty per cent over 1965. The growth of the Soviet Fishing Fleet and its technological sophistication obviously contributed greatly to such a catch. However, the chievement would not have been possible without the tremendous ffort of the Soviet scientific research and development rganizations supporting the Soviet Fishing Fleet. Now we shall xamine the history and the development of the Soviet efforts n this area.

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[22] Sovetskaya Rossiya, May 19,1971.

Research and Development

It is now generally accepted that the success of fishing industry depends upon two factors: efficiency and knowledge. While the former, efficiency, mainly is a product of technology, which was briefly discussed above, the latter, knowledge, comes from the marine science research. Many experts in the field are agreed that the quality and emphasis of Soviet research in support of fisheries exceeds that of any other country and, especially in recent times, the Soviets have made considerable progress in the application of modern science to ocean fishing.[23]

The first Soviet Scientific Research Institute of the Fishing Industry, Plavmornin (Floating Marine Scientific Institute) was organized in 1921 with the tasks of "broadly ranging research in the Arctic Ocean and adjoining seas".[24] The importance attached to the research in the interest of the fishing industry can be illustrated by the following: the decree which established Plavmornin and was signed by Lenin provided the

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[23] See, for example, Marshall D. Shulman, "The Soviet Turn to the Sea", Uses of the Seas (Englewood Cliffs, N.J.: Prentice-Hall, 1968), and Wilbert McL. Chapman, Fishery Resources in Offshore Waters", The Law of the Sea: Offshore Boundaries and and Zones (Columbus: Ohio State University Press, 1967).

[24] Pybnoe Khozyaistvo No. 3, 1971.

nstitute with equipment, fuel, and food on the same basis s "utmost important state agencies". As a result of more than hirty expeditions in the Barents, White, and Kara Seas aboard he Persei, the first Bathymetric chart was created, the current ystem was studied, and considerable knowledge of the biological roductivity of the waters and the sea bottom was obtained. uring the period 1921-1926 a network of specialized laboratories, ubordinated to the Central Institute of the Fishing Industry n Moscow and serving the fishing regions around Murmansk, the ar East, the Caspian, and the Black Sea was created.

Of considerable importance for the development of fishing n the Barents Sea was the organization of GOIN (State ceanographic Institute) at the end of 1929. In 1932 the pecially organized Murmansk Herring Expedition established he possibility of drift fishing for herring in the Barents Sea. t the end of 1933 this expedition was merged with the Murmansk etachment of GOIN, and the PINRO (Polar Scientific Research nstitute of Marine Fisheries and Oceanography) was created.

In 1926 the Pacific Scientific-Fishing Station was rganized "to study the fish reserves of the Far Eastern seas or the purpose of commercial fishing". In the late 1920's, he Pacific Station concluded studied of the biology and istribution of Kamchatka crabs. Based upon the findings of the

station a rather sizable industry for catching, processing, and canning of crabs was established in the area. In the 1930's, canned crab was one of the important items of Soviet export. In 1930 the station was reorganized into the Pacific Scientific Research Institute of Fisheries and Oceanography (TINRO).

In the late 1920's and early 1930's, considerable attention was devoted to the study and improvement of fish processing methods, including salting processes, and quality of salt. The work of the fishing industry research institutes made an important contribution to the development of the Soviet salt industry, thereby precluding the need for importation of salt from abroad. (Salt used to be an important item in Russian and later Soviet import). The institutes also developed new technological processes for the processing of caviar-the first item of the fishing industry sold on export.

The fishing expeditions of 1936-1939 proved the profitability of herring fishing in the open sea and discovered rich herring grounds in the Northern and Pacific waters. The methodology of long-term forcasts for bottom fish and herring was worked out. As a result of work of the scientific institutes prior to World War II, the Soviet Union had developed a good picture of the nature and volume of the fishing resources in the seas adjoining her waters.

In the post-World War II period the research work of the scientific institutes was concentrated on the development of sea and oceanic fishing as well as whaling in the Antarctic region. Their contribution to the development of expeditionary fishing in the remote areas of the world ocean is immeasurable. They have been constantly involved in fish reconnaissance and the discovery of new fishing grounds, the study of the distribution of plankton, development of new nets, trawls, and the improvement of their effectiveness, and the development of ew methods of fishing, including the use of electrical current, ight, and low-frequency sounds.

Today there are eighteen research institutes of the Soviet ishing industry. Their work is conducted in close cooperation th the Soviet Academy of Sciences and a number of oceanographic d hydrometeorlogical institutes subordinated to the other nistries. In addition to the above mentioned PINRO and TINRO e most important institutes are:

VNIRO - (the head institute of fishering industry entific research bodies) - All-Union Scientific Research titute of Fisheries and Oceanography

AtlantNIRO - Atlantic Scientific Research Institute of ne Fisheries and Oceanography

AzcherNIRO - Azov-Black Sea Scientific Research Institute arine Fisheries and Oceanography

KaspNIIRKh - Caspian Scientific Research Institute of eries

NIKIMRP - Scientific Research and Design Institute of the Fish Industry

Giprorybprom - State Institute for the Design and Planning of Enterprises and Machinery of the Fishing Industry

Giprorybflot - State Design Institute of the Fishing Fleet

As can be seen each major Soviet basin has at least one institute assigned to it.

The PINRO Institute presently conducts up to sixty expeditions annually, during which around 8,000 socalled oceanographic stations are performed and large amounts of biological data collected. (Mass surveys of fish are nearing 1,150,000 samples per year). The institutes owns sixteen research ships. Since 1958 the institute has been conducting work on acclimatization of Pacific salmon in the White and Barents Seas.[25]

The TINRO owns a fleet of thirty-six research ships and is conducting research on all known or potential fishing grounds in the Pacific Ocean.

The Soviet Fishing Research Institutes work out new methods of fishing processing especially suitable for employment aboard factory ships. Such methods include smoking in a high-voltage field in connection with head processing using infra-red rays. The gamma radiation process for canning is under development, and an experimental installation called Stavrida

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[25] *Fishing Industry* No. 3, 1971.

was successfully tested in 1970 aboard the scientific ship Akademik Knipovich, built in 1964 specifically for research in the remote areas of the ocean, where the potentialities of future fishing grounds are determined. Research work has begun on determining the best means of utilizing Antarctic Krill for human nutrition. (This represents the first attempt to use plankton as a human food). The ship's processing plant produced a special cheese containing krill protein.

In addition to the surface research ships, the industry since 1958 has been using a converted W-Class submarine, Severyanka, for the research. This submarine gathered considerable data on fish habits as well as the efficiency of trawling methods. In May 1971, the decision to build two more submarines for fishing research was announced. One will be of long range and endurance and the second, a midget type for short dives.[26] Also the Soviets are using anumber of submersibles, such as Sever-1, with working depths up to six hundred meters; Sever-2, a self-propelled type equipped with a manipulator and working depths of more than 1,000 meters; and the Gvidon self-propelled "underwater laboratory with submergence depths of several

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[26] Nedelya No. 21, May 17-23, 1971.

hundred meters". Another device aiding in the study of the behavior of the trawls as well as of fish is the Bathyplane Atlant, which, with a man aboard, is towed behind the fishing vessel and is capable of photographing and reporting on the fishing process itself.[27]

The Atlantic Scientific Research Institute has special department of marine electronics. The department designed and developed a number of underwater TV equipments which automatically observe the behavior of the trawl and transmit the picture to the trawler. Two such equipments, IGEK and PRITSEL, are said to improve trawl productivity by more than thirty per cent, and the latter is capable of seeing schools of fish hundreds of meters away from the trawl.[28] A number of sophisticated sonars for finding schools of fish have been developed. Apparently the quality of these sonars is rather high, because one of them, the Kalmar, is capable of detecting a single fish at depths up to 800 meters.[29]

In order to attract fish and to concentrate a fish school just prior to the trawl, a special rocket which spreads an aromatic bait has been used. Originally, the rockets were

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[27] Sovetskaya Rossiya, July 12, 1968.

[28] Vodnyy Transport, April 29, 1969.

[29] Sudostroyeniye No. 12, December 1968, pp. 27-30.

propelled by solid fuel and most of them were expendable. Later, a special steam propelled rocket was developed which floats and can be used up to 1,000 times. A special remote-control device is used to actuate the sprayer.[30]

It was reported that by imitating sounds of predators Soviet fishing vessels can force fish to the bottom, where a bottom trawl catches them. In that way, the effectiveness of the fishing gear is increased by 300-500%. An experiment in the Caspian Sea tested the effectiveness of lights and electric current to herd fish and later to pump them into a fishing vessel, at the cost of about one-third that of a net operation.[31]

The previously generally accepted belief that the oceans are a limitless source of fish resources is now disputed. One of the reasons for this is that the world fishing efforts are expanding at such a rapid rate that the ocean will not be able to sustain it. The depletion of fishery resources became the fact of life. For example, in 1966 over four million tons of erring was taken in Northern Atlantic, while in 1969 the catch mount to a little over two million tons. In the Northeastern art of the Atlantic, where fishing is performed primarily by

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[30] Sotsialisticheskaya Industriya, January 23, 1970.

[31] U. S.Naval Institute Proceedings, July 1968.

the Soviet Union, Iceland, Denmark, and Norway, the annual herring catches decreased catastrophically:

> Iceland, more than 13 times (from 770,000 to 57,000 tons);
> Norway, close to seven times;
> USSR, more than six times (from 500,000 to 75,000 tons).

Each side blames the other.[32]

The Soviet Union ordered a complete halt to herring fishing in the Norwegian Sea and considerably reduced it in the other areas of Northeastern Atlantic. A similar situation exists in the Soviet Far East, where at the end of the fifties there were four huge schools of herring, and now there is only one in the Okhotsk Sea.

Soviet scientists warned the fishing industry on the possibility of the depletion of Pacific herring. The necessity for conservation practices was well recognized by Soviet scientists a long time ago. In 1938 (!) Academician Knipovich wrote: "There used to be a time when even big names in the cientific world were inclined to consider the wealth of the cean unlimited. The time for such naive illusions, which are nevitably the results of a superficial knowledge of nature, s passed irreversibly".[33] But, even at the present time the

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[32] Izvestiya, December 13, 1970.

[33] Literaturnaya Gazeta No. 42, October 15, 1969.

opinion of scientists concerning the maximum level of fishing which the oceans would be able to sustain differ widely. Some conclude that the world fishery production could be increased up to two hundred million tons without any radical development such as fish farming, and the ocean would be able to sustain it.[34] Other scientists, including many Soviets, put the maximum sustainable level somewhere between one hundred million and 150 million tons. But the growth in world population, the steadily increasing number and size of ships involved in fishing together with the sophistication of fishing equipment, and, finally, the growth, though at a slower rate, of fish catches, have convinced the majority of the scientists that, if the present practice continues, the ocean might become a biological desert. Moreover, it was clearly stated in the Soviet press that the traditional methods of catching fish in the world oceans will not meet human needs in the future. It was also emphasized that in spite of existing possibility of increasing catches in inland waters considerably, its capability, will be limited. Strong arguments have been made in the Soviet Union for drastic changes in fishing, to switch from the methods of simple hunting of fish to rational and scientifically based methods of fish

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[34] Milner B. Schaefer, "Economic and Social Needs for Marine Resources," Ocean Engineering: Goals, Environment, Technology, New York: Wiley, 1968, p. 6.

harvesting.[35] In order to achieve such a rational use of the ocean wealth the following has been proposed:

- to study and master those areas of the ocean and catch those forms of the aquatic life which has not been used intensively;

- to increase fishing in the middle layers as well as pelagic fishing were considerable resources of anchovies, mackarel, tuna, marlins, sharks, and other types of fish exist;

- to improve methods for determining fishing resources in order to establish maximum sustainable level of catches;

- more rational fishing in relation to the size and the age of the fish caught;

- considerably increase catches of small previously not used fish and such form of sea life as krill, for production of protein or fish protein concentrates (FPC);

- to increase the practice of transportation of certain fish from one area of the ocean to another (primarily off-shore areas) and to assist fish in acclimation;

- to intensify the use of the Continental Shelf and to create there a sort of aquaculture which would poteniially become a major marine food production areas.

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[35] Vodnyy Transport, July 1, 1971.

Presently, to exercise conservation practice, research hips are being sent to the prospective fishing grounds, ahead f the arrival of the fishing fleets, where they determine not nly the quantity and type of fish available, but also measure ish size and determine fish age. This procedure is claimed o minimize the possibility of catching young fish and decreases he chances of over-catch.[36] As was stated above, the production rocess for fish protein paste from krill has been developed nd the needed equipment tested. It has been claimed that he catches ofkrill measured in protein units may produce twice s much protein as presently obtained from all world fishing.[37]

Some steps are being initiated in the direction of eveloping aquaculture. From the experimental grounds of zcher-NIRO, some forms of sea life and sea weeds are being arvested at half the cost of the conventional methods at sea. oviet scientists have long been working to improve the breed f the fish, and recently a major success was reported. A rolonged experiment had resulted in the hybrid of a beluga and sturgeon. It was claimed that nature's barrier had been vercome, and a new fish called bester, whose "parents" are the eluga and the sturgeon is very viable and fast growing. In

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[36] Sotsialisticheskaya Industriya, July 13, 1971.

[37] Vodnyy Transport, July 1, 1971.

1966 the second generation of this fish was developed from the roe laid by the bester. It is now claimed that the bester came out of the experimental state long ago and is ready for natural breeding and reproduction, prospects for which were considered very favorable.

Fishing by Kolkhozes and in Inland Waters

In addition to the fishing enterprises subordinated to the Ministry of the Fishing Industry, there are hundreds of fishing kolkhozes (collectives, organizationally similar to the agricultural collective farms), involved in fishing in inland waters as well as at high sea. Under the Model Statue of the Fishing Kolkhoz, approved by the Council of People's Commissars on 16 February 1939, all motor and sailing boats used for fishing and transport, machinery, fishing gear and net-making equipment were collectivized in the Fishing Kolkhoz.

An important role in the operation of Kolkhozes used to be played by the socalled motor-fishing stations (MRS). By the end of the 1950's however, the methods of allotment of technical production equipment to Kolkhozes by the MRS were found inadequate, and the system was changed. All equipment formerly belonging to the MRS's was sold to the Kolkhozes, and the MRS's became technical stations for the repair. Since that

time, the ships, fishing gear, etc. have been sold to the kolkhozes on a cash or credit basis.

In 1969 the total kolkhoz fishing fleet had about 10,000 fishing vessels and accounted for about one-quarter of the total Soviet fish catch. Only in Kamchatka and Sakhalin are there more than five hundred fishing kolkhozes, and more than 180 of them are involved in sea and ocean fishing. Their fleet has a relatively small number of large freezer trawlers (BMRT), a few hundred medium refrigerator trawlers (SRT) and a few hundred ocean-going seiners. Working for the kolkhozes there are over 2,000 captains and navigators with regular certificates. The reason that the kolkhozes fish in distant waters (concurrently and quite often together with the expeditions of the Ministry of the Fishing Industry) is not for their love for navigation or even the better quality of fish there, but the absence of fish in nearby off-shore waters. The Far Eastern regions of the Soviet Union are a classical example, but their case is especially typical for another reason. Several years ago, not to mention the pre-World War II period and the first decade following, fish was found in abundance in those waters, but ever greater plans for catches, the real demand for fish in the country, good pay (frequently many times over that in the agricultural collective farms) promoted not only a rapid development of the fishing fleet

in the kolkhozes, but unreasonably large catches which often considerably exceed the processing capacity of the fishing industry. In all fairness, it should be stated that the Soviet fishermen are not alone responsible for the overexploited waters of the Okhotsk Sea, around Kamchatka and the Kurile Islands; Japanese fishermen made their own considerable contribution. Soviet scientists made, what appeared to be, a correct prognosis, set a quota of fishing and warned against excessive catches, but they were ignored.[38] As a result, all that could be done was for the kolkhoz fishing fleet to follow Ministry of the Fishing Industry and to fish all over the world.

However, to that end a qualitatively different, much more sophisticated and expensive fleet of ships was needed, which was developed but to such a degree that it does not now differs much from the fishing fleet of Ministry of the Fishing Industry. The kolkhoz fleet uses the same type of refrigerator-transports and similar methods of fishing used by the Ministry's flotillas. The economics of the state-owned fishing enterprises and the kolkhozes, however, differ sharply, as does the pay received by the fishermen, as illustrated by the following, hypothetical example: Let us assume that Ivanov is a fisherman of the State-Owned Fishing Flotilla, and Petrov is a fisherman of a

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[38] Literaturyaya Gazeta No. 39, 40, and 42, of October 1969.

Kolkhoz. From the very beginning of a fishing cruise they are in unequal positions. While underway to the fishing ground Ivanov receives socalled "navigational pay" of approximately 160 rubles per month; Petrov is paid nothing. If the fishing is extremely poor and Ivanov catches little or nothing, he will still be paid his guaranteed salary (seventy-five per cent of navigational pay), plus an "area differential".

Length of service in the state fishing industry is well rewarded. For example, in the northern areas, fishermen receive a ten per cent increase in their basic pay every six months. Petrov receives none of those benefits and is paid only for the fish caught and delivered ashore or aboard a refrigerator-transport. It is true that kolkhozes pay their fishermen more per unit of fish caught than the fishing industry pays its fishermen, but, on the other hand, the State pays the kolkhozes considerably less per unit than it pays to the State owned fishing enterprises.

How do kolkhozes manage to exist under those conditions? The "secret" is quite simple - by the considerably higher productivity of their fishermen, by better and cheaper maintenance and repairs, primarily performed by their members, and a very normal desire of the Kolkhoz fishermen to make money. Kolkhoz fishermen are making 400-600 rubles per month, considerably more

than the average wages of a Soviet worker of 140-160 rubles per month. A smaller administrative superstructure and simplicity of accounting methods and control make Kolkhoz overhead costs considerably lower than those of the State owned enterprises.[39]

It is a common practice that fishing kolkhozes in the Soviet Union are assigned to a State owned fishing combine (fish processing factory), whose existence is to a large degree due to the kolkhozes. The system was designed in order to get kolkhoz monies into the State budget, and works as follows: The combine acts as a broker between the kolkhozes assigned to it and buyers of fish the kolkhozes caught. Regardless of to whom the kolkhoz catches are to be delivered, whether a domestic or a foreign customer, this catch is counted as partial fulfillment of the combine's plan, and the combine is paid for it by the buyer. From the money received, the combine in turn pays the kolkhozes, but a considerably smaller sum than received from the buyer. By just such a practice, in 1969 in Kamchatka alone the combines "received" from the kolkhozes twelve million rubles. But being on a self-accountability basis and because of their lower productivity, in addition to the twelve million rubles they received a nineteen million ruble subsidy from the state.

Proponents of the new economic reform launched in the

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[39] Literaturnaya Gazeta No. 43, October 22, 1969.

Soviet Union in 1965 raised the natural question: If kolkhozes are managing to pay for their own operation and make a considerable profit, and in effect are subsidizing the combines, maybe it is more logical for them to own these combines.[40] Naturally, this question remained unanswered, because if the proposed "transaction" were to go through, the next logical step would be to buy regional, state-owned fishing enterprises and ultimately to buy out the Ministry of the Fishing Industry. Another idea proposed in the Soviet Press was to assign only off-shore fishing to kolkhozes, reserving pelagic fishing for the State-owned fishing industry. But, as stated earlier, there are not many fish left in the off-shore waters around the Soviet Union.

The notoriously inadequate Soviet price system is hurting the kolkhozes badly. The July 1967 price reform elevated the prices for metal and metal products. A seiner which used to cost 400,000 rubles prior to the reform cost 750,000 rubles after reform and a BMRT which used to cost 2.5 million rubles, now costs 3.6 million. Even though the prices for a ton of fish remained the same, the kolkhozes managed to operate at a considerable profit by exercising initiative and ingenuity. For example, after ship repair prices were raised, the kolkhozes began to repair their ships themselves, and established a number

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[40] Literaturnaya Gazeta No. 43, October 22, 1969.

of their own small repair yards, saving up to 100,000 rubles on the repair of a BMRT compared with the cost of the repairs at a state-owned ship repair yard. But because the socalled "state interests" always prevail, the initiative of the kolkhozes in these directions is constantly being restrained. In spite all of these, the kolkhozes catches are large, and the operational cost lower.

The efforts of the State Fishing Industry and the fishing kolkhozes resulted in a steady increase of Soviet catches during the five year period 1965-1970, with the total catch for the five years exceeding 34 million tons, or fifty-five per cent more than the preceding five years period. The annual Soviet per capita consumption of sea food increased by 36.5%, to 17.2 kilograms (thirty-eight pounds) in 1970.[41]

But sea fishing, though known and practiced in Russia for centuries, has only recently become the predominant, for traditionally, a considerable amount of fish was caught in the inland waters (rivers, lakes, and other fresh water bodies) as well as closed seas. In contrast to the steadily growing catches in the seas and oceans, the catches in inland waters are steadily declining. For example, the catches in Sea of Azov were: 1936, 158,000 tons; 1946, 52,000 tons; 1956, 25,000 tons;

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[41] Fishing Industry No. 4, 1971, pp. 3-6.

and 1965, 14,000 tons. The picture is not better in lakes and rivers: prior to the Revolution, in 1913, 614,000 tons of fish were caught in them: in 1962 the figure was 426,000 tons, and in 1968, 270,000 tons. (These figures reflect the catches of only expensive fish, such as sturgeon, beluga, sterlet, etc.)[42] The declining catches have been the direct result of depletion in fish stock, which have assumed alarming proportions. Compared with 1937 the catches of certain fish decreased as follows: sturgeon, two times; sundre, seven times; salmon, five times; caspian herring, thirty times. Continuous pressure from ever increasing plans forced inland fishermen to catch more and more small fish. In 1937, 254,000 tons of small fish were caught, while in 1967 this figure reached 560,000 tons. But it is well known fact that large fish eat small ones, and because of the catastrophic decrease in the latter, the potential damage to overall inland fish resources increased considerably. The problem was aggravated by the pollution inevitably accompanying industrial development, which, in addition, required more and more electric power. Consequently, the large number of hydroelectric stations and dams built on the Soviet rivers violated the regular fish migration routes. It must be said that a number of provisions to eliminate the problem were planned and implemented. Bypasses

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[42] Literaturnaya Gazeta No. 30 and No. 50, 1968, and No. 10, 1969.

and elevators were built at the dams, but fish quite often refused to take a free ride on elevators or follow prescribed channels and stubbornly tried to return to their spawning grounds through familiar ways which were blocked by concrete.

Complaints are being voiced that the best scientists and experts have been employed by the fishing industry involved in the sea and ocean fishings and not enough funds have been allocated for research in the interest of inland fishing. Another problem, and this is of a typically Soviet nature, is the administrative or organizational problem. It is impossible to determine who is responsible for the inland waters, their purity, and the preservation of fish. This was admitted by no less an authority than the Minister of the Fishing Industry of the RSFSR.[43] The Soviet Ministry of the Fishing Industry is nominally in overall charge of all matters concerning fishing. Keeping waters free of pollution lies with the corresponding ministries of the various industries, to whom the fulfillment of the plan is the primary goal and anti-pollution measures, in spite of the existing regulations, a remote, secondary goal at best. The Ministry of the Fishing Industry, overwhelmed by the problems associated with sea and oceanic fishing obviously does not and, in all objectivity, probably cannot pay enough attention

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[43] Pravda, May 31, 1969.

to inland waters. For these reasons, the republic ministries and administrations are arguing that they alone should be entrusted with matters associated with inland fishing, and not only responsible for the catches and fulfillment of plan. In reality, the arguments, of course, are centered around of control of funds research facilities. At the end of 1960's, only four per cent of total capital investment in the Soviet fishing industry was allocated for the development of inland fishing.[44]

Certain measures aimed at correcting the existing situation have been undertaken. At present, the Main Directorate for Fishing and Fish Farming in inland basins coordinates the efforts of republic fishing ministries and directorates in their fish preservation efforts. Ten scientific research institutes of the Ministry of the Fishing Industry of the USSR and a group of scientists from the Soviet Academy of Sciences are searching for a solution and are experimenting in order to stabilize inland water fish resources and to promote their growth. One hundred and twenty fish factories and farms have been established. One such enterprise occupies an area of 13,000 hectares and is capable of producing 18,000 tons of fish for consumption and to growing more than eleven million fish to one year of age.

The fresh water fish in the Soviet Union have traditionally

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[44] Pravda, May 31, 1969.

been considered a better fish, and certain types definitely are. The possibilities for well organized fish farming in the Soviet Union are very bright indeed. Its largest republic, the Russian, has 400,000 kilometers of rivers, about twenty million hectares of lakes, and more than four million hectares of artificial water reservoirs. At present, it also has close to 40,000 hectares of fish ponds.

In 1971, the Ministry of the Fishing Industry of the USSR inaugurated a new scientific industrial enterprise which is charged with the task of increasing fish resources in Sea of Azov and the Don River.[45] In 1970, sixty-eight million juvenile sturgeons, 760 million salmon, and about six billion other fish were produced by the above mentioned 120 fish factories and farms and released into Soviet inland water basins. A low catch limit for the inland waters has been established.[46]

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[45] Izvestiya, May 24, 1971.

[46] Fishing Industry No. 4, 1971, pp. 3-6.

Organization

The Ministry of Fishing Industry of the USSR is a Union Republic ministry. In contrast to All-Union ministries, which have administrative power over the entire territory of the Soviet Union, the Union Republic ministries coordinate similar industries in the Republics but directly control only a specified number of enterprises, the list of which has been approved by the Presidium of the Supreme Soviet of the USSR.

The Ministry is headed by the Minister assisted by the central apparatus.

On representations made by the Minister, the Council of Ministers of the USSR approves the collegium of the Ministry for "collective examination of the most important matters relating to fisheries". The collegium is chaired by the Minister, and its members are the Deputy Ministers and senior officials of the Ministry appointed by the Council of Ministers. Decisions of the collegium are implemented by the Minister's orders.

The structures of the Ministry (USSR) comprises five Main Basin Administrations, four Main Branch Administrations, fourteen Administrations, six Departments and two Main Inspection Departments.

The Main Administration of Fleet Maintenance is "to assure planned, preventive repairs of vessels and the manufacture of

spare parts."

The Main Administration for Fish Breeding and Conservation (Glavrybvod) is concerned with the preservation of fish stocks, the designing and implementation of measures for their reproduction and the regulation of fishing.

The Main State Inspection of the Fishing Fleet (Glavgosrybflotinspektsiya) ensures the observance of the Soviet Merchant Shipping Code in the fleets of the fishing industry and the fishing kolkhozes fleet, as well as of rules, regulations and instructions concerning the safety of navigation and fishing. It also administers the salvage service. Glavgosrybflotinspektsiya carries out the tasks assigned to it through Basin State Inspection Departments.

Main Basin Administrations of the Fishing Industry were established in 1962 for local direction of the fishing industry. These Main Basin Administrations (Zapryba - Western Administration of the Fishing Industry - in Murmansk; Dal'ryba - Far Eastern Administration of the Fishing Industry - in Vladivostok; Kaspryba - Caspian Sea Administration of the Fishing Industry; and Azcherryba - Azov-Black Sea Administration of the Fishing Industry - in Sevastopol) are a part of the central apparatus of the Ministry.

Production administrations of the fishing industry of

Union Republics or territories are directly subordinate to the Main Basin Administration. For instance, Zapryba is in direct charge of the Estonian, Lithuanian, Latvian and Kaliningrad production-administrations, which in their turn directly control shore fish-processing enterprises, fishing seaports, plants for repair of ships, etc., within their respective regions, as well as trawling, refrigeration, transport and auxiliary fleets.

The Administration of Industrial Fishing pursues a uniform technological policy. The Administration is responsible for: 1) adequate distribution and maximum utilization of the ishing fleet; (2) opening up and developing new sea regions or fishing operations; (3) introduction of modern fishing ethods; (4) perfecting sea-exploitation projects and fishing ear.

The Shipbuilding Administration lays down the technological olicy for the construction of fishing vessels, for the utilization nd development of the production capacity of shipbuilding yards nd controls the implementation of the shipbuilding plan.

The principal functions of the Administration of Fleet nd Ports Utilization are: (1) development and improvement of leet and fishing ports activities; (2) introduction into the leet and fishing ports of the latest achievements of sciences

and technology; (3) distribution and full utilization of the refrigeration and transport fleet.

The Administration of Fishing Kolkhozes is responsible for the full exploitation of fish stocks by kolkhozes. It carries out the following functions: (1) examines the work of the kolkhoz fishery fleet; (2) participates in developing of new types of vessels and fishing gear.

The Administration of the Sea Transport Fleet, Mortransflot, is responsible for taking delivery of vessels built for the Ministry of Fishing Industry at Soviet and foreign shipyards, and to carry out production tests on the vessels so delivered during the guarantee period. It gives technical assistance for training crews of foreign firms which have purchased the Soviet-built fishing vessels.

There are also: The Main Administration of Material and Technical Supply; the Administrations of Economic Planning, Finance, Fish Produce and Modern Technology, Personnel and Training Institutions, Capital Building and Projects, Scientific Research Institutes, Wages and Labor, Reserve Cadres, External Relations; the Department of Signals and Search Techniques, the Transport Department.

The Ministry of Fishing Industry is widely represented abroad. In addition to various representatives in the UN

organizations, those involved in the foreign trade and shipbuilding, observing fulfillment of various agreements concerning fishery, there are three important categories of representatives whose existence and duty are illustrative, for they show the scope of the Soviet fishing industry activity.

In accordance with bilateral agreements between the government of the USSR and the governments of certain foreign states, the Ministry has representatives residents abroad, whose duties are defined by the contractual obligations of the Soviet Union in each particular case.

The Ministry's representative at Dakar, the Republic of Senegal: (1) supervises the performance of Soviet obligations under the provisions of the Soviet-Senegalese Agreement on Cooperation in the Field of Marine Fishing, of 22 March 1965, and of obligations under certain other agreements to the extent that the Ministry of Fisheries of the USSR is involved in them; (2) attends to making arrangements for the calls of Soviet fishing vessels in Senegalese ports; (3) coordinates with Senegalese representatives all matters connected with the servicing of USSR fishing vessels in their ports; (4) takes care of the interests of Soviet fishing vessels in Senegalese ports; (5) assists Soviet fishing and cargo ships in the implementation of fishing and fishery-production plans; (6) helps

Soviet foreign trade organizations to solve operational problems connected with delivery of fish produce to Senegal; (7) acquaints the captains of Soviet vessels with the local port, customs, sanitary and other rules and formalities, and with the arrangements for servicing and supplying their vessels; (8) renders the Soviet captains assistance in the organization of "politico educational and cultural" work among the crews of their vessels; (9) is authorized to represent the Ministry in its contacts with the Senegalese; (10) is responsible for the strict observance, by the crews of Soviet fishing industry vessels, of Senegalese regulations, statues, instructions, and legislative acts.

The representative in Cuba: (1) ensures the performance of Soviet obligations under the Soviet-Cuban agreements on cooperation in developing marine fishing and in constructing a fishing harbor; (2) directs the servicing of Soviet vessels; (3) deals with questions connected with the processing and deliveries of fish and fish produce to Cuba; (4) supervises the servicing, repairs and supply of Soviet fishery vessels based in the fishing harbors; (5) assists in and controls the activities of the operational group of the Kaliningrad Expedition Base of the Oceanic Fishing and Refrigerator Fleet; (6) coordinates and directs the activities of all Soviet fishery

specialists in Cuba; (7) looks after the interests of the Soviet fishing fleet in Cuban ports.

The operational group of the Ministry in the United Arab Republic: directs the activities of Soviet fishing, transport and scientific vessels engaged in fishing and fishery research in the waters of the Red Sea and in the northwest part of the Indian Ocean. The second "operational group" is stationed in Suez, and is charged with the training, on board of Soviet vessels, the UAR citizens.[47]

Problems, Trends of Development, Plans

In just the last five year period (1965-1970) the Soviet fishing industry received 3.5 billion rubles of capital investment, of which seventy per cent was spent for ships.[48] The interest of the State in the development of the fishing industry and the importance attached to it can be seen in the hundreds of rewards to fishermen usually presented during a specially proclaimed holiday, Fisherman's Day, celebrated in July. The Soviet fishing industry annually receives thousands of young specialists educated in the numerous institutions

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[47] A. A. Volkov, Morskoe Pravo (Maritime Law), Pishchprom, Moscow, 1969, pp. 29-31, 58-73, 84-88.

[48] Vodnyy Transport, July 10, 1971.

subordinated to the industry. There are five institutions of highest learning, fourteen marine schools and other educational institutions, with a total of 60,000 students and cadets. Two maritime academies are training future captains and navigators.

And yet, in spite of the above figures, which apparently represent the power of the Soviet fishing industry, there are a number of serious problems. The nature of these problems can be divided roughly into two major categories: the first is associated with the Soviet centralized system of planning and control, and the second, with the fast development in the industry (what the Soviets called "problems of fast growth"). The existing problems resulted in the violation of certain proportions in the development of various branches of the fishing industry and the declining effectiveness of capital investment in recent years. For example, in 1965 the State's income from the fishing industry exceeded expenditures by 168 million rubles, while in 1968 expenditures exceeded income by twenty-one million rubles. The main reason for the declining profit, and, in fact, operating at a loss, was found to be in the ineffective use of the existing fishing fleet and the declining catches per ship. For example, in 1965 the average catch for a BMRT was 7.3 thousand tons, while in 1970 it was 6.7 thousand tons. The time spent on the fishing grounds by

ships dropped from 71.3% in 1962 to 64.3% in 1968.

Complaints have been made concerning the availability of refrigerator-transports, especially in the Far Eastern enterprises. Although these ships are badly needed on the fishing grounds, they spend fifty-five to fifty-eight per cent of the time in ports waiting to be unloaded or under repair, and only seven to eight per cent of time receiving fish at sea. Effective utilization of refrigerator-transports is handicapped by the low capacities of the Soviet ports as well as of the railroad system.[49]

Available ship repair facilities obviously do not meet the needs of the fishing fleet. The Ministry was accused of spending too great proportion of allocated funds for shipbuilding, neglecting a corresponding increase in ship repair facilities. Previous major repair of a trawler required 146 days, presently 227 days are needed. In 1969, 90,000 ship-days were lost because of low quality of repair.[50] Even the decision of Ministry to build mother-ship, Vostok, the ship which evoked such epithets as "fantastic" in the world press, was severly critized in the Soviet press and on seemingly good economic grounds. According

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[49] Izvestiya, March 20, 1970.

[50] Pravda, April 8, 1970.

to estimates, Vostok was supposed to cost 37.5 million rubles, but, as early as the spring of 1970, it was clear that the ship could cost no less than 50 million rubles, for which fifteen to sixteen BMRT's could be built with the capacity to catch 2.5 to 3 times more fish than the mother ship Vostok.[51]

The Soviet price system as well as the wage system have also adversely influenced the productivity of the Soviet fishing fleet, and urgent calls for modification have been made. The centralized command of the Soviet fishing industry frequently interferes with the decisions of captains by switching ships and sometimes whole flotillas artibrarily from one fishing ground to another. The time lost because of this practice is probably considerable. Another factor is still poorly organized fish reconnaissance. It is argued that a good reconnaissance preceding the arrival of the fishing flotillas would eliminate the unnecessary concentration of large numbers of ships whose fishing capacities far exceed the available resources at a given fishing ground, and minimize losses of time spent underway from one fishing ground to another. Also, some of the fishing gear has been found to be of low effectiveness, and the electronic equipment employed to control them are in short supply. The

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[51] Izvestiya, March 20, 1970.

necessity for to swtich from the over-fished Continental Shelf zone into the deeper areas of the world ocean is being well recognized. The development of the Soviet fishing industry has clearly demonstrated adherence to such a trend. The trend would in turn continue to generate a demand for the construction of primarily medium and large fishing vessels. As far as number of large fishing ships, the Soviet Union is already in first place in the world with 2,900 totalling 3,605,000 GRT.[52] Also, the further remoteness of the fishing areas from home bases would certainly require an even more accelerated development of ships for the auxiliary fleet such as refrigerator-transports, fish processing ships, tankers. The total tonnage of the world fishing fleets during the last ten years grew 2.8 times, but catches only 1.8 times. The Soviet Union expects this trend to continue and, according to their forecasts for 1980, despite the predicted growth of fishing fleet by 2.5 times, catches will grow only 1.5 times, and, hence, fish will cost more.

It is expected that new methods of fish processing and canning will be introduced soon, including pasteurization by irradiation, freezing by liquid nitrogen, and so on. Containerization of fish cargo and solution of the problem of handling containers at sea, if necessary with the help of

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[52] Sudostroyeniye No. 9, 1970, pp. 14-19.

artificial suppression of waves, is expected. To elevate the catch level two measures are proposed: (a) man's active assistance to "King Ocean" through more rational fishing and development of aquaculture, and (b) increased harvesting of other forms of sea life, including krill, the shrimp-like creatures which are frequently mentioned as the most promising.[53]

The future development of the fishing industry during 1971-1975 is planned along these lines:

- more complete and rational mastery of the world ocean wealth and intensified fishing in inland basins;
- the 1975 fish catch is planned to reach 10.3 million tons, representing a growth of forty-seven per cent over 1970;
- Soviet per capita consumption of fishery produce is planned to reach twenty-three kilogram per year;
- the main attention and primary fund allocation will be to further development of ocean fishing, but considerable development of inland fishing is planned as well;
- special attention will be paid to the development of fishing farms on ponds and lakes, with production of 2.5 to 3

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[53] Sotsialisticheskay Industriya, May 29, 1971. The Soviets estimated that approximately 150 million tons of krill were formerly consumed annually by Antarctic whales. With the near disappearance of the whale, krill have multiplied considerably, and 150 million tons is mentioned as a possible catch level.

tons of per fish hectare of water;

- it is planned to build and reconstruct forty-three fish growing enterprises and their annual production in 1975 should reach the level of 150 million sturgeon, up to 850 million salmon, and up to nine billion other young fish;

- more than 900 new ships for the fishing industry will be built in Soviet shipyards and ordered from East Germany, Poland, Denmark, West Germany, France, and other countries;

- to change the designs of all basic types of fishing ships operating in the high seas.[54]

The main design organization of the Soviet fishing industry, Central Design Bureau, Morpromsud, in Leningrad, is already working on the design of ships for the next Five Year Plan, 1975-1980, including a specialized fish meal floating factory, a catamaran, a trawler with a displacement of 1,000 tons, a trawler-factory (canning) ship with a displacement of 10,000 tons, a trawler-mother ship with two fishing vessels aboard, a trawler for Arctic waters capable of working in not very dense ice field, a special high-speed ship for fish reconnaissance with modern equipment and two helicopters.[55]

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[54] Rybnoe Khozyaistvo (Fishing Industry) Nos. 5 and 6, 1971; Vodnyy Transport, issues of March 18 and 20, 1971 and July 10, 1971; Pravda Izvestiya, July 11, 1971; and Nedelya No. 28, July 5-11, 1971.

[55] Leningradskaya Pravda, May 9, 1971.

The socalled super trawlers with a cargo capacity of up to 2,000 tons and speed up to fifteen knots are being developed. Such ships will be capable of independent operations up to 10,000 miles from their bases. They will be an improved type of existing super trawlers, Grumant and Rembrandt, and an improved version of the Atlantik-class trawler, Atlantik-3. Fish canning will be done exclusively afloat, aboard special fish processing factory ships and canning trawlers. The fleet of refrigerator-transport will be enlarged and mother-factory ships with equipment capable of processing 300-400 tons of fish per day will be built. The number of ships of the Kamchatskie Gory class with over 12,000-ton cargo capacity and capability of delivering to the fishing rounds about 2,500 tons of fuel and produce and the production of about 100 tons of fresh water per day will be increased.

It was also decided for reasons not given to greatly increase the fishing fleet of the Lithuanian Republic, which is supposed to receive one hundred fish processing factories and refrigerator-transports during the current five-year period. This new Soviet fishing fleet will be fishing inthe Atlantic, using the most modern ships and fishing gear (such as fishing with electric current and trawls capable of operating up to a depth of 5,000 meters).

All large Soviet fishing trawlers will be equipped with electronic equipment controlling the effectiveness of the trawl in the process of fishing. The capacity of ship repair enterprises should grow more than 1.7 times, the volume of shore freezers and refrigerators, by 1.6 times, and the capacity of fishing ports, by fifty-six per cent.

Considerable attention is planned to be devoted to the organizational problems of the fishing industry. Further development of centralized and computerized, automatic control systems (ASU) for the fishing industry is planned. More attention will be devoted to scientific forecasting in the trends of development and operation of fishing industry. The role of the scientific research institutions of the industry will be further elevated.

It appears that the Soviet Union fishing industry well understands the problem of future fishing in the considerably depleted areas of the world ocean, and is making appropriate provisions for not only sustaining the present level, but for a considerable increase of catches.

The Soviet Union provides technical assistance to a number of less developed countries, particularly in Africa,

to some Asian countries, Mauritius, and recently Peru.[56] Soviet assistance in the development of Cuba's fishing industry has been substantial. The Soviet Union in return is obtaining considerable benefits from the countries to which assistance was granted, and many Soviet fishing vessels are being serviced in the ports of these countries. In the absence of foreign bases, the right of the Soviet fishing vessels to make those port calls are of obvious importance.

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[56] In June 1971 an agreement was signed by the Soviet Union and Peru which provides for technical aid to the latter in the construction of a fishing port, the sending of a scientific research vessel to study fishing resources in the proximity of Peru's shores, and the training of fishing industry specialists in Soviet educational institutions. Vodnyy Transport, June 12, 1971.

Conclusions

Long before the growth of the Soviet Merchant Marine and Navy caught the world's eyes, the Soviet fishing fleet had been seen in various areas of the world's oceans remote from Soviet shores. A high degree of imagination and innovation in the development of the Soviet fishing industry, primarily for the bulk of it operations in the high seas, has been demonstrated. The first trawlers built in the early 1950's were of rather small size, but new programs generated in late 1950's and 1960's produced a fishing fleet capable of operating thousands of miles away from their bases for up to six to eight months. Whereas the fishing vessels of many Western countries, including most of the U.S., have to return to port after five to seven days to deliver their catches, the Soviet fleet processes most of the fish afloat, right in the areas where it was caught, turning out all varieties of sea food products ready for consumption.

The fishing gear employed by the Soviet fleet is among most efficient and advanced in the world. The development of the industry is not only being fed with considerable appropriations permitting vigorous foreign orders for ship constructions and utilization of available domestic shipbuilding

facilities, but is supported by the world's most powerful research and development efforts, highly qualified scientific personnel and a well developed large educational system turning out about 10,000 specialists per year. It appears, that the most of the problems associated with such a rapid development of the industry, with the notable exception of those associated with the nature of the socio-political system, have been recognized, and a search for the appropriate solutions and implementation of corrective measures is underway.

The level of the Soviet catch reached 7.8 million tons in 1970 and is steadily growing. The Soviet Union is now catching more fish and other forms of sea life than the U.S., Great Britain, West Germany, France, and Canada combined. The fear once expressed in the Western press that the Soviet fishing industry would ignore conservation practices seems to be unfounded. The advanced Soviet fishing technology certainly provides an advantage over the fishermen from many other countries, and provides the Soviet Union with the larger catch, but it can hardly be criticized. It seems, that the Soviet Union is honestly trying to observe fish conservation practices and is an active participant in international agreements, conventions, and organizations concerned with research, regulations, and conservation practices. There are now eighty

international agreements concerning fishery. The Soviet Union is party to forty of them. The present Soviet fishing industry is certainly a tool for advancing national interests of the Soviet Union and it has great potential not only for supplying needed protein for the country's population, but for being an instrument of foreign aid.

The military and primarily naval value of the Soviet fishing fleet is a less easily and clearly defined phenomenon. While the great opportunity provided by the fishing fleet operating in the high seas on a year-round basis for training of sailors for the Soviet Navy, and the fact that many of the fishing fleet ships have a para-naval value, is certainly recognized, the problem should be viewed in the light of hard facts concerning contemporary naval warfare and existing geo-political realities. It is probably fair to say that the only small portion of the Soviet fishing fleet can be used effectively by the Soviet Navy in a case of an armed conflict. The "side effect" of huge Soviet fishing fleet in relation to military is, of course, considerable. The meteorological and basic oceanographic research involving the collection of data on water temperature and its distribution through various layers, salinity, density, and distribution of plankton, the employment of modern sonars and other equipment and the plotting of the

bottom charts, etc. is invaluable to the Soviet Navy. It may also be true that the thousands of Soviet fishing ships operating in all corners of the world ocean can be, and probably are being the eyes and ears of Soviet intelligence. They also provide good cover for the intelligence gathering operations of several dozen Soviet Navy intelligence (ELINT) trawlers employed by the Soviet Navy's special "Intelligence Divisions". But in any case, the economic and political values of the Soviet fishing fleet greatly outweigh the possible military factor, and are, in the final analysis, of much greater importance. The development of the Soviet fishing industry illustrates the growth of Soviet maritime power and the nature of its challenge at sea.

CHAPTER VI

RIVER TRANSPORT

About two thirds of the total number of rivers in Europe and Asia flow through the territory of the Soviet Union. They became natural transportation arteries around which the economic development of Russia, particularly European Russia, was to a large degree centered. Moreover, the vastness of the territory and the poorly developed land transportation system made rivers indispensible for the transportation of goods, raw materials, and people. In many areas, particularly in Siberia, river transport has been the only practical means of transportation in extensive use. During the 18th and 19th centuries, a number of artificial waterways (canals) were built. Use of the steam engine on the Russian rivers dates as far back as the early 19th century. In the second half of the 19th century, the mass transportation of oil was being conducted on the Volga River on a regular basis. It may therefore be said that pre-revolutionary Russia had a fairly well developed inland water transport system.

The river transport system was badly damaged by World War I, the Revolution and particularly the Civil War. Nevertheless, a considerable number of river steamers survived and were put in extensive use by the Soviet government, which nationalized all means of water transportation soon after the Revolution.

The first Five Year Plan (1928-1932) provided the beginning of what was termed the "reconstruction of river transport on the basis of wide introduction of new technology". Although not much new technology was introduced, particularly as far as ships were concerned, some improvements in the waterway system was achieved, the major such improvement being the construction of a large dam on the Dniepr River in 1932. A year later the Belomor (White Sea-Baltic) Canal was built.

The second Five Year Plan (1933-1937) demanded a considerable increase in the cargo transported by the river fleets, from 26 billion ton - kilometers at the beginning of the period to 63 billion tons - kilometers, a figure never achieved prior to World War II.[1] In 1913 (last year prior to World War I) 28.5 billion ton - kilometers of cargo was transported by the Russian river fleets, but the figure for 1940 was only 36.1 billion ton - kilometers, i.e. there was little growth over

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[1] Rechnoy Transport (River Transport) No. 4, 1970.

a period of nearly twenty years.

An extensive program for the construction of canals was planned for the second five-year period. At the end of the period, in 1937, the construction of the Moskva Canal was completed. Later, during the third Five Year Plan, the Dniepr - Bug Canal was rebuilt. During the 1930's, river passenger service was considerably expanded.

The war not only interrupted the development of Soviet river transport, but inflicted considerable losses on it. More than 4,300 various vessels were lost, and hundreds of river ports and docks, 300 dams, and more than 60 locks were destroyed.[2] River fleets actively participated in the war, making a noteworthy contribution to the efforts of the overall Soviet transportation system.

A decree of the Council of Ministers of the USSR of September 1, 1947 approved a special program for the accelerated development of river transport, which played an important role. The program envisaged the accelerated construction of new river vessels and also the reconstruction of ports and a number of important waterways.

The directives of the fifth Five Year Plan approved by the

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[2] Rechnoy Transport, No. 4, 1970.

19th Party Congress (1956) considerably increased the appropriations for river transport and allocated a greater portion of the domestic shipbuilding facilities for the construction of river vessels. A special provision was made for reinforcing the Siberian river fleets, a goal which was reached later by the transfer of a considerable number of vessels via the Northern Sea Route.

But the most rapid development of Soviet river transport took place in the sixties, when the river fleets received thousands of new vessels. New waterways connecting all the seas washing the European part of the Soviet Union were opened, making Moscow a real "port of the five seas". A new mode of water transport, the socalled "mixed river-sea" was developed, and thus river transport gradually became involved in carrying foreign trade. In 1969 the river fleets alone carried more than 290 million tons of cargo with a cargo turnover about 150 billion ton - kilometers, and transported 112 million passengers.[3] Furthermore, the development of the rivers in Siberia and the Far East, so essential for the exploitation of the rich natural resources in those areas, was accelerated. This, in brief, is a historical review of the development of Soviet river transport.

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[3] Rechnoy Transport No. 4, 1970.

The more detailed analysis of the Soviet Union inland water transportation system will be made according to the following outline:

Organization and control structure;

Natural waterways and their navigability;

Soviet canals and the artificial waterways;

Mixed river - sea, transportation;

New ships of the Soviet river transport;

Military role.

Organization and Control Structure

Up to 1956, Soviet river transport was controlled either by the Ministry of Merchant Marine or by the Ministry of the River Fleet of the USSR. In 1956, in conjunction with Khrushchev's experiments with "decentralization", the Ministry was abolished and in its stead, organizations to control the river fleet were created in individual Republics. By far the largest has been the Ministry of the River Fleet of the RSFSR (Russian Soviet Federated Socialist Republic), and Administrations (Directorates) for River Transport in the Ukrainian, Belorussian, and Kazakh Republics. In the Latvian Republic, river transport is subordinated to the Ministry of Automobile Transport. The

river transport in the Middle Asian Republics is subordinated to the Ministry of Merchant Marine of the USSR inspite of the fact that none of these republics has access to the sea.

This experiment with decentralized administration resulted in confusion as to the responsibilities of the various organizations for maintaining waterways and exercising unified policies. For example, river transport on the Dniepr is divided between two republics; in the upper Dniepr it is subordinated to the Belorussian Republic, while in the middle and lower Dniepr it is subordinated to the Ukrainian Administration for River Transport.

The Ministry of River Transport of the Russian Federation controls the greatest part of the total USSR river fleet. This Ministry has 22 steamships companies organized on the basin-territorial principle. All major rivers, such as the Volga, Kuban', Lena, Ob', Yenisey, and Amur have correspondingly named steamship companies. Regions incorporating several rivers, such as the Northwestern and East Siberian, have their own steamship companies. In spite of the fact that the RSFSR Ministry of the River Fleet is obligated to coordinate the efforts of the various Republic administrations in charge of their corresponding river fleets, the administrative isolation of these organizations handicaps the practice of a unified technological policy.

By its nature, river transport should cooperate with other

modes of transportation such as the railroads and the merchant marine, both of which are centrally controlled. Starting in 1971, demands were made for a central agency. A special committee, created by the order of the Council of Ministers of the USSR, in cooperation with the Academy of Science and with the participation of representatives of all the transport ministries made a number of recommendations. One of the recommendations dealt with administrative problems and the necessity to have a central agency (All-Union Ministry or a Main Administration subordinated to the Council of Ministers of USSR) to control and coordinate activity of all river transport.[4]

The accelerated development of the northern areas of the Soviet Union and particularly Siberia, elevated the role of river transport considerably. In spite of a considerable increase in its cargo turnover, Soviet transport system still does not satisfy the growing demands of the newly developed economic regions.

The importance of river transport is also evident from the low cost of the transportation it provides. For example, in 1969, ten ton - kilometers cost 4.1 kopeks on large Siberian rivers and 6.7 kopeks on small rivers. By truck, the same volume

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[4] _Vodnyy Transport_, March 20, 1971.

cost 56 kopeks.[5]

Another problem closely associated with the administration is the automated control (ASU) of river transport. Implementation of the ASU has already begun, but it is not well suited for the relatively loosely associated river fleet administrations of the various republics. In 1966, the first Main Calculation Center, based on the URAL-4 computer, began operation for the River Fleet of the RSFSR. At the end of 1969, the Ministry of the River Fleet already had 11 regional calculation centers and 62 computerized calculating bureaus serving more than 280 enterprises and organizations, under the control of the Main Calculation Center.[6] As of the end of 1970 other calculation centers existed in Moscow, Gorki, Novosibirsk, and Leningrad, and work began on organizing a computerized system of control through various steamship companies and ports. It is planned to link all elements of Soviet river transport to the ASU during the decade of 1970's.[7]

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[5] Rechnoy Transport No. 11, 1970, pp. 1-3 and No. 12, 1969, pp. 10-11.

[6] Rechnoy Transport No. 2, 1969, pp. 14-16.

[7] Rechnoy Transport No. 9, 1970, pp. 3-4, and Vodnyy Transport, 24 April 1971.

Natural Waterways and their Navigability

In spite of the apparent abundance of natural waterways in the Soviet Union, the growing demand for river transportation has been forcing the Soviets to introduce larger vessels, and, this, in turn, has created a demand for deeper, more direct, and better navigable waterways. The construction of large hydroelectric stations and dams increased the navigable depths of many Soviet rivers. On the Volga River, this type of work permitted the avigation of river vessels with a 5,000 ton cargo capacity and f so-called sectional trains with a cargo capacity of 7,500 tons nd drafts up to 3.5 meters. When the Volga-system hydrolectrical tations are completed in the next five to six years, navigation ill be open to ships drawing up to four meters. The planned onstruction of six hydroelectrical centers on the Dniepr River ill increase navigable depths up to 3.5 meters.

Intensive economic development of Siberia, particularly ts western part, generated an enormous demand for river ransportation. In addition to the large Siberian rivers, a great umber of smaller rivers have to be made navigable, and very xtensive dredging operations and work on straightening the treams have been underway.[8] During the 1966-1970 period, only

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[8] Vodnyy Transport, 18 February 1971.

in the Irtysh Basin, with its 17,000 kilometers of waterways, 3,100 kilometers of new waterways were mastered by a tremendous amount of dredging often done through permafrosted ground and by straightening the sharp turns in the rivers. As a result, the rich oil regions of the Tumen' District and other Western Siberia areas were connected by rivers with existing transportation systems. The completion of hydro-electric stations on the Angara River rapids and construction of Baikal-Angara River waterway is being planned. After completion of the Middle Yenisey and Osinovsk hydroelectric stations, navigation to the river ports will be open not only for large river vessels, but for high sea ships. In the future it is also planned to connect the Ob' River with the Yenisey River and the Angara with the Lena. When the Kama River and the Irtysh River are connected, the two great waterway systems - the European and the Siberian will be merged, and the so-called "unified inland water transportation system" will be completed.[9]

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[9] Rechnoy Transport No. 9, 1970, pp. 3-5.

Soviet Canals and the Artificial Waterways

The construction of the canals connecting various rivers and creating prolonged waterways began in Russia in early 18th century. Following the Order of 1703 by Peter the Great, the first canal was built in 1709, establishing a waterway connection between Moscow and Petersburg. A number of canal systems were built later in the 18th and 19th centuries, but at the time the Revolution, only the Mariinsky Canal System still maintained its economic value.

The White Sea-Baltic Sea Canal, completed in 1933, was built for non-self propelled wooden barges with a cargo capacity below a thousand tons. The canal connected Leningrad with rchangelsk, shortening the route between the two points by over 2,000 miles (as compared with the route around Scandinavia). he canal was damaged during the World War II and, soon after, it as restored. During the 1950's and 1960's a number of odifications were made, resulting in greater navigable depths of he canal and an improved lock system, making the canal suitable or modern vessels.[10]

The next large project was the construction of the Moskva-

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[10] Rechnoy Transport No. 6, 1969 and No. 10, 1970. For he general description of the Soviet canals as of the middle ixties, see also U. S. Naval Institute Proceedings, July 1967, p. 33-44.

olga Canal, thus connecting Moscow to the Caspian Sea through he major Soviet river, the Volga. The canal was completed in 937.

In 1953 the construction of another important canal, the olga-Don, was completed thus connecting the Volga River and, ence, the Caspian Sea with the Sea of Azov and the Black Sea. t the end of the 1960's, it was decided to increase the depths f the canal and the Tsimlyansk Reservoir to four meters, which ill assure the traffic of large river vessels of the Volga-Don ype carrying the maximum load.[11]

The major step toward completion of Unified Inland Water ransportation System for the European part of USSR was made in 64 when the Volga-BALT Waterway was opened. The Volga-BALT nvolved the reconstruction of the old Mariinsky System; onstruction in 1933 of the Lower-Svirsk hydroelectric center, in 41 the Rybinsk, and in 1952 the Upper-Svirsk hydroelectric enters, and completion in June of 1964 of Volga-BALT Canal.[12] he total length of the canal is 361 kilometers, only 66 of which e represented by artificial canals and 295 by the artifical water eservoirs.[13] The system connected five seas - the Baltic Sea,

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[11] Rechnoy Transport No. 3, 1970.

[12] Rechnoy Transport No. 4, 1969.

[13] Vodnyy Transport, 11 December 1969.

hite Sea, Caspian Sea, Sea of Azov, and the Black Sea. In 970 almost fifteen million tons of cargo were transported long the Volga-BALT waterway system.[14] Many small and medium ized ships of the Soviet Navy can transmit this system to and rom the Baltic and Black Sea and the Arctic Ocean.

Soviet river ships are presently sailing to ports in ngland, Sweden, Germany, Bulgaria, Iran, and other countries, s far as Egypt, using what is called the mixed, river-sea, avigational method (to be discussed later). The already existing canal system, carrying over 60% of the river transported cargo, particularly the White Sea-Baltic Sea, Volga-Don, and Volga-Baltic canals, closely approaches the planned Unified Inland Waterway System of European Part of the USSR.[15] Six thousand kilometers of the existing inland waterway system already permits navigation o ships with draft up to 3.5 meters.[16] The announced and widely discussed future plan includes the direct connection of the Black Sea and the Baltic Sea through existing waterways on the Dniepr River and the Pripyat' and Neman Rivers. New European waterway systems, some planned, and some already under construction, such as the Rhine-Main-Danube, will certainly benefit and improve

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[14] Rechnoy Transport No. 4, 1971.

[15] Vodnyy Transport, 27 February 1971.

[16] Rechnoy Transport No. 10, 1970.

ie operation of the Soviet-European Waterway System. The ew European waterway systems will permit navigation from otterdam to Ismail and will pass through the Netherlands, ermany, Austria, Czechoslovakia, Hungary, Yugoslavia, Rumania, ılgaria, and the Soviet Union.[17]

The Soviet plan to build a canal in the Far East connecting ie Amur River with the Tatar Strait was announced in 1969. ie total length of the proposed canal will be 90 kilometers, it it will shorten the distance from the Amur River to the cific Ocean (Tatar Strait) by up to 1,500 kilometers and make vigation cheaper.[18]

Mixed, River - Sea, Transportation

The soviet term "mixed, river - sea, transportation" is lf-explanatory and means precisely what it says - the ability ships, in this particular instance river ships, to engage in ver, or inland, as well as sea navigation. True, sea navigation always, and quite often severely, restricted by the limited aworthiness of the ships involved. The planned use of the ver ships in the direct transportation of cargo from the ver ports to seaports began in the middle 1950's with the opening

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[17] Pravda, 13 July 1971.

[18] Trud, 29 November 1969.

of the Volga-Don Canal, and greatly accelerated after the opening of the Volga-Baltic waterway. Mixed navigation is now developing by a gradual increase in the sea areas navigated by the river fleet, and construction of special seagoing ships suitable for navigation on inland waterways. So-called conventional ships, either for sea or river service, are poorly suited for this type of navigation; the former, because of its greater cost, and more important, deeper draft, and the latter, mainly for the reason of very poor seaworthiness. The limits of rational use of such ships were determined, with the prediction that the volume of cargo carried in the three basins (Volga-Caspian-Black Sea, Volga-White Sea-Baltic, and Amur-Sakhalin-Okhotsk Sea) by them will soon reach 20 million tons per year and in the not too distant future, 50 million tons.[19] Also, it was argued that the LASH (Lighter Aboard Ship) type ships are very suitable for that mode of transport. With two or three loads of lighters for each LASH ship, it will be possible to utilize up to 90% of its time underway and to have unlimited seaworthiness.[20]

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[19] See A. I. Kovalev, "Direct Water Transportation (River-Sea) of Cargo", Transport, Moscow, 1969. This study describes the optimum approach to such a mode of transportation, and represents the results of celebrated research implying mathematical methods.

[20] Vodnyy Transport, 22 August 1970.

A number of ships of the river register, such as Project o. 791 ("Volga-BALT" class) motorships with a cargo capacity f 2,700 tons; Project Number 558 ("Volganeft" class) tankers ith a cargo capacity of 5,000 tons; Baltiysky, Project No. 781, il-ore carriers; Project No. 1553, and others were specially esigned and are being successfully used in the mixed navigation.[21] hese ships are allowed to sail at sea with waves up to 3.5 meters nd at distances of up to fifty miles from sheltered areas. art of the river-sea fleet is used in the Baltic and Black eas during the winter when most of the rivers and canals are rozen over. This service includes carrying foreign trade cargos.[22]

Two categories of ships for river-sea navigation were ound most suitable. The first category includes ships capable f navigating year round in the closed seas practically without imitations, and the second category is composed of light and nexpensive ships used only during periods of river navigation nd capable of navigating in off-shore sea regions not far from heltered areas. Typical of the first category are ships of $\frac{4}{1}$ S III SP class with a cargo capacity of 2,000 tons; typical f the second category are pushed trains with a cargo capacity of

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[21] _Rechnoy Transport_ No. 5, 1971.

[22] _Rechnoy Transport_ No. 3, 1971.

,000 tons, and MSP class ships (limited in closed sea to fifty iles from sheltered areas and in the open sea to 20 miles).[23]

The mixed navigation opened broad possibilities for a new ypo of activity for the river fleet - participation in ransportation of export-import cargos, as well as the chartering f Soviet river ships by foreign shippers. An agreement on the ransit shipment of Iranian goods via the Soviet Union was igned in 1963 and an agency, Iransovtrans Ltd., was organized. n average of 2-3 weeks are saved carrying goods from European ountries to Iran compared with the traditional route around urope, through the Mediterranean Sea and the Suez Canal. With he Suez Canal presently closed, the importance of this direct oute is obviously increased. Foodstuff cargoes from Bulgaria, reece, and other countries are also being shipped to the candnavian countries and ports of northern Europe.[24] Oil, oil roducts, ore, and metals from the USSR now are carried by the iver fleet to various European countries and even as far as Egypt.[25]

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[23] Sudostrayeniye No. 11, 1970.

[24] Vodnyy Transport, 24 October 1970.

[25] Vodnyy Transport, 12 April 1969 and 3 June 1971.

New Ships of the Soviet River Transport

During the 1966-1970 period the construction of new river ships was accelerated. In 1969, Catamaran Brat'ya Igrotovy, Project No. R19 GTSKB, was built. The vessel with a thousand-ton cargo capacity has a cargo deck area of 900 square meters and is capable of carrying 450 containers, twice as much as a motor ship with a cargo capacity of 2,000 tons. Smaller Catamarans with a 600-ton cargo capacity are also being built.[26]

In 1967 a river motor ship with capacity of 2,700 tons, Sormovskiy Class, capable of carrying timber and bulk cargos was built. The ship made a few cruises from Arkhangelsk to England with a cargo of timber.[27]

In 1970 an experimental river ship with a unique hull made from the three long cylindrical tanks welded together, was built. It is a combination of tanker and dry cargo ship with the possibility of carrying containers in addition to oil. Greater hull strength has been claimed for the ship.[28]

The desire to prolong the navigation period has created an urgent demand for river ice-breakers, and a number of them were

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[26] Rechnoy Transport No. 1, 1971, pp. 6-11.

[27] Rechnoy Transport No. 4, 1970, pp. 6-7.

[28] Vodnyy Transport, 10 October 1970.

built. In addition to the conventional method of breaking the ice, a special ice cutting machine was designed and built.[29] Another device permits the conversion of regular pusher tugs into a sort of ice-breaker, thanks to the special mechanism generating intensive vibration of the ship's hull and thus crushing the ice around the vessel. With the duration of navigational period for most rivers not exceeding 55% of the calendar year in the European part of the USSR and 45% in Siberia, the need for river ice-breakers is obvious.[30]

The State Committee for Science and Technology recommended ider introduction of pushed vessel trains "to increase the roductivity of the river transport".[31] It is anticipated that uring the current Five Year Plan (1971-1975) the use of the ushed-vessel trains in the Soviet inland water transportation system will be increased considerably.

A number of new classes of passenger ships, including a family of large hydrofoil types which have been in operation since the middle of the 1950's have been developed and built. A large series of semi-skimming boats (Zarya class) with water jet propulsion is being presently produced. The shallow draft

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[29] See Chapter, Northern Sea Route, for a description of the machine.

[30] Vodnyy Transport, 20 January 1970, and Rechnoy Transport No. 4, 1970.

[31] Ekonomicheskaya Gazeta No. 28, July 1971, p. 18.

of this boat, which carries 60 passengers, permits operation in small rivers with depths not exceeding .6 meters.[32] Another mass produced passenger ship is the air-cushion Gor'kovchanin, Project No. 1435. It carries 48 passengers. Presently, considerable attention is being devoted to the development of new classes of air-cushion passenger ships.[33]

Plans for the Future

In 1970, the Soviet river fleet transported 358 million tons of cargo. The total cargo turnover amounted to 174 billion ton - kilometers.[34] In 1971, according to the plan, the RSFSR river fleet alone is supposed to carry 318 million tons, with cargo turnover amounting to 168 billion ton - kilometers. It is also planned to transport about 122 million passengers. The largest increase in the transportation of cargo by river fleet is planned to take place in the northeastern region of European Russia and the Siberian rivers (particularly western Siberia). Cargo for the oil-rich regions of western Siberia through

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[32] River Transport No. 4, 1970.

[33] The development of hydrofoil and air-cushion ships is analyzed in the chapter entitled "Shipbuilding".

[34] Rechnoy Transport No. 3, 1971.

Ob'-Irtysh Basin will amount to five million tons in 1971.[35]

In 1975 total Soviet river transport cargo turnover is planned to be 216 billion ton - kilometers. Considerable improvement is planned for passenger service. Presently there re more than 150 passenger lines served by high speed boats (mainly hydrofoils). The number of passenger lines is planned to e increased considerably with primary attention being paid to he small rivers where wide introduction of air-cushion ships ith speeds of 50-60 kilometers per hour, and later up to 250 ilometers per hour, is planned.[36]

Until recently, the low cost of river transportation as the main advantages of this mode of transport. However, uring the last decade, the rate of decrease in transportation osts in the river transport slowed down. While during the six-ear period 1960-1966, the Soviet railroad system managed to ower transportation costs by 11 percent, the decrease in river ransport for the same period was only five per cent.

Since 1966 there was no trend toward further decrease in ransportation cost. The most important reasons are the following:

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[35] Sotsialisticheskaya Industriya, 26 March 1971 and Rechnoy Transport No. 1, 1971, pp. 1-5. Details of 1971-1975 plan were discussed in Vodnyy Transport 19 January 1971 and Rechnoy Transport No. 1, 1971.

[36] Vodnyy Transport, 24 April 1971.

(1) The capacity of existing ports and their mechanization does not match the number of ships already in operation, and lags behind in rate of development. More than 36% of navigation time is spent by ships in ports.

(2) A number of technologically advanced ships designed, and some even with prototypes tested, were not built or were delayed in construction due to the lack of allocated shipbuilding capacity.

(3) The previous plan (1966-1970) to supply river fleets with new ships was not fulfilled, and 140,000 tons of total cargo capacity of tankers and dry cargo vessels as well as 380,000 tons of total cargo capacity of non-self-propelled vessels were not delivered to the river transport.

In accordance to the new plan for 1971-1975, accelerated construction of river ports with the introduction of technologically advanced cargo handling equipment and increased allocation of the shipbuilding industry capacity for river vessels were promised. Party directives specifically projected delivery of river vessels with larger cargo capacity, including a considerable increase in ships of mixed navigation. The construction of dry cargo - tanker ships employing the cylindrical method with cargo capacity up to 9,000 tons as well as container ships and self-unloading bulk carriers is being planned.

Considerable work to improve the navigability of inland ateterways along the lines discussed previously are visualized y the plan.[37]

Military Role

In addition to its tremendous economic importance, the oviet river transport has a number of military applications hose significance was well demonstrated during World War II. he river ships of the Don and Kuban' Steam Ship Companies were ubordinated to the Azov Naval Flotilla commanded by Admiral orshkov, and many were used for amphibious operations.[38] n fact, all river transport of the European part of the USSR djacent to the front was controlled by the Soviet Navy. A umber of river flotillas were organized, and actively participated n the war. Many of the ships of those flotillas were formerly iver vessels converted into warships. During the defense of talingrad, the Volga River Flotilla and river vessels of the olga Steamship Company played a very important role.

At the present time, the role of river transport in military ransportation is still considered important. Special departments

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[37] Vodnyy Transport, 24 April 1971.

[38] Vodnyy Transport, 29 July 1971.

n charge of military transportation exist in every Soviet ilitary district. Incorporated in such departments are branches esponsible for the transportation of troops and hardware on the nland basins. They are also responsible for maintainance of iver vessels in a constant state of readiness for military ransportation, and the majority of river vessels have special quipment, not used during normal operations, needed for ilitary transportation. It is also the duty of those branches o see to it and require that "not a single vessel would leave heir shipbuilding or ship repair enterprise with defective pecial equipment."[39] Undoubtedly the river fleet is being and ill be used for the delivery of ~~supplies to the~~ Soviet Armed orces. Particularly important are the "sea-river" ships.

The existence of an extensive network of deep inland aterways makes it possible to shuttle naval ships up to DEsize s well as some classes of submarines among the various seas of he European part of the USSR. Some types of river vessels are uited for the auxiliary naval combat role in coastal warfare, ncluding mine laying and mine sweeping. Familiarity of the river leet personnel, particularly their captains and navigators, with he theater of operation makes them ideal reserve personnel for he Navy.

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[39] Tyl i snabzhenie Sovetskikh Vooruzennykhsil - Rear Service nd Supply of the Soviet Armed Forces, No. 1, 1970, pp. 81-83.

CHAPTER VII

NORTHERN SEA ROUTE

The Arctic Ocean differs sharply from all the other regions of the world ocean with respect to its climatic and especially its ice conditions. The development of the Polar Regions and the Northern Sea Route, Soviets consider as one of the brightest pages in the history of Russia. Recognizing the important contribution by foreigners, historically Russia, and by succession, the Soviet Union was the major discoverer of most of the Arctic Islands and lands, and first to achieve practical mastery of navigation along the Northern Sea Route.

The first complete passage of the Northern Sea Route from East to West was made in 1915 by two Russian ships, Taimyr and Vaigach, under command of Captain Vil'kitskiy. The expeditions of 1910-1914 established a number of routes to the Northern Regions of Russia from its Pacific Coast.

In September of 1916 a note by the Russian Foreign Ministry was sent to all nations ascerting the Russian claim to all territories explored and unexplored, discovered and

undiscovered between the Russian Coast on the Arctic Ocean and the North Pole, with the exception of previously recognized territories of other nations.[1] Thus, the recognition of economic and strategic value of the region was clearly demonstrated by the Russian government.

As was pointed out by Captain O. P. Araldsen, Royal Norweigen Navy, "the October 1917 Revolution changed many things, but not the Russian preoccupation with the Arctic".[2] Practically from the very beginning of its existence, the Soviet government has recognized the economic and strategic value of the Northern Region. In January 1919 a commission for the study of the north was created under the Scientific-Technical Directorate of the Supreme Council of the National Economy (VSNKH). In December 1919 the Russian Academy of Sciences worked up a plan involving measures for the revival of hydrographic work in the northern seas. During the same year, the famous Kara Expeditions for the delivery of Northern Siberian grain, were organized. In the course of the expeditions, the Northern Sea Route was opened up from the West to the mouth of great Siberian rivers, Ob and Yenisey.

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[1] For the details of this diplomatic move see: Constantine Krypton, The Norther Sea Route and the Economy of the Soviet North, (Praeger, New York, 1956), and Ostrov Vrangelya (Wrangel Island), Moscow, Glavsevmorput, 1946, pp. 35-36.

[2] U. S. Naval Institute Proceedings, June 1967, pp. 49-57.

udimentary ice service and weather service stations were rganized along the route of the expeditions.

Soon, in the East, the ships also began to make more or ess regular voyages from the East to the mouths of Kolyma nd Lena Rivers. In 1921 twenty-three detachments of the orthern Scientific Fishing Expedition were operating in the orthern waters and on the islands of the Arctic Ocean.[3] On ay 4, 1920, the Soviet Government declared the White Sea to be ts internal waters. A year later on May 24, 1921, a degree of he Council of People's Commissars signed by Lenin claimed the ight of the Soviets to exclusive exploitation of the fish resources and sea mammals in the White Sea and in the Arctic cean along the shore from the State boundary with Finland to the Northern extremity of Navaya Zemlya.[4] On 4 November 1924, following unsuccessful attempts of Canada to lay claim to Wrangel Island,[5] a memorandum to all states was sent by Soviet Government reiterating the 1916 notification from the Russian Minister of Foreign Affairs and calling attention to the Eastern boundaries between Russia and the U.S. established by the

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[3] Morskoy Sbornik No. 6, 1970, pp. 83-88.

[4] C. Krypton, op. cit., p. 32.

[5] Ibid., p. 38

Convention of 1867.[6]

In 1924 the first ice-air reconnaissance was made in Kara Sea. Two years later landing and taking off from the ice was mastered. Gradually, the aviation began regular ice-air reconnaissance and thus Polar Aviation was developed.[7] The network of Polar Stations had been growing steadily. In 1932, an expedition headed by O. Schmidt aboard Sibiryakov completed a voyage through the Northern Sea Route during one navigational season. In December of the same year, by the special resolution of the Council of People's Commissars of the USSR, the Main Directorate of the Northern Sea Route, Glav Sev Mor Put', was organized. This organization, with extremely wide range of responsibilities, played a very important role in the development of Soviet Arctic in general and Northern Sea Route in particular. In 1934 the loss of the *Cheluskin* and rescue operation for the members of expedition and ship's crew, performed by aviation, resulted in awarding for the first time the highest Soviet decoration, Hero of Soviet Union, to the seven rescue pilots. In 1936 Arctic Seas were navigated by 160 ships, including some ships of the Soviet Navy. In that year two destroyers accompanied

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[6] *Ibid.*, p. 46.

[7] *Morskoy Flot* No. 9, 1967, pp. 9-11.

by ice-breaker Litke (the Russians call it ice-cutter), ice reinforced steam ship Anadyr', and tanker, Lok-Batan, were transferred from Kronshtadt (Baltic Fleet) via White Sea - Baltic Canal to Vladivostak where they became the first sizeable surface ships of newly created Soviet Pacific Fleet. The destroyer's hulls were reinforced with already tested lumber-metal protective layer along the water line called Shuba.[8] During World War II, in 1942, the transfer of three ships from Pacific fleet (destroyer leader - Baku, and two destroyers) to the Northern Fleet was achieved.[9] The Soviet mastery of the route was demonstrated in 1939 when in addition to navigation by ships of the merchant marine, agroup of bucket-dredgers, a suction-dredger, and a number of tugs were transferred from Murmansk to Nikolaevsk on the Amur. Those were the ships of the so-called Technical Fleet, poorly suited not only for ice navigation, but even for off-shore navigation.[10] Prior to World War II, duration of navigation reached over a hundred days in the Western part of the Northern Sea Route and over seventy days in its eastern part. The first and to the best knowledge of

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[8] Morskoy Sbornik No. 6, 1970, pp. 83-88.

[9] Sudostroyeniye No. 7, pp. 65-67, No. 8, pp. 69-70, 1966.

[10] Sudostreyeniye No. 8, 1969, pp. 71-72.

this writer, the only passage of foreign warship along the Northern Sea Route took place in 1940, when after signing of Soviet-German Pact, a German raider, classified as Auxiliary Cruiser and called "Ship 45" (Comet) made a successful passage to Pacific, assisted by Soviet pilotage and ice-breaker, Stalin. While in Pacific the Ship-45, in cooperation with other German raider Ship 36, and alone sank several allied and neutral merchant ships. During the war the route was used to all possible extent, including the transportation of lend-lease supply from the United States, initially delivered to the Soviet Far East. Each year tens of ships passed from the Pacific toward the West being accompanied in the western part of the route by convoys. German's effort to interrupt this rather important transportation artery by employing submarines, raiders, and aviation, though resulting in some losses, was generally unsuccessful, due to a number of factors among which climatic conditions, size of the forces employed, and lack of reconnaissance were the major.

After the war the efforts for further mastering of the Northern Sea Route continued. Systematic, planned research in the Arctic was intensified during the period of 1948-1951, followed by three years of passivity. After 1954 the Soviet Union has maintained at least two drifting stations on the ice.

The total number of these stations in a 34 year period, starting with 1937 I. Papanin Station has been 20.[11] Polar aviation was reinforced with a greater number and better quality of aircraft. By the mid 1950's the Northern Sea Route was fully operational.

Icebreakers

The first Russian Icebreaker, Ermak, was designed by Admiral Makarov specifically for Arctic navigation and was built in England in 1899. Makarov's efforts were supported by the famous scientist Mendeleyev.[12] Many ideas incorporated into the design of Ermak are still valid and being used in construction of contemporary icebreakers. Ermak, which was called the "Grandpa of ice-breaker fleet" served 65 years, was awarded Order of Lenin and, after final retirement in 1964, has been distinguished by memorial in Murmansk.

Before the revolution of 1917, Russia had eight ice breakers and a number of steam ships reinforced for ice navigation. Most of the ships survived the revolution and civil war, but major reinforcement of icebreaker's fleet did not come until

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[11] Vodnyy Transport, 15 December 1970.

[12] Sudostroyeniye No. 9, 1969, p. 57.

1938 when four ice-breakers of the Stalin class (presently Sibir' Class) were built.

The next reinforcement of Soviet Ice-breaker's Fleet came in the mid 1950's when three ice-breakers of Kapitan class (*Kapitan Belousov, Kapitan Voronin, Kapitan Melekhov*) were built for the USSR by Finland. In 1959 the nuclear powered ice breaker, *Lenin*, the most powerful ship of this type, was built. During the decadeof 1960's five units of Moskva class ice-breakers were built.

Soviet Icebreakers

Class	Lenin	Moskva	Kapitan	Subur'	Krasin	Sibiryakov
Number of Units		5	3			
(Year of Construction)	(1959)	(1960-1969)	(1954-1956)	(1938)	(1917)	(1925)
	(a)	(a)	(b)	(b)	(b)	(b)
Major Elements						
Displacement	17,000	15,300	5,300	10,000	9,000	5,000
Type of engines/Total Power	Nuclear/ 44,000	Diesel-Electric/ 26,000	Diesel-Electric/ 12,000	Steam/ 11,100	Steam/ 11,400	Steam/ 9,500
Number and Power of Main Engines	2 x 10,000 1 x 20,000	1 x 11,000 2 x 5,500	4 x 3,500 (2 stern, 2 bow)	3 x 3,700	3 x 3,800	1 x 2,890 2 x 3,280
Total SHP	(All E, 40,000)	(All E, 22,000)	(E, 10,500)	11,100	11,400	9,440

Source: V. Arshenevskii, Icebreakers, Transport, Moscow, 1970.

a - Liner icebreaker
b - Auxiliary Icebreaker
E - Electric motor

As of 1970, the Soviets divided icebreakers into three ajor categories:

(1) Harbor Icebreakers with propulsion plant up
    to 5,000 - 6,000 SHP (Shaft Horse Power)
(2) Auxiliary Icebreakers up to 12,000 - 15,000 SHP
(3) Liner Icebreakers above 15,000 SHP

uch a classification reflects Soviet experience in the Arctic, here not as much displacement, although a factor, but power s needed and icebreakers above 15,000 SHP, preferably in range f 30,000 - 40,000 SHP, are required.[13]

All, but one (Lenin), post war Soviet icebreakers were uilt in Finland. Presently, there are only six liner cebreakers in the Soviet Union. But, there are only three more cebreakers in the entire world fleet which would fall in this ategory. They are: American Glacier, and two Canadian ships, ouis S. St. Laurent and John A. MacDonald.

In the decade of the 1960's, the Soviet Union built two cebreaker type hydrographic ships - Petr Pakhtusov (1966) and eorgii Sedov (1967) - both with 5,400 SHP. A large series of rbor icebreakers, V. Pronchisctsev-class, was also built in

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[13] A. Arshenevsky "Ledokoly" (Icebreakers), Transport, scow, 1970.

the decade of the 1960's.[14]

Soviet experience in the Arctic, however, convinced them that more powerful ice breakers and in greater number are needed in order to prolong navigation along the Northern Sea Route and make it more reliable. As a result, the Soviet Union ordered three large icebreakers to be built during 1971-1975 period by Wartsila, Finland. The 20,000 ton ships will be powered by diesel-electric plant of 36,000 SHP. They will be among the most powerful motor ships in the world.[15] Another Soviet plan visualizes construction of two nuclear powered icebreakers of Arktika Class. With their help, it is planned to prolong navigation along the complete Northern Route up to six months, and to make navigation in the route's western and eastern areas uninterrupted during the whole year. In addition, it is planned to double the speed of the ships following the new nuclear icebreakers.[16] But, it would be incorrect to assume, that nuclear icebreakers would soon

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[14] There is no internationally accepted classification of icebreakers. Canada, for example, divides its icebreakers into two major categories, full icebreakers, and light icebreakers. Roughly, the first category would include Soviet Liner Icebreakers and Auxiliary Icebreakers and the second category would include Soviet harbor icebreakers.

[15] Vodnyy Transport, 15 October, 1970.

[16] Izvestiya, 21 February 1970.

represent the backbone of the Soviet icebreakers fleet. More likely, the conventionally powered icebreakers will continue to play the most important role. Increased power of their propulsion plants and improved hulls would make them as reliable as nuclear, but much cheaper.

No country in the world is afflicted with so much loss and inconvenience by winter as the Soviet Union. Almost every sea which washes Soviet territory freezes over. The Baltic in its eastern part in severe winter is frozen up to 140 days. Even Odessa, a Black Sea port, is sometimes frozen in for up to 100 days in a year. All this demands constant efforts to search for new means of cutting ice.

During the last several years, a number of new means to cut ice were designed. A new type of special vessel, which appears to have very little in common with the icebreaker, but nevertheless serves the same purpose, was designed by the Ice Laboratory of the Arctic and Antarctic Research Institute in Leningrad by a group headed by Professor Peschanskyi. The bow of the ship slopes forward below the waterline, forming a kind of slip-way. Mounted on the bow are four rows of large rotary cutting discs which bite into the ice and cut out large bars of it as the ship moves forward. These bars are forced up the slip-way where they are crushed, picked up by a conveyor system, and thrown over the side

nto the ice, well away from the ship's side leaving an ice-free anel. Though, theoretically, the new device can saw through ce of any thickness, calculations have shown that it would be practical to use it on the ice of more than two feet in thickness ecause of slow speed.

Another new method to fight the ice is the water jet gun, laimed to be capable of pulverizing ice barriers more than three eet thick. It was said that the two new methods are planned to e used for keeping channels and port approaches free of ice, ile conventional icebreakers will do the job in the open sea.

A method to keep ice bound ports free of ice was said to e also developed. It is achieved with the help of pipes laid own on the bottom. Air, which was fed through the pipe, bubbled p through the water and constantly mixed the warm lower layers f the water with colder upper ones and so inhibited the formation f ice.[17]

In addition to weather and navigational aid services and leet of icebreakers, another essential element for successful avigation in the Arctic is ice reconnaissance. The best, of ourse, and most productive is air-ice reconnaissance, and Soviet olar Aviation has been employed for this purpose for many years.

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[17] Sputnik (from magazine Znanie-Sila) No. 1, Moscow, 1968.

p to recent times, the major means of ice reconnaissance were isual and photo reconnaissance - both depend heavily upon weather onditions.

Recently the system called TOROS (translated ICE HAMMOCK) or the ice reconnaissance and assisting ice breakers and ships n ice navigation was successfully tested. The system, installed board an aircraft, incorporates as its major element side-looking airborne radar. All weather operation and the ability "to see" hrough the snow and observe ship tracks in the ice field was laimed for the system. The high resolution picture is simultaneously egistered on the scope and video-tape and via photo-telemetry ransmitted to ships and to shore control points. Simultaneously with the picture, the system produces the exact coordinates of he aircraft which carries it. The system was successfully tested n 1970.[18]

Another radar equipment designed to measure the thickness of the ice field from an airborne helicopter was tested during 971. A cross section cut of the ice field is displayed on he screen of the equipment. Many Soviet icebreakers and some erchant ships, particularly those with ice reinforced hulls, re carrying or are capable of carrying helicopters. These elicopters equipped with the above device (especially coupled

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[18] Pravda, 3 May 1970; Morskoy Flot No. 9, 1970, pp. 27-28.

with photo telemetry capability) would help not only to improve and simplify ice reconnaissance but would increase productivity of ice breakers by permitting them to select thinner ice for a passage. The equipment could, under certain conditions, permit ships with ice reinforced hulls to navigate alone without assistance from icebreakers.[19]

Legal Aspects of Soviet Arctica and Northern Sea Route

The Soviet government has issued a series of legal acts related to the status of Soviet Arctic and to the exploitation and organization of the route. In addition to the above mentioned reinforcement of the Tsarist government acts concerning Arctic possessions, the resolution of 15 April 1926 by the Presidium of the Central Executive Committee of the USSR proclaimed the establishment of the geographical boundaries of the Soviet Sector of the Arctic between meridians 32°04'35" East longitude and 168°49'30" West longitude. Within the boundaries of the indicated sector, the Soviet Union claims to exercise full sovereignty of all "land and islands located in the Arctic Ocean, north of the coast of the Soviet Union, as far as the North Pole".[20]

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[19] Trud, 12 June 1971.

[20] Morskoy Sbornik No. 6, 1970, pp. 83-88.

The navigation along the Northern Sea Route is treated y the Soviets as navigation in Soviet Territorial Waters. To upport such a claim the Kara, Laptev, East Siberian and Chukchi Seas, through which the Northern Sea Route passes, are viewed as broad, shallow bays with specific ice conditions",[21] surrounded y the cost of the Soviet Union. The exceptionally severe imatic conditions of the Siberian Seas and straits and the resence of ice during the greater part of the year "serving as a rt of continuation of Soviet territory" are used to substantiate he Soviet arguments. The majority of the straits through which he Northern Sea Route passes are said to be within the Soviet rritorial waters, particularly Karskie Vorota, Yogorskiy Shar nd Vil'kitskiy Straits. The Straits of Dmitri Laptev and Sannikova re considered as belonging to the Soviet Union historically.[22]

Colossal expenditures by the Soviet and previously Russian tates, are also cited in defense of the claim that the Northern a Route is the national route. The cost involved in the intenance of the route is of course considerable.[23]

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[21] Morskoy Sbornik No. 8, 1969, pp. 80-88.

[22] Ibid.

[23] As an example, the "SEVER-69" upper-latitude expedition volved dozens of airplanes and helicopters. The expedition aced seventy drifting automatic radio-meteorlogical stations n addition to existing stations.

The Northern Sea Route is compared by the Soviets with he Norweigan Indreleia Sea Route which the International Court f Justice of the United Nations in its decision on 18 December 951 recognized as an inner national Route of Norway. Canada's laims of sovereignty over the passages between the Arctic Islands ight be used by the Soviets as another precedent.

The Canadian concern over the possible pollution in the rctic is shared by the Soviets. Unsuitable ships, especially n the absence of icebreaker's assistance, have definitely resented the ecological hazard, for it can easily be damaged nd so cause the pollution. Following the Canadian Prime Minister rudeau's visit to USSR (May, 1971), the development of Soviet-nadian relations and future cooperation including that in the rctic were praised by the Soviets.[24]

The present Soviet claims can be summarized as follows: () The Northern Sea Route belongs to only one nation, the oviet Union, as an internal national route which guarantees the ation's vital economic, political, and defense interests in he Arctic region. (b) The special geographical location of he Northern Sea Route, the most vital sectors of which pass hrough Soviet Territorial and Inland waters, gives the Soviet

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[24] Typical was an article in Pravda, June 18, 1971, "andshake Across the North Pole".

Union an indisputable right to regulate in it the regime of navigation by foreign merchant and naval ships.[25]

The seriousness of the claim and uncompromisiveness of the Soviet Union was demonstrated in the summer of 1967, when two U. S. Coast Guard Icebreakers, Edisto and Eastwind, after unsuccessful attempts to pass north of Severnaya Zemlya were forced to enter the Vilkitskiy Straits and were turned back by the Soviets.[26]

The importance of the Northern Sea Route is elevated by the numerous navigable rivers of the country (Pechora, Ob, Yenisey, Khatanga, Olenek, Lena, Yana, Indigirka, Kolyma and others) connecting it with the northern regions of the USSR. There are an extensive network of ports, the majority of which have been developed during the years of Soviet power. Among those of particular economic importance are: in the Barents Sea - Pechenga, which exports copper-nickel ores, and Nar'yan-Mar, a port for the export of bituminous coal from the Vorkuta Basin and timber that has been rafted down the Pechora; in the Kara Sea - Kilson and Dudinka, which provide an outlet to the sea for

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[25] Morskoy Sbornik No. 6, 1970, pp. 83-88.

[26] The detailed description of this voyage is given in U. S. Naval Institute Proceedings, April 1968, pp. 74-79.

te production of the Noril'sk mining region, and Igarka, the lrgest center of timber export; in the Laptev Sea - Nordvik, Katanga, and Tiksi, the maritime gateways to Yakut; in the Est Siberian Sea - Ambarchik and Pevek, rapidly growing seaports ad industrial centers of the Northeast.

The Soviet North is the richest base for the wood-cemical industry, a world exporter of timber. It is also rch in useful minerals - mineral fuel, iron ores, phosphates, vrious construction materials, bauxite, copper, and a number o other nonferrous and rare metals. New industrial regions are bing rapidly developed there.

The Twenty-Fourth Party Congress Directives for the five yar plan (1971 - 1975) projected further development of the Nrthern Region. The special attention in the directives was gven to Norilsk Metallurgical Combine. The industrial development c the region which started in the decade of 1960's had already osorbed 24 billion rubles of capital investment, exceeding the sm spent in the previous forty years, 1920-1960, more than twice.[27]

The development of the Arctic region has been accompanied with number of original solutions. An urgent demand for power, or example, generated design, construction, and beginning of peration in the end of 1970 of Floating Gas-Turbine Power Station,

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[27] Komsomol'skaya Pravda, 14 March 1971.

orthern Lights (20,000 KW). A decision was made to build a eries of such power stations which can be placed anywhere here there is waterway (bay, channel, river) which permit assage of a ship with 1.55m draft.

Combined with the rapid development of Soviet Arctic egions, where water transport is still, for all practical urposes, the only means of transportation, the importance of orthern Sea Route to Soviet Union is obvious. The Route has een used practically exclusively by the Soviet ships and legally obody challenged it. With the growth of its merchant marine, owever, and the development of much wider cooperation with aritime organizations of the world, the Soviet Union is starting o change its position. Convinced that the mastery of the oute in general has been achieved and navigational period ncreased and probably from the desire to obtain some reciprocity or the Soviet merchantmen in the other part of the world, the oviets, starting with 1966, but particularly after the closure of the Suez Canal in 1967, began the promotion of the route for oreign shipping. The economic advantages for certain shipping o use the Northern Sea Route are obvious. The length of the oute from Murmansk to Provideniya (southern part of the Bering trait) is 3,400 nautical miles. Murmansk - Vladivistok distance a the route is 6,100 miles, while via the Suez Canal, more

n 12,000 miles. From London to Yokohama via the route is
,30 miles shorter than via the Suez Canal. In spite of some
uction in speed while transiting the ice a ship saves
average of 13 days in one direction via the Arctic Transit
n London to Yokohama compared with that via the Suez Canal.
1967 the Soviet Ministry of Merchant Marine announced the
n to open traffic along the Northern Sea Route between ports
Western Europe and the Pacific Ocean. The use of Ice-class
ps was proposed. The navigation was promised to be supported
assigned icebreakers, polar aviation, by the Hydrographic
vice, and by special "scientific-operational groups" from
Hydrometeorologic Service. Referring to the difficult
igation and the ice situation in Volkitskiy Strait, the
ndatory icebreaker and pilot use was specified for the convoys.
thern Sea Route Sailing Instructions were published for the
voying of foreign ships. The scale of fees for the icebreaker
pilot were announced. The Northeastern Administration of
Merchant Marine was established in the center of the Arctic
h headquarters in Tiksi with primary mission to support
nsportation and further development of navigation along the
te.

The strategic value of the Arctic including the Northern
Route was well understood long before the revolution. The

famous Russian scientist, D. I. Mendeleev wrote "When it would be possible to transfer fleets or even part of them from Atlantic to Pacific Ocean and reverse, the naval defense of the country will gain a lot, for Russia should keep strong fleets to defend its vital interest in the both oceans".[28] Soviet war ships can be and have been transferred between Europeans and the Pacific Soviet Fleets avoiding the necessity to enter foreign waters prior to World War II, during the World War II, and after World War II. The number of transferred ships has not been great, however. The transfer of submarines is another matter, and this undoubtedly is done on a more regular basis. The calls for construction and use of the large transport submarines for year-round delivery of cargoes and oil have been made in Soviet Union for many years.[29]

The Arctic became one of the major places where Soviet Air Defense Units are located and quite extensive network of observation radars and communication centers have been built.

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[28] From the Scientific Archives of D. I. Mendeleev, cited in Mastering The Extreme North, Volume I, Academy of Sciences of the USSR, Moscow - Leningrad, 1960.

[29] A detailed study, dealing with feasibility of such project was completed by Professor Pokrovskii in 1955. Since that time, the problem was repeatedly mentioned by the Ministry of Merchant Marine and its Central Scientific Research Institute. See, for example, its Transactions, V. 133, Leningrad, 1970.

pesently hardly a month would pass without Soviet Military pess mentioning harsh duty of Air Defense Units, performing i Arctic Region.

To summarize: (1) The Soviet Union successfully continued te Russian efforts of long duration to master the Northern Sea Rute and advance in the Arctic Region; (2) the development o Arctic and Siberia regions with their wealth of natural rsources drastically elevated the importance of the route; (3) cnstantly increasing Soviet foreign trade, associated with fast gowth of Soviet Merchant Marine, added to route's importance; () the use of the route by foreign shipping, though up to now sow in developing, would probably be intensified in the future; () the military role of the Arctic Region and the Northern Sa Route is significant for the defense (Anti-Air and ASW) ad as a communication artery.

EPILOGUE

Soviet maritime power of today is the result of more than fifty years of the Soviet Union's development as a state. The magnitude of Soviet maritime power historically has generally reflected the level of the Soviet economy or, more correctly of the industrial capacities. More particularly, however, the naval element of Soviet maritime power in a number of instances swung upward in its development from the general level of the Soviet economy. Traditional Soviet preoccupation with defense matters has for a long time produced a peculiar combination of modernity and backwardness in its economy in which the armament sector has received the best production capacities and priority allocation of resources. The civilian sector, on the contrary, being supplied on a residual basis, has been developing much more slowly and still has a technological level below that of most developed countries. Analyzing the Khruschchev period, Michel Garder observed: "Thanks to him, the Soviet Union's military power could frighten, but its internal economy could not inspire envy. Hitler at least produced cannons in order to seize the butter of other countries; the Soviet arsenal was intended

o protect a butter which in the Soviet Union remained an uncommon ommodity".

Together with the seizure of political power in the course f the 1917 Revolution, the Communists inherited a considerable aritime tradition. Historically, the Russians have demonstrated any times a thorough understanding of the importance of the ea and were among the early pioneers of the sea. The drive toward he sea was an essential element of Russian policy for centuries. t is enough to recall Russian stubborness and consistency in ttempts to gain control of the Straits or rights to uninterrupted assage to doubt the claim that Russian development was marked y a lack of understanding of sea power. One may ask what they eeded the straits for - to march their regiments through? The eglect of maritime power by certain rulers was well compensated y the achievements of Peter the Great and the skillful employment f navy under Catherine ghe Great. The Russian Imperial Navy as a center where innovative scientific thoughts often found nderstanding and many were implemented. In turn, the navy roduced a considerable number of officers who distinguished themselves in exploratory and scientific work, and some in the theory of naval art as well. One of the main reasons that Russia failed in the past to achieve a degree of world sea power was the backwardness of her technology and the general weakness of

th economy. The same factors had kept the Soviet Union from becoming a recognized world maritime power, despite the fact that its importance has always been understood and despite two attempts to develop at least the naval element of miritime power in excess of her economic capability.

The rapid industrialization of the Soviet Union interrupted by the World War II was resumed after the war and the economy, restored. The death of Stalin permitted a major revision of Soviet foreign policy, not in respect to the goals, but to the means for achieving the same ends. Mastering of nuclear energy and the beginning of the introduction of nuclear armament probably speeded up the realization by the new Soviet leaders that the od policy of uncompromising confrontation, keeping the country o the brink of war, was dangerous and, in the long run, unproductive. The proclaimed course of peaceful coexistence btter suited Soviet interests in the rapidly changing world. Wile continuing to be antagonistic to many basic interests o the West, the new course implied the development of Soviet mritime power as an essential element. Thus, the accelerated dvelopment and gradual coordinated application of the Soviet mritime power, which permitted Soviet political, economic, and mlitary influence to be extended over a wide range and with far lss direct risk, started in the mid-1950's.

Particular attention has been paid to the underdeveloped orld, specifically the non-allied countries in it. Combining olitical support for key countries with economic and military id, Soviet foreign policy in the selected areas of the Third orld was in most cases quite pragmatic, demonstrating the xistence of a mutually interacting relationship between Soviet ims and capabilities. H. Dinerstein distinguished three types of oviet activity:

(1) denial of influence in neutral areas to adversaries;

(2) intrusion into the opponent's sphere of influence;

(3) promotion of a revolutionary situation.[1]

t is not difficult to see that the maritime power is needed for ll three of them.

The Soviet Union's own economic interests, evident in her apidly growing foreign trade and the development of remote areas f the country rich in natural resources needed to support the rowing industry, as well as defense interests were among the ajor factors generating the quite rapid development of maritime ower, during the second half of the 1950's and the decade of the 960's. Although having the longest coastline in the world washed y 12 seas, the Soviet Union's access to the open ocean is

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[1] H. Dinerstein, Moscow and the Third World: Power Politics r Revolution?; Problems of Communism, January-February 1968, p.52.

handicapped by the peculiar geography, which, while restricting to a degree the employment of maritime power, particularly its naval aspect, does not prevent it.

Moreover, the Soviet Union is not strategically located in relation to the world trade routes. These routes, however, are not the result of geography alone, but to the large degree of the econimic development of certain regions of the world, particularly their industrial capability to produce for export and their purchasing power for imports. Historically, trade routes are constantly shifting, depending upon the emergence or disappearance of those factors in certain regions of the world. It seems that the ability of a military power, and historically it has been a naval power, to adjust the distribution of trade routes is rapidly disappearing. The system of military alliances has produced a number of examples where two opponents belonging to the opposing camps and exercising their navies to combat each other, might be quite faithful trade partners. Such a situation not only has contributed to the development of Soviet foreign trade, but has helped the development of Soviet industry, which, in the final analysis, makes trade possible. The trade also provides the Soviet Union with the opportunity to buy advanced technology from the industrially developed countries of the West. The direct assistance of these technologically advanced countries

o the Soviet effort to develop its maritime power, particularly he merchant marine and fishing fleet, was quite substantial. aradoxically, the same countries, in the mid-1960's realizing he momentum and scope of the Soviet maritime development and eginning to feel its competition started to scream, "The Russians re coming!". In fact, some had invited them.

The role of the Navy as one of the leading forces has been learly recognized in the Soviet Union and, as evident from the xtensive naval programs of the last seventeen years and the ontinuous appearance of new, more sophisticated ships, the Soviet avy has neither a shortage of allocated industrial capacity nor f funds for research and development. The Soviet leadership's atisfaction with the Navy's performance appears to be expressed n the continued presence of Gorshkov as Commander-in-Chief of he Soviet Navy for 17 years, his membership in the Central ommittee of the CPSU and the presence as candidate-member in the entral Committee of two Commanders of the Soviet Fleets, the orthern and the Pacific. The top echelon of the Soviet naval ommand holds the highest ranks ever in the history of the Soviet avy, including one Admiral of the Fleet of the Soviet Union, hree fleet admirals, and a considerable number of full admirals.

Even the top echelon of the Soviet Army has explicitly ecognized the importance of the Navy, and through the Commander-

in-Chief of Ground Forces expresses its "constant readi
support the Navy," a complete turnabout from the traditi
treatment of the Navy as "faithful helper of the Army." Minister of Defense Marshall A. A. Grechko recently said, "under modern conditions combat operations on the oceans and seas are acquiring special significance. Navies can have an enormous impact on the entire course of a future war."[2]

The role of the Soviet ballistic missile submarines in the strategic delivery system is growing, as evident from the intensive Y-class program presently underway. Because of the relative invulnerability of the submarine-based system to preventive attack, it is unlikely that their role will decline in the foreseeable future. For several years, the Soviet ballistic missile submarines (SSBNs) have been considered next in importance only to strategic missile troops. The importance of the number of SSBNs on station seems to be well recognized by the Soviets, as witness the increased total number of submarines and the attempts to increase the ranges of their missiles, which would make them even more invulnerable and reduce transit time and hence, increase time on patrol. While alleged Soviet desire to have an advanced base in Cuba for their ballistic missile submarines, similar to the US base at Holy Loch, cannot be

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[2] Marshall Grechko in Morskoy Sbornik No. 7, 1971, p. 5.

rjected out of hand, it does seem to be a very remote possibility. Wile available port facilities in the areas of naval forces dployment are utilized, the basic trend appears to be to avoid dpendence upon bases. Even the employment of tenders based in Cba and replenishing submarines on the high seas (more likely tan a base for SSBNs) seems to be questionable; even if they wre so employed, it would be only in an auxiliary capacity.

The thesis that the Soviet Navy can operate only behind te shield of the full power base of the USSR seems to be outdated. Te Soviet Navy itself has become a very important element of the Sviet power base, and the question "would the Soviets risk the locaust of a nuclear war?" cannot be applied to the Soviet Uion alone anymore. The most logical answer, of course, is "no"; bt who would? It follows that at any point of confrontation were the naval forces in an area are the main representatives the military power of a state, and they alone have the apability to be employed world-wide, the need for a credible evel of these forces is evident. It appears that the principle s not only understood, but is being implemented by the Soviet avy. If such an assumption is accepted, the logical step ould be a new vision of the Soviet naval policy in the direction f "further to the ocean", i.e. more ships with a self-contained apability in remote deployment, more submarines for close

cooperation with such deployed forces, and inevitable emphasis on the availability of air power - long-range naval aviation for the striking role and reconnaissance, and ship-borne aviation (VTOL aircraft and helicopters) for air defense, including anti-cruise missile defense, and local ASW. This would not mean a drastic revision of the previous Soviet decision not to build attack aircraft carriers, for ships carrying VTOL's and helicopters would not be employed in such a role.

It is questionable whether the Soviet Navy would try to acquire an intervention capability, for there is hardly any need for it. By preventing intervention and supplying arms to friends to deal locally with the opposition as well as to resist intervention by a country whose forces have either outmaneuvered the Soviet Navy or even ignored it, Soviet Maritime power would fulfill one of its important roles. The Soviets have demonstrated a good understanding of the potential of naval power in peacetime to achieve the desired effect in support of national policy. They have found that it is cheaper, less dangerous, and more promising to grant protection from the sea, while supplying enough armament to build up a client country's capability to fight on land.

Any notion of superiority actually pursued by an opponent, or just interpreted as being part of his policy from a position of strength, has been met with irritation by the Soviet Union. The

Soviet government statement on 21 August 1963 declared: "As a result of intensive efforts by the Soviet people, and Soviet scientists in the development of nuclear weaponry, the American nuclear monopoly has been broken, the world Socialist system has acquired its own nuclear shield, and the imperialist powers have been deprived of the material basis for conducting their policy of nuclear blackmail and their policies from a 'position of strength', in relations with the Socialist countries."[3] The discussions of the ULMS system in the US and the Washington Post claim that "the hawks and the doves in Congress have found common ground in pushing for strategic weaponry that promises to draw enemy fire away from the continental United States and toward the sea" produced an extremely negative reaction in the Soviet Union. Several reasons were seen by the Soviets behind the alleged US attempt to adopt an "oceanic strategy":

continuous reliance on force as the chief means of attaining foreign policy goals which "remain unchanged", i.e. allegedly "imperialistic and aggressive";

the desire to obtain unilateral military advantages while talking about "sufficiency" and equal security;

"to divert a retaliatory strike away from the (continental) US";

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[3] Pravda, 21 August 1963.

"to improve the geography", particularly the maritime ography, which, with the advance of ballistic missiles,' legedly became unfavorable to the US ascompared to that of the SR.[4]

Krasnaya Zvezda stated that the calculation to achieve nilateral military advantages" did not materialize in the past, d will not materialize now and "any attempt by anyone to assure litary superiority over the USSR will be met with a corresponding crease of military power to guarantee our defense". The official gazine of the Soviet Navy, *Morskoy Sbornik*, was more specific: here is no doubt that the Soviet Navy, in developing itself the future on the basis of the latest achievements in science, chnology, and production, will increase its strategic capabilities the scale necessary to reliably protect our homeland and the untries of the Socialist community. And if the U.S.A. adopts 'oceanic strategy' as a new course of the "grand strategy," navy will, of course, be on a level which will ensure the solution of problems in the new situation that will arise on the as and oceans."

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[4] *"The Nixon Doctrine: Declarations and Realities"*, a scussion at the Institute on the US of the Academy of Sciences, SR. *USA: Economics, Politics, Ideology*. Moscow, No. 2, bruary 1971, pp. 18-48; *Krasnaya Zvezda*, 13 July 1971; Rear miral Stalbo, *The Zigzags of American Grand Strategy*, Morskoy Sbrnik No. 8, 1971, pp. 96-99.

Admiral Gorshkov's article in Pravda of July 25, 1971, proclaimed: "Vain hopes! No strategy, including the socalled 'oceanic' will save from condign punsihment any aggressor who would risk starting a war against the USSR". Basically the same idea was advanced earlier, criticizing the alleged desire of the US strategy to divert Soviet retaliatory strikes to the ocean-based strategic delivery system by asserting that "American politicans understand that if it comes to a matter of strategic nuclear warfare between the two super powers, then all the socalled strategic limitations will remain basically on paper."[5]

It has become a standard assertion in the Soviet Union that the Americans have always been disturbed by the advantage of the Soviet Union in the size of its territory, in that the US "by expanding its naval forces, has, figuratively speaking, attempted to expand its territory". It was claimed that "the U.S. transition to an 'oceanic strategy' should also be viewed as an attempt to extricate itself from the difficult situation which has arisen due to the fact that geography (as expressed by Vice Admiral Rickover), following the emergence of intercontinental missiles, played a "nasty trick" on the U.S.A. - the oceans have ceased to protect her territory from the vicissitudes of war."[6]

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[5] USA: Economics, Politics, Ideology, No. 2, 1971.

[6] Rear Admiral Stalbo, op. cit., p. 98.

The foregoing Soviet reaction illustrates a sensitivity of the Soviet Union to any attempt by its main opponent, real or imagined, to change the balance of naval forces. The open emphasis on the strategic delivery system in the framework of "oceanic strategy" allegedly emphasized by the United States is not convincing, for, in reality, Soviet concern about the possible growth of general purpose naval forces in the US Navy is not less, and perhaps, is even greater. While the possibility of an all-out war at sea seems to be clearly rejected by the Soviet Union, as it has been in pronouncements of some US officials, the growing importance of naval forces in general, particularly general purpose forces, is clearly recognized.

Besides the military purpose, the role of the world ocean in supporting the life resources of mankind is being viewed by the Soviet Union as extremely important, and their emphasis on the simultaneous development of other elements of maritime power, besides the Navy, is not accidental. The planned 37% increase in merchant marine during the 1971-1975 period (5.3 million dwt; 550 new ships) represents a continuing drive to develop efficient sea transportation, capable not only of assuring the Soviets a pattern of commerce, but also of implementing Soviet foreign policy mainly through economic and

military assistance. Greater emphasis upon more efficient ships inevitably results in their specialization, a trend evident in the current Soviet shipbuilding and from their orders abroad.

The fast expansion of Soviet foreign trade and the demands of domestic transportation generated by the development of new economic regions in the North and the Far East are creating an increasing demand for sea transportation. The Soviet Merchant Marine does not have excessive tonnage in relation to the total demand and while the drive to increase the chartering of Soviet ships by foreign shippers continues, and will most likely increase, the chartering of foreign ships cannot at the same time be reduced substantially. Moreover, while the size and composition of the Soviet Merchant Marine are capable of influencing shipping policies in certain regions, they are not considered great enough to dictate those policies, particularly world-wide. The Soviets are also interested in the profit to be gained, and they are unlikely to operate on uneconomical terms. As members of various international shipping organizations, the Soviets are obliged to observe the rules imposed by them.

It is logical to assume that the Soviet Navy views the civilian ships as a reserve, and contingency plans to utilize them in war time, after conversion and arming, have long existed.[7]

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[7] See, for example, Admiral V. A. Alafuzov critical review of the book, Military Strategy, Morskoy Sbornik No. 1, 1963, p. 96.

t further specialization of the ships and their growing tonnage (rticularly tankers), directed toward satisfying the need of mmerce to be competitive and profitable, makes their military e, even after conversion, questionable.

The inability of Soviet agriculture to meet requirements r protein will most likely continue. This factor alone resents a strong stimulus for further development of a Soviet gh sea fishing fleet despite a declining fish stock and rising t cost. In addition, the demand for higher efficiency and rger fishing ships and the necessity to search for new fishing ounds, which also requires larger and more sophisticated support ps, will intensify. Soviet cooperation in conserving rine resources is virtually assured.

Soviet oceanographic efforts represented by the joint search of numerous scientific organizations and coordinated by e Academy of Sciences has no equal, at least in its scale. efits obtained by the merchant marine and the fishing fleet om oceanographic research are numerous and growing. Heavy phasis on military oceanography and its benefits to the Soviet vy, particularly to submarine operations and ASW, while fficult to measure quantitatively, must be considered substantial. e scope of the Soviet work to master the depths for exploration d exploitation of marine resources is being widened. Intensive

ie of converted submarines for testing equipment and concepts has nc known parallel in the West, and as an idea seems to be very pomising.[8] The simultaneous coordinated use of several ships, ircraft and weather satellites for oceanographic research in a gven region is becoming a routine Soviet practice.

The Soviet shipbuilding industry continues to perform stisfactorily, being neither overloaded nor under utilized. Is output supplemented by sizeable foreign deliveries appears t be satisfying the Soviet demands for ships, both naval and cvilian. Compared with the previous five-year period, either bcause of enlarged production capacities coupled with increased lbor productivity, or because of a planned reduction in naval sip construction which is unlikely, or combination of the two, i the current 1971-1975 five year period it is planned to icrease the domestic share of civilian ship production by 30%. Lrge Soviet orders for ship construction abroad have played a mltiple role. Not only did they provide conditions for the rpid development of the merchant marine and the fishing and oeanographic fleets, and permitted the Soviet shipbuilding idustry to implement extensive naval programs, but they assured

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[8] The latest experiment, during which four aquanauts "who fr the first time ever left the submarine at depths measured in tree-digit numbers" (in meters), and who were in the water "for sveral hours" daily for many days was described in <u>Pravda</u>, Mrch 19, 1972.

the avoidance of an overcapacity in the shipbuilding industry. Of particular importance has been the role of the Warsaw Pact country shipbuilding industries with a considerable degree of specialization in certain types of ships built and mutual deliveries. In general, Soviet shipbuilding has been quite innovative, and a number of new methods in hull assembly and propulsion technology have been employed.

In addition to its important economic role, the development of maritime power has provided the Soviet Union with a tool to be employed in competition for political influence on a world-wide scale. In the Soviet approach, each element of maritime power contributes to a specific political objective. While the main task of the Soviet Navy's general-purpose forces is to neutralize the US Navy influence through selective containment in carefully selected regions, other elements do their job in a coordinated effort, i.e. delivering economic and military assistance, promoting trade, conducting research in waters adjoining a specific region, building ports, teaching how to fish, etc. Quite often such coordinated efforts produce desirable results for the Soviet Union, but Soviet success, whenever and whereever it has been achieved, cannot be explained by their effectiveness along, for the mistakes and ineptitude of the West have played no lesser a role. As Hans Morgenthau observed: "In large parts of the world there

exists today an objective revolutionary situation. This revolutionary situation would exist even if Communism had never been heard of ... that this national and social revolutions are largely identified with Communism is primarily the result of the West's failure to identify with them morally and to support them materially."[9] The Soviet Union definitely took advantage of a number of opportunities, and maritime power played an important role in their exploitation.

The growth of Soviet maritime power has not been marked by size alone, but also by innovation. Its development has rested on a powerful scientific and a reasonably well developed technological base, both supported by the world's most powerful maritime educational establishment, which graduates specialists on a production-line basis. More important, with the obvious support from the leadership, innovative maritime thinking was not only made popular, but encouraged and well rewarded, both morally and materially. Such an attitude should and did produce positive results. In the United States, on the contrary, when the economy slows down, the scientists whose efforts should be essential in restoring the momentum of the economy are fired first. Even while business is normal, those whose research made

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[9] Hans Morgethau, A New Foreign Policy for the US, Praeger, New York, 1969, p. 149.

design and production possible are often paid less than those who sell the product, thus, in effect, being economically penalized for thinking. Such practices result in adherence to outdated concepts, lack of innovativeness, and extrememly high cost of new systems. By way of example, during the post-war period, no single nation ever had more than one fifth of the aircraft carriers than the US Navy did. The carrier became the major ship around which, in effect, the United States Navy had been developed. Of three major innovations, the angled deck, the steam catapult, and the mirror landing methods, each drastically improving the carrier as a platform for launching its singular weapon system, its aircraft, not one was of American origin; all were British inventions. It just happens that Great Britain has been the closest ally of the US, but the fact by itself is alarming. At present, in factors such as variety of submarines, cruise missile armament, types of surface ships, and propulsion systems, it is not the Soviet navy, but the US Navy, which has to catch up.

The development of Soviet maritime power has been product of the industrial and technological base of the country and skillful use of foreign technology, often obtained under adverse political relations with the West. Conceptually, it is wrong to speak about the sudden awakening of the Soviet leadership in understanding the importance of maritime power; it is more correct

to speak of the realization of the long-cherished Russian and Soviet dream to be a great maritime power, achieved by skillful and innovative application of efforts and considerable resources.

The further sophistication of the Warsaw Pact mechanism has, in the decade of the 1960's, resulted in the appearance of combined pact fleets, particularly in the Baltic Sea, and of a sort of integrated merchant marine, no small asset to the total strength of Soviet maritime power. Under the present complex international relations, each increment in Soviet maritime power o in that of her allies is in harsh reality detrimental to the iterests of the US and its allies, providing Moscow with aditional options in the framework of the proclaimed "competition o the two world systems." The challenge to the West resulting fom the Soviet maritime development is constantly increasing troughout the whole maritime spectrum.

N. V. Gogol', a prominent Russian writer of 19th century, compared Russia to a fast moving troika. In "Dead Souls" he wote, "Russia, whither flyest thou? Answer! She gives no aswer. The ringing of bells melts into music; the air, torn into shreds, whirs and rushes like the wind, everything that is n earth is flying by, and the other states and nations, with ooks askance, make way for her and draw aside." In the ontemporary world, there is a new Russia, the Soviet Union, the

state with a different ideology which is alien to the West. erything in that state, including the economy, traditions, ational pride and aspirations, is directed by and subordinated the interests of this ideology. Often chaotic in the past, e gait of the old Russian troika has been replaced by a well ntrolled and coordinated movement, over foreign courses, of a w troika. Recently, for the foreign "drives", to the tired, ging and not very effective thill horse of Communist ideology, o young and growing trace horses were added: one of them is e Soviet economy manifesting itself in the form of growing reign trade, technological assistance, and economic and litary aid, and the second, although a by-product of the first, s Soviet maritime power. The future will show if "other states d nations" will "make way and draw aside." The decision is heirs.

APPENDIX I

WARSAW PACT COUNTRIES

echant Marines

The Counsel for Mutual Economic Assistance, CMEA, began ordination of the economic plans of its members in the 1950's. ntil 1965 this coordination was exercised on the basis of ready approved national plans, but starting in 1965, the ordination of plans preceded their approval by each individual ntry government. In the course of such multilateral coor- ation, the countries have exchanged information on the key atures of their national long-term plans. For example, in 90 and beginning of 1971, the CMEA countries have completed k on the coordination of national economic plans for 1971- 95. Bilateral coordination between the USSR and other CMEA ntries has also been arranged and formalized in the signing f a series of protocols. Compared with the preceding five ears, the Soviet Union's trade with other Comecon countries r 1971-1975 is to increase as follows: by 57% with Bulgaria, re than 50% with Hungary, 56% with East Germany, about 65% h Poland, over 35% with Rumania, and over 40% with echoslovakia.[1]

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[1] New Times No. 4, 1971.

The trade among Comecon countries relies upon the long trm contracts and consistent promotion of socalled Socialist Eonomic Integration. The latter has been especially actively pomoted by the Soviet Union since the decision of the special 2rd Session of the CMEA, held in April 1969. Total volume o Soviet foreign trades with CMEA countries in 1971-1975 priod is planned to exceed 76 billion rubles (growth of 1½ tmes compared with previous five years).[2] The Bucharest's 2th Session of the CMEA considered a long range program for te integration of countries' economies in the next twenty yars.

In the past members of the CMEA were acting on the wrld charter market practically exclusively as importers of poduction of sea transport.[3] With the growth of their merchant mrines, they are becoming more and more exporters of it. In te economic terms, the goal is to achieve at least a positive blance and thus not being forced to spend foreign currencies fr sea transport. Another goal is more political than eonomic - "liberation from the dependence upon capitalist cuntries, in the area of sea transportation."

About 65% of the total volume of Communist countries' tade is among themselves. The volume of goods transported by sa is constantly growing. Presently more than 40% is carried

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[2] New Times No. 3, 1971.

[3] By chartering foreign ships and permitting charter of teir ships, the merchant marines of the Communist countries ae conducting export and import of production of sea transport.

sea and, in general, the rate of development of sea transport xceeds that of land transportation.

The attempts to coordinate activity of the CMEA countries' rchant marines goes back to its creation in 1949 in spite the fact that both the merchant marines of the member untries and the foreign trade were very weak. The acknowledged al of such cooperation is the rational use of tonnage, ordinated action in charter market, and, in general, increased fectiveness of foreign trade and improved balance of payments. 1952 it was decided that the conferences of organizations volved in charter market will be held on the annual basis. 1957, the 8tb Session of the CMEA organized a working oup for transport, whose function among others, was to ordinate plans for the foreign trade transportation. The 58 9th Session of CMEA established a commission for onomical, scientific, and technical cooperation in the area transport. Commission coordinates plans for capital vestment in transport development, research, and is responsible mutual efforts to create scientific research centers and sign bureaus. During the period of 1962-1965 the Commission ordinated plans for the development of sea transport of all mecon members for 1966-1970 period.[4]

Considerable attention was devoted to the ship-building dustries. It was decided to reduce the number of ships types ilt by CMEA countries from sixty down to eighteen and to build

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[4] N. D. Mozharov, "Cooperation of Socialist Countries the area of Sea Transport", Transport PH, Moscow, 1969, p. 76-80.

secialized ships in large series assuring their technological mdernity and suitability for the needs of the CMEA countries.

In 1963 the Bureau for Coordination of Ships' Charter was ceated. The Bureau with headquarters in Moscow assisted in dafting the organizational principles of joint shipping lines. Oe of the reasons behind the coordination of ship charter is "o apply active influence upon world charter market through cordinated action".[5] The proposals for creation of CMEA carter center and liner conferences were under considerations i 1970.

The CMEA organizations dealing with their merchant marine rsemble the North Atlantic Planning Board for Ocean Shipping kown as PBOS. The PBOS purpose has been to mobilize ocean ging shipping in a single pool and allocate it on a world-wide bsis in time of emergency. The Defense Shipping Authority, etablished by the Board, is to insure the effective use of NATO sips, which participating governments should, in war time eergency, place in a central pool for allocation by the Dfense Shipping Authority. Existing organizations and ahieved level of cooperation among Warsaw Pact members in aea of their merchant marines has all provisions if not more, o the Planning Board for Ocean Shipping. In December 1971 a important agreement concerning the CMEA countries cooperation i shipping was signed by all members. The agreement is to asure the coordinated transportation of all foreign trade

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[5] Ibid., p. 82.

argos of the CMEA members, rational distribution of cargo low among ports of various countries and different ship lines,

In general, the development of the CMEA countries merchant rines has been as following: In 1951-1955 period, when the a trade began to develop, the increase of their merchant marines s practically negligible (from 2.2 million tons in 1950 to 5 million tons in 1955). This growth was far behind the mands. The period witnessed a considerable dependence upon artered ships. The United States introduced a number of strictions demanding special permission to charter American ips for the Soviet and Chinese cargos and published list of rategic goods which were prohibited to carry on American ips and ships of the flag of convenience to Communist countries.

In the period of 1955-1960 the foreign trade of the CMEA untries continued to grow, including that with the developed pitalist countries. The growth of merchant marines (2.2 mes during the period) approximately correspondent to e tempo of their foreign trade development. However, it s not enough to overcome lack of tonnage developed in the eceding period. The situation not only improved, but grevated in the early sixties. Victory of the Castro volution in Cuba generated considerable pressure upon the EA countries and their merchant marines. During only one ar, 1961, socalled trade with Cuba grew from 192 million bles to 814 million rubles or 4.3 times.[6] One of the major

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[6] Ibid., p. 84. See also Vodny Transport, January 4, 1972.

argos has been oil. The economic sunctions aggrevated already ad situation with tonnage. For example, Standard Oil of ew Jersey warned the associations of ship owners and brokers hat it will not charter tankers involved in the transportation f oil to the Comecon countries and Cuba. A number of decisions y the U.S. Government applied pressure upon countries whose hips were involved in the delivering cargos to Cuba. All this orced the CMEA countries to accelerate the development of heir merchant marines and to improve their effectiveness. he task "to assure independence of foreign trade from apitalist charter market, to decrease spending of the foreign xchange for charter and to increase effectiveness of the oreign trade" was proclaimed. The task to eliminate the harter of foreign ships was never set up. The available tatistics shows, that simultaneously with a fast growth of he CMEA merchant marines and the steadily increasing number f the Communist ships chartered by foreign countries, the MEA countries charter of foreign ships is being increased oo.[7] During decade of 1960's, the CMEA fleet tonnage ncreased more than twice, while foreign trade grew by 1.5 imes. There were qualitative changes as well. In 1968 more han 40% of the ships were less than five years old, of modern esign, suitable for the needs of the CMEA foreign trade. The reaking point in the fulfillment of proclaimed task was chieved in 1963, when the percentage of tonnage of chartered oreign ships was reduced. In 1966 the ships of Comecon

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[7] Ibid., p. 87.

ountries carried four-fifths of the cargo sold by CIF and ought by FOB.[8]

During the second half of the 1960's there was steady rowth of tonnage and percentage of the CMEA ships chartered y foreign countries, i.e. the growth of the "export" of the roduction of merchant marine.[9]

A brief review of the development of merchant marines f individual CMEA countries (with the exception of the oviet Union) now in order.

Post World War II developments of *Polish Merchant Marine* egan in March of 1946 when twenty-five ships, total capacity f 92,000 registered tons, returned to the country. In 1947 oviet Union transferred to Poland 15%, of 56,000 registered ons, of ships received by reparations. During the six years lan, 1950-1955, the growth of Polish Merchant Marine was slow nd mainly achieved through buying old ships from the Western ountres. Communist victory in China aggravated the situation n Polish Merchant Marine. Trade with China grew during period f 1950-1955 more than eight times. In addition, Poland was major country training China's Merchant Marine crews. The oint lines, ships of which were men by the mixed Polish-Chinese rews, were organized. During the first five-year plan,

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[8] *Ibid*., p. 81, 134-147.

[9] For the details see: 1) B. B. Gorozontov, "*Transport nd International Socialistic Division of Labor*", Moscow, anaie, 1967. 2) "Sea Transport of the USSR during 1966-1970", oscow, Transport, 1967. 3) "Fifty Years of Sea Transport of he Soviet Union," Moscow, Transport, 1967. 4) *Lloyd's Register f Shipping, Statistical Tables, 1950, 1955, 1960, 1967*. 5) N. D. ozharov, *Cooperation of Socialistic Countries in the Area of Sea ransport*, Transport Publishing House, Moscow, 1969.

956-1960, domestic shipbuilding industry provided half the onnage, and the percentage of old ships bought declined. uring the second five-year plan, 1961-1965, the percentage of omestically built ships delivered to Polish Merchant Marine rew up to sixty-three. Starting with 1966, over 95% of the rowth of Polish Merchant Marine was achieved by delivery of ew ships, the majority of them built by the domestic yards. he growth of Polish Merchant Marine tonnage (thousand tons, ead-weight) was as follows: 1949-206; 1955-392; 1960-826; 965-1,288; 1967-1,608.[10] In the middle of 1960's a number f advanced ships were ordered aboard.

All these measures resulted in quantitative renovation nd improvements in economic performance of the Polish Merchant arine. At the end of 1960's the future of the Polish Merchant arine was widely debated.[11] A special committee of the erchant Marine Ministry recommended a plan of merchant marine evelopment up to 1985. According to plan, "the development f sea transport of the country should be oriented mainly on he earning of foreign exchange", and its tonnage in 1985 hould reach 8.5 - 9 million dwt, out of which 3.5 - 4 million wt should be allocated for "export", i.e. for the purpose f earning foreign exchange. The main task of the

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[10] N. D. Mozharov, "Cooperation of Socialist Countries in he Area of Sea Transport", Transport PH, Moscow, 1969, p. 94.

[11] Morski Rocznik Statystyczny; B. Polkowski. Stan i truktura polskiej floty transportowej 31 grudnia 1967, Wyd. nstytutu Morskiego, Gdansk, 1968. (Maritime Statistical earbook. B. Polkovski, "The Condition and Structure of olish Merchant Marine, 31 December 1967", Published by aritime Institute, Gdansk, 1968.

rchant marine of the country was formulated as "protection balance of payment of the state and active support for its provement".[12]

The Polish Merchant Marine industry is relied upon its ell developed ship-building industry. There are three major hip-building yards in Gdansk, Gdynya, and Stettin. As of iddle of 1970 a thousand ships were built in the Polish yards ut of which were more than 700 ships sold.[13] As of 1969, 8% of ships sold were delivered to the Soviet Union.[14] At he beginning of 1971, Gdansk shipyard had built for export 66 ships out of which 425 were built for the USSR. The SSR bought close to three million tons of Polish built ships uring the decades of 1950's and 1960's. Presently, about 0% of Soviet Merchant Marine tonnage are represented by hips built in Poland.[15]

The size of the Polish built ships is being constantly increased. Polish ship-building techniques is quite advanced and many innovations (including welding of ship-s sections afloat) are employed. Toward the end of 1970, the following types of ships were under construction or planned: three types

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[12] Plan perspektywiczny Zeglugi morskiej. Technika i gospodarka morska, (Prospective Plan of Merchant Marine, Technology and Maritime Management"), 1967., No. 11.

[13] Sovetskaya Rossiya, June 9, 1970, and Economicheskaya Gazeta No. 27, July 1969.

[14] Pravda, April 16, 1971.

[15] Izvestiya, February 12 and February 25, 1971.

of tankers, the largest 94,500 dwt; seven types of bulk carriers, the largest 75,000 dwt; twelve types of general cargo ships, some with seppd of 22 knots; three types of refrigerator ships. Soviet Union continues to be the major customer of Polish built ships and in 1971 additional orders were signed with Polish foreign trade enterprise Centromor. According to the agreement, in a period of 1972-1975, Poland will built thirty-five universal ships with total cargo capacity of 262,000 tons and nine large fish processing factories.[16]

Most of the propulsion plants for Polish built ships are domestically produced. Poznan's Cegielski plant is one of the largest European diesel building enterprises. Most of the diesels are built on foreign licenses from Zulzer, Burmeister and Wain, and Fiat. The second enterprise, Zgoda, builds smaller high revolution diesels of 1,500 to 3,000 horsepower output. A rather extensive network of education, research, and design institutions support the Polish Merchant Marine industry.

At the end of 1970, the Polish Merchant Marine consisted of 259 ships, with total cargo capacity of more than 1,900,000 tons. More than half of this tonnage was represented by ships less than five years old. According to the 1971-1975 plan, Polish Merchant Marine will be enlarged by 99 ships and in 1975 its tonnage should reach 3.5 million tons. A new "Northern Port" in Gdansk, capable of handling ships up to 100,000 dwt

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[16] Ibid.

(and in future up to 250,000 dwt) will be built. The construction of this port proclaimed to be a national task.[17]

East Germany (German Democratic Republic - GDR) has the third largest, after the Soviet Union and Poland, merchant marine among Warsaw Pact Countries. At the end of 1955 East German Merchant Marine had 9 ships. In 1957, the first two domestically built ships entered the service. The urgent need for a greater number of ships forced the East German Government to adopt in 1958 a decision for accelerated development of its merchant marine. During 1958-1960 period, fourteen old ships were bought agroad and twenty new ships were built at domestic yards. Two tankers were built in the Soviet Union. All these measures resulted in the rather rapid growth of East German Merchant Marine. If in 1950 it had 1.3 thousand dwt, in 1960 it has 277,000, in 1965, 794,000, and in 1970 it was 1.3 million dwt.[18] Between 1958 and 1967 cargo turnover of East German Merchant Marine grew more than fifty times, and in 1967 it was 23,608 million ton-miles.[19] Simultaneously, East German port structure was rapidly developed. According to a special decision of October 1957, the construction of Rostok port was proclaimed as a national task. This port, the largest in East Germany, became the major East German port

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[17] Vodnyy Transport, July 15, 1971.

[18] Statistiches Jahrbuch der Deutschen Demoktattschen Republik, 1968. ("German Democratic Republic's Yearbook of Statistics", 1968, 1970).

[19] New Times No. 17, 1969.

to service cargo to Cuba. According to new 1971-1975 plan in 1975 East German Merchant Marine should grow to 1,750,000 dwt.[20]

East German ship-building industry is no less important. There are twelve ship-building yards. The major of them are located in the Rostok area:

1. The Warnow Yard in Warnemunde, employs over 8,000 workers, and specializes on construction of dry cargo ships up to 16,000 dwt. Total annual production close to 200,000 dwt.
2. The Neptune Yard in Rostok specializes in building dry cargo ships up to 11,000 dwt, research vessels and auxiliary ships. Total annual production close to 100,000 dwt.
3. The Stralsund Yard employs over 6,000 workers and specializes in building fishing vessels. Annual output is more than 80,000 reg. tons (74,369 reg. tons of 1970 output went to the Soviet Union). Quite advance methods of ship-building - sectional and block, automated steel processing - are employed by the yard.
4. The Wismar Yard also employs over 6,000 workers, but it specializes in building of passenger liners up to 25,000 reg. tons, fishing factory-ships, refrigerators and expeditionary ships. Annual output is 50,000 dwt.

Two machine building factories, one in Rostok and second in Magdeburg, are producing diesels for all types of ships. Presently, East German ship-building industry completely satisfies the needs of its merchant marine, and the bulk of the production is going for export. The major consumer is the Soviet Union.

During twenty years more than 3,000 ships were built. Twenty-six countries have ordered ships from East Germany, particularly famous for its fishing vessels (19% of world's total are East German built). In 1970 92% of the newly

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[20] *Morskoy Flot No. 11*, 1970.

onstructed tonnage went for export.[21] According to all agree-ents signed between USSR and East Germany only in 1970, the otal delivery of ships amounted to 800,000,000 rubles. East erman ship-building industry was first to initiate construction f container ships among Communist countries. At the present ontainer ships up to 23,000 tons are built.[22] The industry s supported by an extensive network of research institutes.

As a result of World War II, Rumania lost practically ll of its merchant fleet. In 1950 eight ships were obtained nd, later, up to 1960 Rumanian fleet did not grow. In the eriod of 1960-1965 the fast growth of Rumanian fleet was chieved, mainly by the deliveries of domestically built hips. The growth of Rumanian fleet can be illustrated by he following figures: 1960-31,000 dwt; 1965-166,000 dwt; 970--around 600,000 dwt.[23]

Rumanian ship-building industry is quite advanced and ast growing. During 1971-1975 its output should be tripled, ompared with 1970. There are six ship-building yards, major f them located in Galati, Turnu-Severin, and Constanta. oviet Union has been the major customer of the Rumanian ship-uilding industry. However, in the last two or three years oviet's orders have been reduced.[24]

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[21] Vodnyy Transport, June 15, 1971; Sudostroyeniye No. 8, 971, pp. 72-73.

[22] Vodnyy Transport, May 8, 1971; Pravda, March 2, 1972.

[23] N. D. Mozharov, pp. 107-108.

[24] Vodnyy Transport, October 21, 1971.

Up to 1960 development of the Bulgarian Merchant Marine was slow, but was vastly accelerated during the decade of 1960's. If in 1960 total deadweight was 60,000 tons, in 1965 it was 576,000 tons and in 1970 it exceeded one million tons. Beginning in 1967 Bulgarian Merchant Marines became profitable and started to earn foreign exchange. The growth of Bulgarian Merchant Marine has been mainly achieved by domestic ship-building industry. In 1950 a joing Soviet-Bulgarian ship-building and repair enterprise, Korbso, was set up. In 1954 it became a Bulgarian enterprise which merged with three other shipyards in Varna and became known as Georgi Dimitrov ship-building yard and ship repair yard. Another ship-building yard, in Burgas, is presently being enlarged. Bulgaria builds ships for Poland, Hungary, Czechoslovakia, North Korea, China, and Norway, but its major customer has been the Soviet Union. Presently, different types of ships are being built, including bulk carriers up to 38,000 dwt. The Bulgarian Merchant Marine should be doubled during the 1971-1975 period primarily by the deliveries at domestic ship-building industry. It is also planned to increase the use of Bulgarian ships for charter and the task to increase foreign currency earning power of merchant marine has been set.[25]

Hungary has two types of merchant fleets - sea and mixed, river-sea, navigation. Total tonnage of both fleets in 1967 exceeded 28,000 dwt.[26] Hungarian ship-building industry builds

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[25] Vodnyy Transport, February 14, 1971.

[26] N. D. Mozharov; p. 118.

hips up to 2,000 dwt. Seventy-five per cent of its production s going for export. Most ships have been ordered by the oviet Union. However, orders from England, Belgium, Italy, uba, Greece, and other countries have been received.[27]

Even Czechoslovakia has its own merchant marine. As of 967 its whole fleet - ten ships of some 150,000 tons was mployed in liner shippings, serving two lines: Far Eastern, rom Black Sea, and Baltic-Cuba (joint with East Germany, uba, and Poland).[28]

Growing foreign trade of Comecon countries, among themselves as well as with capitalist and developing countries, he desire to economize on the transportation, particularly in terms of foreign exchange, the need to participate in programs such as economic-military aid, assistance to North Vietnam, and Cuba forced the CMEA members to accelerate the development of their merchant marines. None of them excludes charter of foreign ships, but the policy of "positive balance in the sea transport charter" has been vigorously pursued, particularly by Poland, Bulgaria, and East Germany.

If, in the past, considerable percentage of ships for their merchant marines was bought from Western countries and Japan, the development of domestic ship-building industries has reduced it considerably, and the majority of CMEA countries are ship's exporters. By large, the major portion of their

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[27] New York Times, March 7, 1967.

[28] N. D. Mozharov, p. 124-125.

hip-building capacities is occupied by the Soviet orders hich certainly stimulated the industries' development and ave helped the Soviet Union to develop its merchant marine, ishing, and oceanographic fleets. Parallel to the constantly ncreasing tonnage, the measures designed to improve effectiveness of the industry have been implemented. At the present, he coordination of the CMEA countries' Merchant Marines, oint nature of their operation and control exercised from oscow are such, that to a certain degree one can speak of ntegrated fleet, or CMEA's Merchant Marine. Effectiveness f it has been particularly well demonstrated by the ninterrupted delivery of cargo to Cuba, North Vietnam, and he Middle East.

avies

The development, or more precisely, the gradual restortion of the navies by the present East European members of he Warsaw Pact was initiated soon after the end of World War I. The Soviet Union granted major assistance initially to he Polish and Bulgarian navies, and later to the East German nd Rumanian navies. The initial order of battle of the ast European countries' navies represented a not very umerous collection of old, mainly obsolete ships with the ame quality of armament. Soviet deliveries of warships o these countries could not and did not change the situation, or in the main they, too, were old and to a large degree bsolete ships. The situation with the personnel of East

ropean navies was, however, different. A large number of lish and Bulgarian and later East German and Rumanian val officers were trained in Soviet naval schools and the ademy. Since the early 1950's these countries initiated te training of future naval officers domestically, but vanced training, although on diminished scale, continued i the Soviet Navy education establishment.

While the Polish, Bulgarian, and Rumanian navies had en developing openly, the East German Navy officially did t come into existence until January 1956. Nonetheless, e East German naval forces, although not numerous and rong, have been in existence since late 1940's when the rst units of the socalled Sea Police were organized.[29]

With the creation of the Warsaw Treaty Organization (WTO) n 14 May 1955, a new course was set for the development f East European navies. Much closer cooperation between e East European and Soviet navies has been established, ralleling the renovation of forces. An operational system posed of the Soviet Baltic Fleet, the Polish Navy, and e East German Navy, which in the event of a war would l be subordinated to a joint command, has been established n the Baltic.[30] During the second half of the 1950's the iets delivered warships to Poland (Skory-class destroyers,

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[29] Marine Rundschau No. 1, 1969, pp. 16-33.

[30] Przeglad Morski (Polish Maritime Review) No. 6, e 1968, pp. 29-41.

submarines and torpedo boats) and East Germany (Riga-class escorts, torpedo and patrol boats). On a somewhat smaller scale, Soviet ships were transferred to the Bulgarian and Rumanian navies as well. Simultaneously, domestic construction was initiated of warships outfitted with Soviet armament and equipment or produced according to Soviet designs. Gradually, starting in the late 1950's there have been joint exercises of the Soviet Baltic Fleet with the Polish and East German navies and the Black Sea Fleet with the Bulgarian and Rumanian navies. While Rumania has refrained to a large degree from joint exercises, in late 1960's Bulgaria, in contrast, went further than ever before, exercising her ships together with the Soviet Mediterranean Eskadra.

In the Baltic, the cooperation of Warsaw Pact navies is particularly extensive. After acquiring an amphibious capability, development of which started in the early 1960's, a number of joint landing exercises have been observed, including one during exercise Sever (1968), in which forces from all three navies participated. The Polish Navy has a shore defense division trained for amphibious landing while East Germany uses specially trained army regiment for this purpose.[31] In the summer of 1971 joint Soviet-Polish and East German naval forces for the first time carried out exercises in the Skagerrak off southern Norway.[32]

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[31] Marine Rundschau, January-February 1972, pp. 91-97; and No. 1, 1969, pp. 32-33.

[32] Internation Defense Digest No. 4, 1971.

The decisions of the March 1969 Budapest meeting of the TO Political Consultative Committee established the Committee f Defense Ministers, and outlined new provisions concerning he combined (Ob'yedinennyye) armed forces and combined arsaw Pact command. The necessity for wider application of ommon principles in military theory, training methods, and ilitary education were emphasized during the meeting. The nits for the combined naval forces of the WTO are allocated rom the navies of member nations.[33] The March 1971 Budapest eeting of the Committee of Warsaw Pact Defense Ministers onsidered the further improvement of the WTO armed forces nfrastructure, the further development of means of control nd prospects for the joint development of their armies and avies.[34]

Recently, the Warsaw Pact navies have been supplied with ore sophisticated armament and better ships, both domestically nd Soviet built. Thus, it was reported that East German SW Forces are being reinforced with new ships propelled by combined gas turbine-diesel plant. The Polish Navy eceived its first missile armed ship, a converted Kotlin-lass destroyer armed with SAMs.[35]

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[33] Marshall Grechko in Pravda, February 23, 1970; and rmy General Shtemenko; Combined Brotherhood, <u>Krasnaya</u> <u>vezda</u>, February 22, 1970.

[34] <u>Izvestiya</u>, March 5, 1971.

[35] <u>Politik und Wirtschaft No.95</u>, 10 December 1971.

NAVIES OF EAST EUROPEAN COUNTRIES, MEMBERS OF WTO

Forces Country	Destroyers	Escorts	Submarines	Mine-sweepers	Guided missile boats	Patrol boats	Torpedo boats	Landing ships	Personn
Poland	4 (1)	8 (2)	5	24	12	38	20	22	20,000
East Germany (GDR)	---	2 (3)	---	31	12	26	62	18	16,000
Bulgaria	---	2	2	6	---	6	12	14	9,000
Rumania	---	---	---	26	5	3	---	---	5,000

(1) - including 1 DLG
(2) - submarine chasers
(3) - Riga-class

Sources: 1) Jane's, 1971-1972
2) The Military Balance 1971-1972 (IISS)

The naval strength of the Warsaw Pact countries illusrated by the table obviously augments the Soviet Navy potenial for coastal operations in the Baltic and Black Sea areas. t also provides the Soviet Navy with a legal pretext for the dvance (300-400 miles) base system. The East European navies osess types of ships in considerable number which are essenial for fulfilling certain tasks assigned to the naval forces f the Warsaw Pact, including amphibious operations, mine and ounter-mine operations, ASW and limited support of Soviet ubmarines, and support of the army flank. The Warsaw Pact rovides the Soviet Union with better opportunities to improve ts strategic position in the two maritime flanks of the Euroean theater of war.

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[36] See Dr. R. A. Remington, <u>The Warsaw Pact</u>: Case Studies in Communist Conflict Resolution, Cambridge, Massachusetts: M.I.T. Press, 268 pp., 1971.

APPENDIX II

SOVIET FOREIGN TRADE, ECONOMIC AND MILITARY AID

oreign Trade

Pre-revolutionary Russia traded with many countries, ut only a few major European countries and the United States layed a decisive role. Germany was the most important rading partner, accounting for nearly 40% of trade turnover n 1913.

Soon after the 1917 October Revolution, all foreign and nternal debts were counselled.[1] In December 12, 1917, the upreme National Economic Council (SNEC) adopted the resolution on interim order in the field of foreign trade" under hich the export and import activity could be conducted only y permission of the export department of the SNEC. By the 29 December 1917 resolution of the Council of People's Commissars the foreign trade department of the People's Commissariat of Commerce and Industry was granted exclusive right to issue licenses for export and import. Finally, by a decree of the Council of People's Commissars of 22 April 1918 foreign trade was nationalized, thus creating a state monoply.

During the first years of Soviet power, trade relations

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[1] Voprosy Istorii (Problems of History) No. 6, 1967, pp. 38-53.

were maintained only with few neutral countries, mainly Sweden. During the first three years, 1918, 1919, and 1920, the exports totalled only 7.5 million rubles and imports 87.5 million rubles, thus creating an 80-million ruble deficit. In January 1920 the Entente Supreme Council resolution permitted the exchange of commodities with Russia on condition that trade be carried out with the Soviet cooperative organizations rather than directly with the Soviet government, which was not recognized.

The Soviet government then began its diplomatic maneuvering. A peace treaty signed with Estonia on February 2, 1920, was an important step in the development of foreign trade, for it helped the Soviets to come out on the West European markets and thus reducing the impact of the Entente Supreme Council resolution. The peace treaties with Lithuania, Latvia, Finland, and Poland served the same purpose, because the treaties were followed by the organization of foreign trade agencies abroad in the form of the trade delegation of Soviet Russia. The result was that in 1921 Soviet foreign trade was eight times greater than that of 1920, exports growing 14 times and the imports more than seven times. (In 1921 the import of food stuffs constituted 60% of all imports and played an important role in easing the famine.)

But the Entente resolution continued to handicap the development of Soviet foreign trade a great deal. Under the circumstances, the Soviet government decision on December 2, 1922, granted the Centrosoyuz (The Central Cooperatives Union) the right to administer its foreign trade through national

ooperatives associations and also through any international holesale purchases cooperative union. On December 5, 1921, he People's Commissariat of Foreign Trade and the Centrosoyuz igned an agreement under which the latter acted as the ommissioner of the Commissariat in foreign markets.[2] The alance of foreign trade continued to be unfavorable to the oviet Union, and in 1921 reached a deficit of 150 million ubles, which has to be covered by the sale of gold, reserves f which were very limited. What the Soviets needed were redits, which were refused until the Soviet government ecognized the pre-war and wartime debts of Tsarist Russia nd the Provisional government. During the Genoa Economic onference, the Soviets were presented with a bill for 18.5 illion so called gold rubles, whereupon the Soviet delegation resented a counterbill, indicating that the Allied intervention and blockade, and the Civil War which they supported or more than three years had caused losses to Russia of 39 billion rubles. Obviously, the Conference was deadlocked.

The Rapallo Treaty signed on April 16, 1922, helped the Soviet Union in developing its foreign trade. Even more favorable development resulted in 1924 after the establishment of diplomatic relations with Britain, Italy, Austria, Norway, Sweden, China, Denmark, Mexico, and France. Total foreign trade turnover in 1924 reached 470 million rubles, in 1925,

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[2] Voprosy Istorii No. 8, 1967, pp. 42-48.

,123 million rubles, and in 1928, 1,377 million rubles. uring the four years of the first Five Year Plan (1929-1932), he turnover of Soviet foreign trade was 5,900 million rubles. ollowing a policy of promoting rapid industrialization, the ommodity group "plant and equipment" represented close to 0% of the entire Soviet imports during the period and was qual to the total amount of plant and equipment imported uring the period of 1918-1928.

The major stress, however, was placed on the policy f so called liberation of the Soviet Union from import ependence by developing domestic industry. The most evealing example of such a policy can be cited in case of ractor production. In the early 1930's, forced collectiviation of the Soviet agriculture required machines, mainly ractors. In 1931 the tractor imports were already 2.5 times reater than in 1929.

The first large industrial enterprise built during the irst Five Year Plan was the Stalingrad, now the Volgograd, ractor Plant, stocked with American equipment which cost 8 million rubles to import. The Kharkov Tractor Plant, which was built two years later, was partially equipped with Soviet made machinery, while the value of imported machinery was only 12 million rubles. While in 1924-1931 180 million rubles were spent to import 86,000 tractors, in 1934 the Soviet tractor producing enterprises produced 93,500 tractors at a cost of 58 million rubles. Starting in 1933, the tractor imports into the Soviet Union were stopped.[3]

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[3] *Voprosy Istorii No. 6*, 1967, p. 41.

During the second Five Year Plan (1933-1938) and in general up to the beginning of World War II, Soviet foreign trade had been consistently declining (with the exception of 1940, when trade with Nazi Germany somewhat increased total foreign trade turnover after the signing of the Soviet-German pact). There were a number of reasons for this. Soviet authors liked to emphasize industralization as a major one. While this is an important factor, it should be stressed, however, that a number of political reasons were no less important in the curtailment of Soviet foreign trade. Before the Nazis came to power, Germany was the biggest trading partner of the Soviet Union. Also important were trading relations with Italy and Japan, which degenerated sharply after 1933. Moreover, the major export items were raw materials, which the Soviet industry, involved in an extensive military build-up, needed for itself and hence the shortage of foreign exchange. The trade figures in millions of rubles were as follows:

Year	Export	Import	Turnover
1930	813	830	1,643
1933	388	273	661
1935	288	189	477
1940	240	242	482

Source: Voprosy Istorii No. 8, 1967.

The first post-war years produced drastic changes in the orientation of Soviet foreign trade, which began to grow steadily soon after the restoration of the Soviet economy, which was basically completed at the end of 1940's. If in

946, total trade turnover with Western countries amounted to 91 million rubles of which 304 was with the United States; n 1950 it was 440 million rubles, of which only 50 million ubles was with the United States. Meanwhile, the trade ith socialist countries, especially after the creation of he Council for Mutual Economic Assistance (CMEA) has played decisive role, as can be seen from the table below.

POSTWAR SOVIET FOREIGN TRADE

(Millions of rublos, in prices at the time)

		1950	1955	1960	1965
otal	a	2,925	5,838	10,071	14,598
	b	1,615	3,083	5,005	7,350
	c	1,310	2,755	3,581	5,049
ith all socialist countries	a	2,373	4,662	7,371	10,048
	b	1,270	2,453	3,790	4,999
	c	1,023	2,209	3,581	5,049
ith CMEA countries	a	1,753	3,267	5,469	8,471
	b	938	1,722	2,881	4,210
	c	815	1,545	2,588	4,261
ith developing countries	a	112	272	783	1,743
	b	29	128	302	1,009
	c	83	144	481	734
ith developed (capitalist) countries	a	440	904	1,917	2,806
	b	236	502	913	1,341
	c	204	402	1,004	1,465

a - Turnover
b - Export
c - Import

Source - Voprosy Istorii No. 8, 1967.

SOVIET TRADE WITH DEVELOPED COUNTRIES

(In millions of rubles)

	1946	1950	1955	1960	1965	1970
Ttal	491	440	904	1,917	2,806	4,700
Bitain	36	128	216	271	399	641
Fnland	62	55	211	264	408	531
Wst Germany	0	0	48	286	248	544
Fance	35	6	86	183	202	413
Ialy	0.5	34	30	173	225	472
Seden	14	31	41	90	98	235
Sitzerland	0.7	10	11	13	28	61*
Astria	1	23	44	116	102	155
Blgium	6	28	35	46	74	149*
Hlland	1	5	60	63	85	154*
apan	0	4	4	124	326	652
anada	6	0.3	4	14	240	131*
SA	304	50	22	76	89	161

- 1968 figures

ource - International Affairs #12, 1969; New Times #14, April 1971; Ekonomicheskaya Gazeta #24, June, 1971.

After the Communist victory in China, Soviet trade with that country grew steadily, reaching its peak in 1959, when total turnover was 1,850 million rubles. However, the decline since 1959 was considerably faster than the growth during the previous period. Between 1960 and 1965 the volume of Soviet-Chinese trade dropped to nearly one-fifth and in 1965 it amounted to only 376 million rubles. In 1969 the trade between two Communist giants reached its lowest point (around 50 million rubles).[4] At the end of 1970 a trade agreement between the Soviet Union and China was signed resulting in the somewhat increased amount of trade for the following year.

Soviet deliveries of industrial raw materials played an important role in trade with the CMEA countries. Between 1955 and 1965 the USSR delivered 168 million tons of iron ore, 5.5 million tons of manganese ore and more than 25 million tons of coke to the CMEA countries. Trade between them has been conducted on the basis of long-term agreements. During the decade of the 1960's East Germany replaced China as the Soviet's biggest foreign trade partner.

Khrushchev's decision to intensify the development of the Soviet chemical industry at the end of the 1950's contributed to a considerable increase in the Soviet foreign trade with the developed countries. But the availability of credit remained to be a major obstacle. The method of bilateral trade and clearing accounts applied for the first time after

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[4] Economicheskaya Gazeta No. 24, June 1971, and Izvestiya, 26 August 1971.

he war in trade between the Soviet Union and Western countries as replaced during the 1960's by accounts in freely convertible urrency. Under these conditions, the problem of balancing xports and imports became less acute.

However, it has always been general Soviet foreign trade olicy to strive to balance its receipts and expenditures for ny given individual country. Soviet imports from the ndustrially developed countries consist mainly of machinery nd equipment and sophisticated manufacturers. The major oviet problem in trading with industrially developed countries s the structure of Soviet exports, which has been mainly epresented by raw materials.[5]

The structure of Soviet exports and imports has also een changing in the post World War II period. The share f plant and equipment in export has been growing and as arly as 1965 amounted to 1,472 million rubles. Oil and il products had been the next largest item in the Soviet xports. During the period of 1955-1965 more than 360 illion tons of oil and oil products valued at 6,300 million ubles were exported. The third biggest Soviet commodity roup, accounted for over 10% of the total export, was iron nd steel.

On the whole, the turnover of Soviet foreign trade during he period of the Seven Year Plan (1958-1965) had been increasing faster than planned. According to the plan, Soviet foreign trade in 1965 was to exceed the 1958 level by 50% but

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[5] International Affairs No. 12, 1969, pp. 29-33.

te actual increase during the period was 1.9 times.

The 23rd Party Congress Directives for the 1966-1970 ive Year Plan demanded a further increase in the Soviet oreign trade with the improvement of the structure of oviet exports to be achieved mainly by stepping-up the export machines, equipment, instruments, transport, and communcation facilities and other finished goods of the processing ndustry.

As can be seen from the table, Soviet Foreign Trade, 965-1970, the volume of Soviet foreign trade during the eriod 1966-1970 exceeded 91,000 million rubles compared ith 64,000 million rubles in 1961-1965. The average annual ncrease of Soviet foreign trade during that period, 8.8%, xceeded the rate of growth of national income, 7.1%.[6]

The Soviet Union is trading with over a hundred countries. ut, nearly two-thirds of the trade turnover in 1966-1970 60,600 million rubles) was with the Socialist countries CMEA countries amounted to 51,600 million rubles). Nearly alf of the machinery and equipment exported by the CMEA ountries were bought by the Soviet Union including 85% of he shipping tonnage and marine equipment.[7]

While the volume of trade with the developed countries uring the five years increased from 2,800 million rubles in 965 to 4,700 million rubles in 1970, their share in the total olume of Soviet foreign trade decreased somewhat toward the nd of the period from 21.9% in 1969 to 21.3% in 1970.

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[6] _Economicheskaya Gazeta #24_, June 1971.

[7] _New Times #50_, December 16, 1970.

SOVIET FOREIGN TRADE, 1965-1970

(000 million rubles, in prices at the time)

	1965	1966	1967	1968	1969	1970
otal turnover	14.6	15.1	16.4	18.0	19.8	22.1
With Socialist countries	10.0	10.0	11.1	12.1	12.9	14.4
ith CMEA ountries	8.5	8.4	9.3	10.3	11.2	12.3
ith developing ountries	1.8	1.9	1.9	2.0	2.5	3.0
ith developed capitalist) ountries	2.8	3.2	3.4	3.9	4.4	4.7

Source - New Times #50, 1970, and Economicheskaya Gazeta 24, June 1971.

Trade with Japan during five years, 1966-1970, amounted to 2,600 million rubles. In 1970, it stood at 653 million rubles, placing Japan first among Soviet trading partners of the developed countries (Great Britain, with 641 million rubles, was second). Nearly 96% of Soviet exports to Japan were raw materials and less than 1%, engineering products. Soviet imports from Japan, in contrast, were mostly manufactured goods. The new trade agreement signed at the end of September 1971 envisages a total turnover of 4,750 million rubles over the five years 1971-1975. The 1975 annual target is set at 1,000 million rubles.[8] Joint development of the Port of Wrangel, with its facilities designed to handle 10 million tons of coal, 800,000 tons of wood chips, and 140,000 containers annually and Soviet approval for the transshipment of containerized cargo across Siberia between Japan and Europe, should further increase the volume of Soviet-Japanese foreign trade. The general agreement concerning the development of the Port of Wrangel Bay was signed in December 1970 with the YV Kabushiki Kaisha firm acting on behalf of fourteen cooperating Japanese companies.[9]

Trade with the developing countries during 1966-1970 amounted to over 11,000 million rubles - 4,000 million more than in 1961-1965, - representing 13.5% of the total Soviet foreign trade. In 1970 total turnover with Egypt was 606 million rubles, with India, 365 million rubles, Iran, 231 million

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[8] New Times #42, 1971, pp. 20-21.

[9] Ibid., p. 21.

ubles, Algeria, 118 million rubles.

In 1970 Soviet exports amounted to 11.5 billion rubles. he task set by the 23rd Party Congress for a considerable ncrease in export of machinery and equipment can hardly be alled fulfilled, increasing from 20% in 1965 to 21.5% in 1970.

In 1970 imports amounted to 10.6 billion rubles, of hich more than one-third was spent on machines and equipment. n 1970 more than 600 million rubles were spent for ships nd ship equipment and 297 million rubles, for auto transport.[10]

According to directives of the 24th Party Congress, foreign rade during the period of 1971-1975 is supposed to increase y 33-35% with the main role, as always, assigned to the ocialist countries. In 1975, annual foreign trade turnover s supposed to reach approximately 30 billion rubles. Total rade turnover with the CMEA countries for 1971-1975 period s planned at over 76 billion rubles, an increase of more han half compared with 1966-1970. An unspecified increase in olume of trade and greater scientific and technical ooperation with the developing countries was also promised. number of long-term agreements signed with France, Britain, inland, Japan, Italy, Sweden, and other developed countries hould certainly produce a considerable increase in trade. he availability of long-term and rather large credits from he developed capitalist countries, particularly for a truck uilt plant, large diameter oil pipes, and the development

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[10] *Economicheskaya Gazeta No. 24*, June 1971.

of Siberia might help to generate a considerable increase in the Soviet trade.[11]

For years, the Soviet Union has been active in oil exports, the majority of which have been seaborne. Oil exports have brought a considerable amount of hard currency and have also generated the demand for a rather sizeable tanker fleet. In the period between the two world wars, the USSR exported 50 million tons of oil and oil products. After the war the export of oil was resumed in 1955.[12] A considerable portion (approximately 1/3) of the Soviet oil export goes to the Socialist countries, particularly to the CMEA members. The remaining two-thirds are sold to West European countries and Japan. Starting in 1960 the Soviet Union began delivery of oil to Cuba (approximately 4 million tons per year). Soviet oil to Poland and East Germany, with the further possibility of delivering it to some West European countries, is pumped through the Druzhba (Friendship) pipeline. In 1966 the Soviet export of oil amounted to 73 million tons, of which 41 million tons were sold to the developed countries.[13] The Soviet Union presently operates a few oil corporations, which might be called international, NAFTA-A in Finland and NAFTA-B in Belgium. In Belgium the Soviets hold 60% of the company's stock with an investment

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[11] Economicheskaya Gazeta #24, June 1971, and New Times #14, April 1971.

[12] Economicheskaya Gazeta No. 39, 1967.

[13] Ibid.

f 750 million Belgian francs. A Soviet Company, NAFTA imited, exists in Great Britain.[14]

The Soviet Union has 18,600 miles of oil pipelines, epresenting 13% of the world's total. New pipelines from estern Siberia oil fields are planned. In addition to the estern line, the 3,700-mile eastern line would bring iberian oil to Nakhodka, which is about 400 miles from apan. It was reported that the Soviet negotiators tried o persuade Japan to participate in the construction of hese pipelines, arguing that the 1.9 billion dollars needed o built the line would be a small price to pay for reduced ependence on Middle East oil.[15]

The plan for stepped-up cooperation with the Soviet Union n exploiting Soviet natural gas and oil resources was nounced in Tokyo. The agreement, reached on September 7, 971, reflected the decision of Japanese business to go ead with two projects to explore oil deposits in Tyumen', stern Siberia, and to secure stable natural gas supplies r Japan through a pipeline from north Sakhalin and Yakutsk, stern Siberia.[16]

Construction of a refinery at Nakhodka oil base had ready handled 4 million tons of oil.[17] It is planned to

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[14] *Vodnyy Transport*, July 17, 1971.

[15] *Washington Post*, February 28, 1971.

[16] *Washington Post*, September 9, 1971.

[17] *Vyshka*, June 18, 1971, p. 2.

ncrease the base capacity by 150%. Large off-shore gas nd oil deposits were discovered in the Sakhalin area.

During the previous five-year period an important oil xport base was established in Ventspills on the Baltic Sea ith a capacity to export 6 million tons a year. It is lanned to double this capacity during the current Five Year lan. The Soviet oil output for 1975 is planned to be 500 illion tons, so it would be logical to expect an increase n Soviet oil exports.

At the end of 1963 the Soviet Union entered negotiations ith a number of foreign ship owners for the delivery of oviet built ships.[18] The Soviet Union had delivered ships o some foreign, mainly Communist, countries, previously, ut their number was small. Since the middle 1960's, the hip export has been growing steadily. During the last our years, Sudoimport sold to a number of countries, including est Germany, Great Britain, Sweden, 26 dry cargo ships, wo tankers (one fifty thousand tonner), eight production and ransport refrigerators. A hundred or more Kometa passenger ydrofoils have been exported since 1967 to Yugoslavia, est Germany, Finland, and since spring 1970, to the Western emisphere, when International Hydrolines Incorporated of ew York, bought the first vessel and started hydrofoil ervice in the Virgin Islands. The company expressed eadiness to buy eight more of the vessels.[19] A number of

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[18] The New York Times, February 17, 1964.

[19] Washington Post, April 4, 1970.

Regoletto-class ships have been built for Sweden in an apparent barter deal.

The Soviet drive to accelerate the export of technological products can be illustrated by her recently expressed readiness to sell enriched uranium and atomic reactors to anybody in the West who will pay for them. Moreover, the quoted price ($27.00) was almost $5.00 less than the U.S. unit price for enriched uranium. The Soviet Union has also been conducting a vigorous compaign for the sale of Soviet made commerical jets. In September 1971 it was reported that Moscow made an attractive offer to that end to Chile.[20]

Economic Aid

Since 1954, the Soviet Union has extended an estimated 7.2 billion dollars in economic aid to over 40 developing countries. The ten top recipients in the 1954-1970 period are India, (1.6 billion), Egypt (1.1 billion), Afghanistan (700 million), Iran (560 million), Turkey(370 million), Indonesia (370 million), Iraq (320 million), Pakistan (265 million), Syria (235 million), and Algeria (230 million).[21] Providing an alternative to Western aid, Soviet economic aid probably helped to create a climate for neutralizing Western influence, and thus provides Moscow with a sort of leverage in international affairs. In general terms, the

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[20] Washington Post, September 11, 1971.

[21] Washington Post, May 30, 1971.

program was neither a roaring success nor a dismal failure, and successes seemed to outnumber the failures.

With time, the Soviet Union has become more sophisticated in the distribution of its economic aid, and during certain periods, much tighter with her purse, developing a more business-like approach to the program. Such changes occurred during the middle of the 1960's when extensive surveys prior to making new aid commitment were conducted and a considerable portion of commercial credits were distributed with the design to promote exports of Soviet machinery and equipment. Moreover, in 1967 there was a decline in the economic aid commitment to the developing countries. The decline probably did not constitute any fundamental change in the Soviet attitude toward foreign aid and should probably be attributed to the large backlog of unexpended credits which were still available from the allocations of the two previous years.

During the last two years of the 1960's and in 1970, the economic aid figures have been growing. In the spring of 1971 during the 14th Annual Meeting of the UN Economic Commission for Latin America, the Soviet Union offered technical and other aid to Latin America.[22] As reported by the State Committee for Foreign Economic Relations under the Soviet Council of Ministers at the beginning of 1971, the Soviet Union had economic and technical cooperation agreements with 18 Asian, 20 African, and 2 Latin American countries.[23]

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[22] Washington Post, May 30, 1971.

[23] New Times, No. 3, 1971, pp. 18-20.

The distribution of Soviet aid among the basic branches of the economy of the developing countries is as follows:

Industry and power	68.7%
Agriculture	6.2%
Transport and communications	10.0%
Geological prospecting	10.0%
Education, culture, public health, and sports	4.2%
Housing construction and municipal services	0.4%
Other branches	0.5%
Total	100.0%

Source - New Times #3, 1971.

In total the Soviet Union has helped with the construction of more than 700 industrial enterprises and other projects, of which some 340 have already been put into operation. The openly proclaimed goal of the Soviet aid is to help to create and extend the state sector of the recipient country's economy, particularly heavy industry enterprises, for which more than half of the total aid is going. In most cases the Soviet credits are of long duration and at relatively low interest rates (2.5 - 3% annually) applied only on credits actually used.[24]

In many cases the credits are repaid in the developing country's traditional exports and, in some cases, in national currencies, for which the Soviet Union is buying some raw material and consumer goods. A statement by V. Sergeyev, Vice-Chairman of the State Committee for Foreign Economic Relations, emphasized that "Soviet economic and technical

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[24] New Times No. 3, 1971, p. 19.

aid to the developing countries benefits both sides and in no sense is a matter of charity".[25]

The exported Soviet machinery and equipment has few buyers in the industrial countries, but are in demand in the developing countries. In addition, many developing countries found that the Soviet Union represents a market for their agricultural, raw materials and foodstuffs. Thus, the Soviet economic aid to the developing countries and trade with them has a rather sound economic basis and very likely will not only continue, but grow.

Soviet Military Aid

While economic aid represents a phenomenon originating mainly in the post-Stalin era (Afghanistan, in 1954, was the first country to receive aid), Soviet military aid to "promising" movements goes back to the early years of Soviet power. During the 1920's the movements led by Kemal Attarturk of Turkey and Chiang Kai-shek of China received Soviet military aid. During the second half of the 1930's, a considerable amount of ammunition, arms, and advisors were sent to the Kuomintang in China and the Spanish Republicans. After World War II, the goal of undermining Western countries' position led to the supply of arms to Israel. Later, however, the rigidity of the doctrine pronounced by Zhdanov in the Cominform session, the weak economic situation of the USSR, the beginning of the Cold War and the opposition of the United States and its allies clearly expressed in the Truman

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[25] New Times No. 3, 1971, p. 20.

Doctrine, forced the Soviet Union to refrain from active arms support in late forties and early fifties (excluding, of course, Korea type situation).

In the mid-1950's, however, the situation had changed, and rather drastically: Stalin was dead, the military sector of the Soviet economy improved considerably.

In the spring of 1955 Mikoyan visited Yugoslavia. Obviously designed to prepare the ground for Khrushchev's meeting with Tito, the visit produced an unusual classified letter from the CPSU Central Committee. The letter reported the results of Mikoyan's meetings with Tito, emphasizing Tito's advice concerning the number of non-allied nations and their leaders. In particular, Nasser was mentioned as a strong anti-imperialist quite in need of support.[26] Events followed one another with remarkable speed. Shepilov, who was considered as the best Soviet export in the Middle East, made a trip to Cairo and was soon appointed Soviet Foreign Minister. A number of military aid assistance agreements were signed, thus initiating what has become an essential instrument of Soviet foreign policy towards the underdeveloped world.

Initially, the Soviet Union preferred to remain in the background, using Czechoslovakia and Poland as intermediaries. Czechoslovakia signed an initial arms agreement

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[26] Many leaders of neutralist countries used to be viewed at that time by the Soviet propaganda as counter-revolutionary, at best, or "imperialist puppets".

with Egypt, Syria, and Yemen.[27]

Toward the end of the 1950's such ill devised camouflage was dropped, and the Soviet Union began supplying arms to various countries, and primarily the Arab World, openly. The first Soviet naval ships arrived in Egypt just prior to the Suez Crisis of November 1958. Starting in 1958 an arms deal with Indonesia was closed, and the first groups of Indonesian naval officers and crews started to be trained by the Soviet Navy in Poland. During the next five years, one Sverdlov-class cruiser (Ordzhonikidze), seven Skory-class destroyers, 12 W-class submarines, 7 Riga-class destroyer escorts, about two dozen torpedo boats, a number of minesweepers, Komar-class missile boats, and auxiliary ships were transferred to the Indonesian Navy. Neither were the majority of transferred ships suitable for the environment and operational requirements nor was the Indonesian Navy ready or capable of operating them properly. Moreover, it is doubtful that the Indonesian needed such a collection of naval armament. The Soviet Navy at least was honest in the deal involving the cruiser, trying to persuade the Indonesians that they did not need it. As for the rest of the ships transferred, the majority of them were obsolescent and the Soviet Navy was glad to get rid of them,

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[27] Instead of "military aid", a more accurate term would be "military Loans" for almost all Soviet agreements involved long-term, low-interest loans. For a detailed analysis of Soviet supplies of arms, see: Arms for the Third World: Soviet Military Aid Diplomacy by Wynfred Joshua and Stephen P. Givert; Baltimore: The John Hopkins Press, 1969.

ot a difficult task in the case of such an eager "buyer" as ukarno was.

In 1961 the Soviet Union began to supply arms to Cuba. rms shipments were especially substantial during the second alf of 1961 and 1962, up to the Cuban Missile Crisis, after hich it was continued on the basis of maintaining a certain egree of combat capability of the Cuban armed forces. During he 1960's, arms were also supplied to a number of African ations.

The first agreement for the delivery of Soviet arms to ndia was reached in 1960, but the agreement on naval ships as not signed until 1965.[28] Apparently, India was reluctant o be dependent upon Soviet arms supply and for a while tried o reach an agreement with Western countries, particularly ritain. The Soviet Union had long before expressed her eadiness to cooperate. In February 1957 a Soviet military ission headed by Marshall Zhukov visited India and toured he Indian defense establishments. During July of the same ear, a return visit was made by a group of high ranking ndian military officers, headed by General Timaya, then hief of the Indian General Staff. The group was not only ery well received "as personal guests of Marshall Zhukov" in July 1957 this had significance), but it was also given good look at the Soviet ships and naval establishments. nother high ranking Indian delegation visited the Soviet Union nd was given a good opportunity to see the Soviet's Navy in he middle of the 1960's. Apparently, the second delegation

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[28] Arms For The Third World, p. 87.

was decisive, and a plan to acquire a number of submarines and ships was worked out. The Soviet Union not only delivered four large attack F-class submarines and a number of small surface ships, including some missile boats, but offered to help India build its own submarines and other ships.[29] Presently, it looks as if India's dependence upon Soviet armaments, which might lead to a dependence upon tactics, is growing.

The supply of Soviet arms to North Vietnam, very substantial in volume, though restricted in nature, is common knowledge. Other countries of the Indochina Peninsula, Laos and Cambodia, were also given Soviet military aid. In the case of Laos, a 1960 emergency request from the regime of Souvanna Phouma was met by an arms airlift.[30]

Toward the end of the 1960's the list of Soviet military aid recipients included 25 countries.[31] While, in general, the arms were supplied to neutralist, former colonial, countries most of which were openly anti-western, there were some exceptions (such as the case with Iran and Pakistan). As Soviet military aid programs progressed, they were justified on the basis of aid to movements of national liberation.[32]

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[29] International Defense Review, Vol. IV, No. 1, February 1971, p. 21.

[30] Arms for the Third World, p. 56.

[31] Ibid., p. 84.

[32] Lt. Col. G. Eskov and Col. Prilepskii, "World Socialist System: A Decisive Contemporary Factor," Kommunist Vooruzhennykh Sil, No. 22, November 1964, pp. 34-41.

Neither the infrequent failure to produce reliable friends (as was the case with Ghana, the Congo, and recently Sudan), nor poor prospects of repayment, nor the costs of the programs prevent the Soviet Union from continuing military aid, particularly to certain key countries in given areas. Geographically, the scope of the Soviet military aid has also been widening. The competition with China for the influence in the Third World has definitely been a factor, and, materially, the Soviet capacity compared with the Chinese is considerably greater. As for the quality of the armament supply, in general, it was adequate for the needs of the recipient countries. In a number of occasions in the past, certain key recipient countries (particularly Indonesia and Egypt) were supplied with the better armaments than the majority of the Warsaw Pact members. Egypt, which to a certain degree represents a special case, prior to the June 1967 war possessed and at present still possesses many weapon systems still in use by the Soviet armed forces. The increased sophistication of the armaments supplied through the military aid programs was to be expected since technological advances resulted in more rapid changes in Soviet weapon systems and hence, the ready availability of replaced systems for the military aid programs. But the technological progress of developed countries produced even a greater gap between them and the developing countries. Such a gap and the sophistication of the weaponry received in turn generate a greater dependence on the part of the recipient countries upon the arms suppliers.

Military assistance has become an essential instrument of Soviet foreign policy toward many developing countries, and will definitely continue in the foreseeable future. The obviously unchanging goal of the Soviet Union of undermining Western positions might even intensify the military aid program.

Conclusions

During the very first years of Soviet power, the state monopoly on foreign trade was established. Since then it has been viewed as one of the "commanding heights" of the economy and closely guarded. After the so called economic reform of 1965, the number and specialization of foreign trade associations were increased and some of them were transferred from the Ministry of Foreign Trade to other organizations (including some in the merchant marine). However, no further steps to give producing industries direct access to foreign markets were permitted. Moreover, the Soviet Union has exercised a close watch over the situation concerning the state monopoly on foreign trade in other Socialist countries, openly admitting that "if the foreign trade monopoly were lifted even in one Socialist country, there would be harm to the cause of Socialism as a whole".[33] The very strictest maintenance of the foreign trade monopoly has been viewed as the necessity to achieve the close interweaving of the foreign political and foreign economic tasks of the Soviet government, admitting that "in developing its foreign economic relations, the USSR cannot fail to take into

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[33] "Foreign Trade", The Soviet Ministry of Foreign Trade, July 1967, p. 6.

account the position which one country or another occupies in relation to our country and to states allied with us."[34]

Soviet foreign trade, particularly since the end of 1950's, has been growing steadily and rather rapidly. The bulk of it has been with CMEA countries. Trade with developed Western countries and Japan, especially during the last five or six years has been considerably increased too. While the main export items to the developed countries continued to be raw materials, particularly oil, natural gas, timber, and other minerals, imports from them come mainly under the heading of machinery, plant, and equipment or, in general, advanced technology. The recent Soviet trade agreements with Italy, Austria, Japan, and other countries indicated that such a trend will continue, at least for a while. Since the middle 1960's, the task to increase the export of machinery was set, and while its total volume increased (mainly thanks to exports to the developing countries), it's share in Soviet foreign trade did not. But foreign trade inevitably helps to improve the efficiency of domestic production which in turn further stimulates the trade itself. A number of Soviet owned banks were established in many European countries, the most important being the Moscow Narodny Bank Ltd. in London.

Since the middle 1950's, the Soviet Union has been involved in economic and military aid to the developing countries. As a rule, the recipients of the Soviet military and economic aid are also trade partners, representing about 14% (3 billion

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[34] *Izvestiya*, April 21, 1968.

rubles in 1970) of total Soviet trade turnover. As the Soviets themselves acknowledge "the significance of the Soviet Union's ties with Asian, African, and Latin American countries is measured not only by figures. These ties promote the break-up of obsolete forms, the development of society's new productive forces and the early winning of economic independence. Today, although the positions of the West in foreign trade and economic ties with the Third World are still strong, the external economic policy of the Soviet Union and other Socialist states has deprived imperialism of its monopolistic position in trade, the provision of technical assistance and technical know-how and also in the purchase of export goods from the developing states."[35] A portion of the Soviet economic aid has been devoted to the development of maritime industries of the recipient countries, particularly ports, thus, benefitting not only the Soviet Merchant Marine but in a number of cases the Soviet Navy as well. The growth of the Soviet foreign trade and the Soviet Union's involvement in economic and military aid have definitely influenced the development of the merchant marine.

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[35] International Affairs, January 1969, p. 14.

APPENDIX III

SOME ASPECTS OF THE MARITIME LAW, INTERNATIONAL COOPERATION

The growth of the Soviet maritime power has been naturally accompanied by wider Soviet participation in various international maritime organizations, and intensified development of various aspects of the Soviet Maritime Law (in general, relevant aspects of international law as well). The Soviet system of normative acts governing internal and territorial waters, jurisdiction over foreign vessels, concept of innocent passage, various treaties and statutes, etc., has been considerably widened. W. E. Butler, in his survey of Soviet maritime legislation and practice[1] had found that "there have been and are significant even creative differences of opinion among Soviet lawyers with respect to international legal questions which can have an impact on Soviet state practice, Soviet positions in maritime disputes with other states, and the Soviet approach to study of international law in general".

While restraining from any attempt to undertake analysis of the jurisprudential foundations of Soviet Maritime Law,

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[1] Willieam E. Butler, The Law of Soviet Territorial Waters; A Case Study of Maritime Legislation and Practice, New York, Frederick Praeger, 1967, p. 192.

it is desirable to outline the major Soviet normative acts and State Practices, for they definitely constitute an inseparable part of the development of Soviet maritime power. Similarly, the oceans are being taken more and more into the sphere of politics and the legal norms of states quite often are, or even in more cases might be, sources of international problems.

In general, both principal sources of international law, the customary international law, (the practices of states, precedents) and conventional international law (formal agreements, treaties) are widely practiced by the Soviet Union. The Soviet Union is a member of various international maritime organizations. Since 1958, it has been a member of the Inter-Governmental Maritime Consultative Organization (IMCO). At the beginning of 1971, some Soviet ports were accepted into the International Association of Ports and Harbors.[2] A number of socialist countries and their ship lines organized, in June 1970, the International Association of Shippers - INSA. At the end of 1963, the Soviet Association of Maritime Law was founded with the task "of protecting Soviet merchant marine interests". In May 1969, the Soviet Union was made the 31st member of the International Maritime Committee.[3]

An important source of the Soviet Maritime Law is the Soviet Merchant Shipping Code (KTM - Kodeks Torgovogo Moreplavaniya) which was prepared by TsNIIMF (Central Scientific

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[2] Vodnyy Transport, 20 February 1971.

[3] Morskoy Flot No. 2, 1971.

Research Institute of Merchant Marine) and approved by the Presidium of the Supreme Soviet on September 17, 1968.[4] The code contains norms applicable to the right of sailing under the Soviet flag, the right of ownership of sea-going vessels, the registration of vessels in the Register of Shipping, the crew composition of sea-going vessels, etc. The Code also contains provision relating to contracts of carriage by sea, general and particular average, compensation for damages resulting from collision, rewards for rendering assistance at sea (including salvage), and maritime insurance. The provisions contained in the Code are amplified by subordinate legislation: ordinances of the Counsel of Ministers of the USSR, orders of the Ministers of Merchant Marine and Fishing Industry, tariff regulations, etc.

According to the Code, the Ministry of Merchant Marine is obligated to control adherence to laws on mercantile navigation and to agreements signed by the Soviet Union. The USSR Registry of Shipping, also administered by the USSR Ministry of Merchant Marine, executes independent (irrespective of the ownership of ships by various ministries and departments) technical control over sea-going ships and their preparation and construction. The Registry is also responsible for the classification of ships and for issuing ship documents as provided by international agreements and conventions.[5]

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[4] TsNIIMF Transactions, 1970, Vol. 133, p. 2.

[5] A. A. Volkov, Morskoe Pravo (Maritime Law), PischProm, Moscow, 1969, pp. 14-16.

It has been a standard Soviet claim, that Soviet ship lines are judicial persons and are lawful owners of the Soviet merchant ships. Simultaneously Soviet merchant ships are the property of the state and hence, have privileged immunity. Article 10 of the KTM recognizes the person who uses the vessel as ship owner irrespective of whether he is its actual owner or whether he makes use of it on some other legal ground. Soviet legal publications assert[6] that the immunity of state property in general, and state owned vessels in particular, results from the principle of the equality of sovereign states and hence, no compulsory measures against state property can be undertaken. Article 20 of the KTM provides that state vessels may not be arrested or sued without he consent of the Counsel of Ministers; Article 77 of the TM directs that the rules regulating detention of a vessel t the request of plaintiff do not apply to the vessels owned y a foreign state.[7]

The Soviet Union is a party to various international onventions including older ones such as, The International onvention for the Protection of Submerged Telegraph Cables igned in Paris in 1884, The Brussels Convention of 1910, he Lisbon Agreement of 1930 (concerning maritime signals), he International Convention for Safety of Life at Sea, and

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[6] Ibid., pp. 14-16.

[7] With the exception of cases specified in the Article 1 of the Basic Provisions of Civil Procedure of the Soviet nion and Union Republics.

The International Regulations for Preventing Collision at Sea signed in London in 1960.[8] The Geneva International Convention of 1958 dealing with, the territorial sea and the continuous zone, the high seas, and the continental shelf, were signed by the Soviet Union and ratified by the Presidium of The Supreme Soviet. However, the provisions outlined in Article 20 of the Geneva Convention of 1958, on the territorial sea and the contingious zone, recognizing the right of coastal states to take proceedings against and to arrest foreign ships in the territorial waters was found inconsistent with the principles of international law by the Soviet Union and is regarded as unlawful. While signing the convention, the Soviet representative stated that "the state vessels in foreign territorial waters enjoy immunity and therefore, pplication to them of measures mentioned in this article may take place only with the consent of the state under whose flag the vessel sails."[9]

Certain provisions of the Geneva Convention of 1958 on fishing and conservation of living resources of the high eas were found unacceptable by the Soviet Union and were ot signed. The Soviet Union is a member of various inter-ational commissions dealing with fisheries. A number of ishing regulations were recognized and officially approved y the Soviet Union.

erritorial Waters

The Soviet Union for a long time was the only major power

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[8] Volkov, p. 138.

[9] Ibid., p. 34.

laiming a 12 mile extension as the base line for its erritorial sea. During the decades of the 1950's and 1960's particularly after the 1958 Geneva Convention) there has een a notable tendency to expand territorial waters. At the eginning of the 1950's there were only three states claiming 2 mile limits, the USSR, Columbia, and Guatamela; toward the nd of the 1960's the number had increased to 41 (Columbia eanwhile reduced its claim to six miles), and more than 0 states claimed more than a three mile limit. Many states, ncluding the U.S., while still maintaining three mile imits,[10] extended their authorities over fisheries to egions beyond their territorial waters up to a total depth f 12 miles.

The legal regime of the Soviet territorial waters is ainly constituted in The Statue on the Protection of the tate Frontier of the USSR, approved by the Supreme Soviet n December 22, 1960. The statute provides that the territorial aters of the USSR are comprised of a 12 mile-wide belt coastal waters measured from the low water mark both long the mainland and around islands, or from the line onstituting the outer limit of the interior waters of the SSR. The outer limit of the Soviet territorial waters is onsidered as the state sea frontier and the vertical extension this line is the frontier of Soviet air space. Foreign r ships require prior permission of the Soviet Government

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[10] It may be assumed that for all practical purposes, the ited States recognizes claims up to 12 miles as valid by iling to challenge the claims.

for passage through the territorial waters and for entry to the interior waters of the USSR, and must observe special regulations published in the "Notifications to Mariners". Foreign submarines, permitted to visit the territorial and interior waters, must stay on the surface and not submerge. The right of innocent passage through the territorial waters of the USSR, which is defined as sailing through the territorial waters for the purpose of traversing them without entering into interior waters, or for the purpose of leaving the interior waters and entering the high seas, is given exclusively to foreign vessels other than warships. The passage is considered innocent if the vessels follow the usual navigational course or one recommended by the competent organs of the USSR, and if the vessels abide by the prescribed regulation and avoid regions closed to navigation (such regions are usually announced in "Notifications to Mariners").[11]

The Soviet Union has taken a negative stance on the tendency to extend territorial waters beyond the 12 mile limit, stating the practice "infringes on the principle of freedom at sea and constitutes a violation of international law".[12] For example, the Soviet Embassy in Buenos Aires declared on January 25, 1967, that "the Soviet Union does not recognize as lawful the Argentine Government's recent decision to extend the territorial water limit to 200 nautical

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[11] A. Volkov, p. 68.

[12] "Territorial waters and international law", International Affairs No. 8, 1969, pp. 78-81.

miles."[13]

The protection of the Soviet state frontier at sea is conducted by the frontier forces of KGB (the State Committee for Security). Frontier servich ships are authorized to pursue and detain offending vessels not only within territorial or interior waters, but also on the high seas until a pursued vessel enters foreign territorial waters and to use arms if the violation cannot be stopped.[14]

The Soviet Union has widely exercised the concept of interior waters and "historic" bays.[15] For example, the White Sea is considered as interior waters based on historic tradition. The Bay of Peter the Great has been called historic bay and special permission of the Soviet authorities is required for foreign vessels to navigate there with the exception of calls at (and departure from) the port of Nakhodka. There were attempts to consider the Sea of Okhotsk as an internal sea. The official Soviet navy magazine stated that "in points of fact, many historical, economic, foreign policy, military, and legal arguments confirm the rightness of fixing the status of the Sea of Okhotsk as both a closed and an internal sea, coming under the international law concept of historic waters". But in spite of the claim that "the

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[13] Izvestiya, February 7, 1967.

[14] A. Volkov, pp. 71-72.

[15] According to the Geneva Convention, interior waters are those situated between the coast and the base line from which the extent of territorial waters is measured.

question of closing the Sea of Okhotsk to foreign military navigation and flights of aircraft is not a farfetched one" no official declaration has been made.[16]

Continental Shelf

The 1958 Geneva Convention on the Continental Shelf specifies that the coastal state has sovereign rights over the Continental Shelf in order to explore and to exploit its natural resources. The term shelf was used to designate the sea bed situated beyond the territorial waters up to a depth of 200 meters, or beyond that limit up to a point where the depth of the water allows the exploitation of natural resources. But the growing technological development already left very few regions of the world ocean, and soon will probably leave none, where man cannot penetrate. The ability to mine and harvest the resources of both the Continental Shelf and the deep sea bed has created the possibility that large areas of oceans will be used by a few technologically developed nations for their own benefit, tothe detriment of the less developed states which are in the majority. The existing ambiguity in the definition of the Continental Shelf, in the part stressing the limit of expolitability, generated legitimate concern in a number of Western states, particularly among some American scholars

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[16] Morskoy Sbornik No. 8, 1967, pp. 14-15.

and specialists in international law.[17] However, no similar concern was expressed in the Soviet Union. Moreover, the decree of the Presidium of the Supreme Soviet of the USSR on February 6, 1968, in effect expanded the definition of the Continental Shelf given by the 1958 Convention, adding that "the sea bed and the sub-soil of depressions situated in the Continental Shelf of the USSR irrespective of their depths shall be part of the Continental Shelf of the USSR".[18]

The Counsel of Ministers of the USSR instructed the corresponding ministries and departments "to work out the necessary regulations and instructions for rational use and protection of the natural wealth of the Soviet Continental Shelf and to pay special attention to the Organization of Control over the observance of the law operating in the USSR on these questions".[19] It was further stated that "foreigners may exploit the natural wealth only on the basis of inter-governmental agreements or special permits issued by competent Soviet authorities."

The Joint Declaration on the Baltic Continental Shelf was signed in Moscow on October 23, 1968, by the Soviet Union,

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[17] The problem was discussed in great detail during the International Symposium held in Stockholm, June 1968. See Towards a Better Use of the Ocean, Contemporary Legal Problems in Ocean Development by Professor W. T. Burke; Comments and Recommendations by an International Peace Research Institute.

[18] Moscow TASS International Service in English 1417 GMT, 14 December 1968, and William E. Butler, "Edict on Continental Shelf, Presidium of the USSR Supreme Soviet, 6 February 1968; "American Journal of International Law", January 1969, p. 104.

[19] Ibid.

Poland, and East Germany. It was declared that the Baltic Continental Shelf must be used for peaceful purposes only and that the signatories will consult with one another on matters of mutual interest relating to the shelf, and the particulars of the bar on its military use.[20]

The declaration does not establish the actual boundaries of the Continental Shelf appertaining to different Baltic States, leaving determination to the provisions of the 1958 Geneva Convention. Further, the participants agreed not to give over parcels of the Baltic Continental Shelf to non-Baltic States or to citizens or firms of those states for the purpose of exploration, exploitation, etc.

Apparently, the attempts to persuade certain Baltic states to join the declaration were made. During the summer of 1969 visit of Swedish Prime Minister Olof Palme to Moscow, the declaration on the Baltic Continental Shelf was discussed.[21] But, as was later stated in Stockholm, "the difficulty in carrying out this work lies in the fact that Sweden and other Nordic countries have no diplomatic relations with the GDR. A solution needs to be found to make it possible to conclude an agreement with Sweden on an official basis."[22] The USSR possesses about 20% of the world Continental Shelf and for this reason alone, any legal steps initiated by the Soviet Government are important.

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[20] New Times No. 47, 1968, pp. 6-7.

[21] International Affairs, February 1971, pp. 11-17.

[22] Ibid.

Cooperation, Treaties, Agreements

Fishing in certain regions of the world ocean has been carried on with excessive intensity and too often without regard to the state of fish stocks. The expected result was the sharp decrease in the catches in certain areas. The increase in fishing efforts is by itself a major factor in fishery jurisdictional problems. Fishery development and conservation, mainly thanks to the United Nation efforts supported by the major states, have been strengthened considerably during the decade of the 1960's. The Soviet Union, it seems, supports the effort. In May of 1965, a joint American-Soviet inspection team, the first joing inspection by the two nations, spent thirteen days cruising the Georges Bank fishing grounds in the Northwest Atlantic.[23] The joint inspection was result of plans made to exchange law enforcement officers at the 1964 meeting of the International Commission for Northwest Atlantic Fisheries. It was reported that the Soviets offered American fishermen free emergency medical care aboard their ships and also suggested "that disputes between American and Soviet fishermen could be solved on the spot".[24]

The Permanent International Counsel for the Exploration of the Sea is the oldest international organization concerned with fishing and fishery research. Established on 22 July 1902, at a conference held in Copenhagen and attended by represen-

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[23] *The New York Times*, May 30, 1965.

[24] *Ibid*.

tatives of Russia, the counsel presently enforces over 60 international agreements relating to fishing, and the Soviet Union is a party to many of them. Apparently, the most difficult area, as far as the Soviet Union is concerned, and where interest with other states have collided more often, is the Northwest Pacific.

The Soviet-Japanese Convention on the High Seas Fisheries in the Northwest Pacific was concluded on May 14, 1956, and in its subsequent development a Soviet-Japanese Northwest Pacific Fishery Commission was established. It spite of this, it became common practice in the Soviet press and in official government statements to blame the Japanese side for overfishing and violating the conservation practice. In the spring of 1971, Japanese fishermen and, indirectly, the Japanese Government were accused of overfishing for herring in the Sea of Okhotsk and of being in violation of existing agreements on crab catches. Japan was reminded that the permission for its fishermen to catch fish and crabs in the Sea of Okhotsk is an act of good will on the side of the Soviet Union, and that the provisions of 1958 Geneva Convention as well as the Edict of the Supreme Soviet of February 6, 1968 concerning "the sovereign rights of Soviet Union upon its continental shelf" applied.[25]

An inter-governmental agreement on the settlement of claims with respect to damage to fishing gear was signed in

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[25] Izvestiya, 15 April 1971, and Sevetskaya Rossiya, 18 April 1971.

Moscow on December 9, 1959 between the governments of the USSR and Norway. Two special commissions, one in Moscow, and another in Oslo, were set up to deal with claims made by their respective fishermen. The commissions were not competent to hear cases of damage to fishing gear which occurred within the territorial waters of the state, since they fall into exclusive jurisdiction of the state in whose territorial waters the damage occurred. In case of dissent with the Commission's verdict, either by plaintiff or defendant, the Commission could address both parties with a proposal to settle the dispute by way of voluntary arbitration. Such arbitration would take place before the Maritime Arbitration Commission in Moscow if the defendant were a Soviet ship owner, and in Norway if the defendant were a Norweigan ship owner. (Norway has no permanent Maritime Arbitration Commission and hence, a special arbitration tribunal would have to be set up for each concrete case). Fishing in the Soviet waters is regulated by the statute on the Conversation of Fish Stocks in Water Bodies of the USSR No. 1045, approved by the Counsel of Ministers on 15 September 1958.[26]

The Soviet Sea Rescue Service is composed of the rescue services of the Soviet Merchant Marine, Fishing Industry, and the Emergency Rescue Service (ERS) of the Soviet Navy. The Service has been coordinated by the ERS and in January 1971, celebrated its 50th Anniversary. The Soviet Union has eight agreements with its neighbors for rescue at sea; the

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[26] A. Volkov, Maritime Law, p. 69.

cooperation is particularly well organized in the Baltic Sea where joint exercises are held occasionally with Poland, Sweden, and other countries.[27] In October 1965, the Soviet Union and Denmark signed a new agreement on salvage and ship raising operations. The Agreement, in addition to the mutual obligation for help to a ship in distress, provides the rights for rescue ships of one country to be called into the territorial or inland waters of the other in case of necessity.

The International Convention for the Prevention of Pollution of the Sea by Oil concluded in London in 1954 and amended in 1962 was signed by the Soviet Union, but so far has not been ratified by the Supreme Soviet. Rather extensive measures exercised to prevent oil pollution have been reported by Soviet Press and at least for one sea, the Caspian, it was claimed that the oil pollution has been halted. The special types of ships, one to clean the harbors and another to clean storage tanks on tankers and whaling factory ships have been employed by the Soviet Merchant Marine and Fishing Industry.[28]

The Sea Bed Treaty

The decade of the 1960's witnessed intensified interest in national rights and international obligations relating to the oceans, their sea beds, and their resources. During the second half of the 1960's, the subject of the military

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[27] Vodnyy Transport, 7 January 1971 and October 11, 1967.

[28] Vodnyy Transport, 18 February 1971.

use of the sea bed was of prime concern. The August 1967 United Nations Malta Resolution proposed a "declaration and treaty concerning the reservation exclusively for peaceful purposes of the sea bed and the ocean floor". The United Nations Ad Hoc Committee of 35 nations to study the peaceful uses of the sea bed and ocean floor beyond the limits of national jurisdiction was established. The Soviet memorandum of July 1, 1968, on some urgent measures for stopping the arms race and for disarmament, proposed that the sea bed and the ocean floor be used for peaceful purposes only. On March 18, 1969, the Soviet Union placed before the Disarmament Committee a treaty draft on the prohibition of the implacement of nuclear weapons and other weapons of mass destruction on the sea bed, the ocean floor, and the sub-soil. This draft was accepted as a basis for the Committee's work on this problem.[29] As a result of the negotiations within the framework of the Disarmament Committee, a joint Soviet-American Treaty Draft was worked out and submitted for the Committee's consideration on October 7, 1969. The Soviet draft proposed a 12 mile off-shore zone, contending this took due account of the security interest of the coastal states while insuring the maximum coverage of the sea bed area by the treaty. The Soviet-American draft also proposed the 12 mile limit for the widest contigious zone provided for by the 1958 Geneva Convention. During the course of debates, various proposals

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[29] International Affairs No. 1, 1970, pp. 41-45.

by other states, including the U.S. proposal made by President Nixon in May 1970, were argued against.[30] The Soviets claim that "there can be little doubt that once the U.S. has established deep water bases or sea bed fortifications it will sooner or later use them to back up its claims to sizable portions of the world ocean".[31] The United States had been accused of allowing the Navy to dictate policy. Towards the end of 1970, however, the Geneva Sea Bed Arms Talks showed definite progress, especially when the United States and the Soviet Union came up with a new draft on the treaty in September 1970. The Soviet-American draft envisaged a ban on the implacement of mass destruction weapons over the whole sea bed outside the 12 mile coastal zone. Finally, on February 11, 1971, the treaty was signed by the United States, the Soviet Union, and some 60 other states. During the signing ceremony in Moscow, Soviet Premier Kosygin referred to the agreement as the "first step toward complete demilitarization of the ocean floor".

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[30] It should be noted that the initial position of the United States at the Ad Hoc Committee of the United Nations and some articles which appeared in the American Press made good ammunition for Soviet propaganda. For example, during the third meeting of the Ad Hoc Committee, the United States set forthe the view that peaceful purposes did not preclude military activities "in pursuit of peaceful aims or in fulfillment of peaceful intents, consistent with the United Nations charter and the obligation of international law". An article in the U.S. Naval Institute Proceedings in May 1969 entitled The Paper Torpedo, claimed that "the United States has a huge stake in the outcome of the U. N. sea beds discussions" and demanded that "the U.S. Navy's voice must come through loud and clear and above all effectively", and argued against the Malta Resolution and in effect the proposed treaty.

[31] New Times No. 27, pp. 18-20, 1969.

In July 1971, the Soviet delegation to the Geneva Committee for peaceful use of the sea bed proposed a preliminary draft of the treaty for peaceful use of the sea bed beyond the Continental Shelf. The proposal stressed the necessity to keep the shelf open, if already closed, for undiscriminated exploitation by all states and prohibiting its use for military purposes. It was claimed that particular attention was being paid in the draft to the interests of the developing countries and the interests of all states regarding navigation and flights in the area of international straits and fishing.[32]

A number of bilateral shipping agreements exist between the Soviet Union and other countries. The first one was concluded between USSR and France in Paris, on April 20, 1967, and became effective on September 1, 1967. In addition to the express desire of both sides to ensure first and foremost the coordinated use of their merchant marine, the promotion of the normal development of international shipping on the basis of freedom of mercantile navigation was also stressed as an aim of the agreement.[33] Article III of the agreement states "the parties to the agreement again confirm their adherence to the principle of freedom of international maritime shipping and agree to refrain from any action of a discriminatory character, since they are confinced that such actions may cause harm to the development of international trade". The agreement also emphasized that both sides will encourage

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[32] Pravda, 29 July 1971.

[33] Vodnyy Transport, August 31, 1967.

the participation of Soviet and French ships in the transportation of cargo between their ports, and neither side will hamper the participation of the ships of other side in carrying cargo between its ports and third countries, etc. The agreement also made the provision for a joint commission to observe the implementation of the agreement and to discuss unsolved problems. Somewhat similar agreements were signed between the Soviet Union and Great Britain in 1968, and between the Soviet Union and the Netherlands in 1969.

Beginning in 1965, the Soviet steamship companies have been entering various freight (rate fixing) conferences. The process has not been a smooth one and has been accompanied by numerous accusations. Western ship owners accuse the Soviets of attempted rate cutting, unfair competition, untrustworthiness, etc. The Soviet Ministry of Merchant Marine, in turn, occasionally employing an aggressive tactics demanded fair treatment, blamed the West for the blockades, black lists, a desire to maintain a monopolistic position, etc. Debates were particularly heated on the Soviet entrance to the Australian conferences. Finally, during 1969, the disputes were settled and it seems that the original fears of Western ship owners were not justified. In the long run, it might be even beneficial for world shipping to have the Soviets inside and cooperative, than outside and rate cutting.[34]

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[34] *Izvestiya*, March 16, 1969; *Vodnyy Transport*, 10 October 1968; *Morskoy Flot No. 2*, 1970, pp. 80-82; and No. 3, 1970, pp. 60-64.

Since 1956, the Central Scientific Research Institute of Merchant Fleet, TsNIIMF, became the center for work dealing with Soviet and International maritime legal problems. The TsNIIMF prepared recommendations and working papers for the Soviet delegation to 1958 Geneva Conventions, the 1960, 1965, and 1966 London Conferences, the 12th Session of the Diplomatic Conference on Maritime Law in Brussels in 1967, etc. The Institute plan for 1971-1975 visualized extensive work on the problems of maritime law, including recommendations concerning the relations between Soviet steamship lines and ports with foreign shipping companies; recommendations concerning the safety of navigation, and protection of property and Soviet merchant fleet interests in case of collision, and other works dealing with the general improvement of Soviet maritime legislation.[35]

It may be concluded that the Soviet Union's development of its merchant marine, fishing industry and other aspects of maritime power, and their unavoidably broader association with the world's maritime community have produced considerable intensification of, and the necessity for much wider participation at various international organizations dealing with the maritime problem and corresponding development of Soviet maritime legislation.

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[35] TsNIIMF *Transaction*, 1970, p. 32.

SELECTIVE BIBLIOGRAPHY

OOKS

chkasov, V. I., Basov, A. B., and others, Boyevoy put' Sovetskogo Voyenno - Morskogo Flota ("Combat Path of the Soviet Navy"). Voyenizdat, Moscow, 1967.

ndrassy, J., International Law and the Resources of the Sea/ New York: Columbia University Press, 1970.

he Military Balance, all 1960s editions and 1971-1972. London: The Institute for Strategic Studies.

elov, M. I., Istoriya otkrytiya i osvoeniya Severnogo Morskogo Puti ("History of Discovery and Mastering of the Northern Sea Route"), 4 Vols., Morskoy Transport and Gidpometeoizdat, 1971.

reyer, Siegfried, Guide to the Soviet Navy, United States Naval Institute, Annapolis, 1970.

utler, W. E., The Soviet Union and the Law of the Sea. Baltimore: Johns Hopkins Press, 1971.

ubcommittee on Foreign Policy, Joint Economic Committee, Economic Performance and the Military Burden in the Soviet Union. A compendium of papers, Sept. 18, 1970. Washington, 1970.. 295 p. (Jt. Com. Print.)

rickson, John, Soviet Military Power, London: Royal United Services Institute for Defense Studies, 1971.

airhall, David, Russian Sea Power. Boston: Cambit, 1971.

riedman, W., The Future of the Oceans. New York: Braziller, 1971.

retton, Sir Peter, Vice Adm., Royal Navy (Ret.), Maritime Strategy. New York: Frederick A. Praeger, 1965.

uzhenko, T. B., Minister of Merchant Marine, USSR, Morskoy Flot v vos'moy pyatiletke ("Sea Transport during Eighth Five Year Plan"). Transport, Moscow, 1971.

Herman, L. M., *The Postwar Expansion of Russia's Fishing Industry*. U.S. Government Printing Office. (88th Congress, 2nd Session, Senate), 1964.

Herrick, R. W., *Soviet Naval Strategy*, United States Naval Institute, Annapolis, 1968.

Heizlet, Sir Arthur, Vice Adm., *Aircraft and Sea Power*. New York: Stein and Day, 1970.

Idyll, C. P., *The Sea Against Hunger*. New York: Crowell, 1970.

Istoriya Velikoy Otechestvennoy Voiny Sovetskogo Soyuza 1941-1945 ("History of the Great Patriotic War of the Soviet Union, 1941-1945"), 6 Vols., Moscow, Voenizdat, 1960-1965.

Kuznegsov, N. G. *Nakanune* ("On the Eve"), Moscow, Voyenizdat, 1966.

Kuznetsov, N. G. *Gody Voiny* ("The War Years"), Octyabr', #8, 9, 12, 1968 or Voyenizdat, 1971.

Khesin, S. S., *Oktyabr'skaya Revolyutsiya i Flot* ("The October Revolution and the Navy"), Nauka, Moscow, 1971.

Jane's Fighting Ships, Jane's Weapon Systems, Jane's All the World's Aircraft, Jane's Surface Skimmer Systems, Jane's Freight Containers. Jane's Yearbooks, England.

Iagovskiy, A., *Strategiya i Ekonomika* ("Strategy and Economics"), Moscow: Voyenizdat, 1957.

Lifshits, L. L., *Tekhnika podvodnoy debychi poleznykh Ickopaemykh* ("Technology of Underwater Extraction of Minerals"), Znaniya, Moscow, 1971.

Martin, L. W., *The Sea in Modern Strategy*. New Jersey: Praeger, 1967.

Medvedev, N. F., *Suda dlya issledovaniya mirovogo okeana* ("Ships for the Research in the World's Ocean"), Sudostroyeniye, 1971.

Mikhailov, S. V., *Mirovoy okean i chelovechestvo* ("Humanity and the Ocean"), Ekonomika P. H., Moscow, 1969.

Moiseyev, P. A., *Biologicheskiya Resursy Mirovo okeana* ("Biological Resources of the World Ocean"), Pishchprom P. H., Moscow, 1969.

Mozharov, N. D., Sotrudnichestvo Sotsialisticheskikh stran v oblasti morskogo transporta ("Cooperation of Socialist Countries in the Area of Sea Transport"). Transport P. H., Moscow, 1969.

Nurok, G. A., Dobycha poleznykh iskopaemykh so dna morey i okeanov ("Extraction of Minerals from the Bottom of Seas and Oceans"), Nedra, Moscow, 1970.

Osvoyeniye Mirovogo Okeana ("Mastering of the World Ocean"), Collection of Articles, Voyenizdat, 1971.

Pavlovich, N. B., Rear Adm., Flot v Pervoy Mirovoy Voyne, ("The Navy in the First World War"), Vol, 1, Voenizdat, Moscow, 1964.

Petrov, M. A., Podgotovka Rossii k Pervoy Mirovoy Voyne na more ("Preparation of Russia for the First World War at Sea"), Voyenizdat, 1926.

Podvodnoye Korablestroyeniye v Rossii 1900-1917 ("Submarine Construction in Russia 1900-1917"), Sudostroyeniye, 1965.

Stalbo, K. A., Rear Adm., ed., Istoriya Voenno-Morskogo Iskusstva ("History of Naval Art"), Voyenizdat, Moscow, 1969.

Strokov, A. A., Istoria Voennogo Iskusstva, ("History of Military Art"), Moscow, Voenizdat, 1965.

Sokolovskiy V. D. (ed)., Voennaya Strategiya ("Military Strategy"), Voenizdat, 3 editions.

Trusov, G. M., Podvodnyye lodki y Russkom i Sovetskom Flots ("Submarines in the Russian and the Soviet Navies"), Cubpromgiz, Moscow, 1963.

Pechenik. L. N., Troyanovskiy, F. M., Syr'evava baza tralovogo rybolovstva na materikovom sklone severnoi Atlantika ("The Trawling Resources on the North Atlantic Continental Slope"), Murmansk Publishing House, 1970.

Wolfe, Thomas W., Soviet Power and Europe, 1945-1970. Baltimore: The Johns Hopkins Press, 1970.

Yakovlev, V. D., Vice Adm., Sovetskiy Voenno-Morskoy Flot ("The Soviet Navy"), Moscow, 1969.

PERIODICALS

United States Naval Institute Proceedings, Annapolis.

Naval Review, all 1960s, 1970, and 1971 issues, United States Naval Institute, Annapolis.

Marine Corps Gazette

MAGAZINES (In Russian)

Kommunist Vooruzhennykh Sil ("Communist of the Armed Forces"), semimonthly, the Main Political Directorate of the Soviet Army and Navy, Moscow.

Morskov Sbornik ("Naval Digest"), since 1848, monthly, the Soviet Navy, Moscow.

Morskov Flot ("Merchant Marine"), since 1918, monthly, Ministry of Merchant Marine, Moscow.

Okeanologiya ("Oceanology"), monthly, the USSR Academy of Sciences, Moscow.

Rybnoye Khozyastvo ("Fishing Industry"), since 1920, monthly, Ministry of Fishing Industry, Moscow.

Rechnoy Transport ("River Transport"), since 1918, monthly, Ministry of River Transport of RSFSR, Moscow.

Sudostroyeniye ("Shipbuilding"), since 1910, monthly, the USSR Ministry of Shipbuilding and A. N. Krylov Scientific and Technical Society of Shipbuilding, Leningrad.

Tekhnika i Vooruzheniye ("Equipment and Armament"), monthly, the USSR Ministry of Defense, Moscow.

Tyl i snabzheniye ("Rear Services and Supply"), monthly, the USSR Ministry of Defense, Moscow.

USA: Economics, Politics, Ideology, monthly, by the Institute of U.S. Studies of the Academy of Sciences of the USSR, Moscow.

Voyenno-Istoricheskiy Zhurnal ("Journal of Military History"), monthly, the USSR Ministry of Defense, Moscow.

Voprosy Ikhtiologii ("Problems of Ighthyology"), the USSR Academy of Sciences, Moscow.

MAGAZINES (In German)

Marine Rundschau ("Naval Review"), bimonthly, Verlag E. S. Mittler & Sohn, P. H., Frankfurt/main, FRG.

Militaertechnik ("Military Equipment"), monthly, Minister of Defense, GDR..

Politik und Wirtschaft ("Politics and Economics"), semiweekly, published by Peter Lorch, FRG.

Soldat und Technik ("Soldier and Equipment"), monthly, Umschau Verlag, P. G. Frankfurt/main, FRG.

Volksarmes ("People's Army"), weekly, Ministry of Defense, GDR.

WEHR Politische Information ("Military-Political Information"), weekly, Dr. Lather Lahrish, publisher, FRG.

MAGAZINES (In Polish)

Morze ("The Sea"), monthly, Ministry of Merchant Marine, Warsaw.

Przeglad Morski ("Maritime Review"), monthly, published by Polish Navy, Gdynia.

Wojskowy Przeglad Techniczny ("Military Technical Review"), monthly, Ministry of Defense, Warsaw.

NEWSPAPERS (In Russian)

Pravda ("Truth"), daily, CC CPSU, Moscow.

Izvestiya ("News"), daily, Soviet Government, Moscow.

Nedelya ("The Week"), weekly, supplement to Izvestiya.

Krasnaya Zvezda ("Red Star"), daily, the USSR Ministry of Defense, Moscow.

Economicheskaya Gazeta ("Economic Gazette"), weekly, CC CPSU, Moscow.

Sotsialisticheskaya Idustriya ("Socialist Industry"), CC CPSU, Moscow.

Vodnyy Transport ("Water Transport"), the USSR Ministry of Merchant Marine and the RSFSR Ministry of River Transport, Moscow.

GLOSSARY

Attack carrier striking forces: Naval forces, the primary offensive weapon of which is carrier-based aircraft. Ships, other than carriers, act primarily to support and screen against submarine and air threat, and secondarily against surface threat. (D., p. 35)*

Deployment: In a strategic sense, the relocation of forces to desired areas of operation (D., p. 95)

Displacement: The weight of a ship, in long tons. It is equal to the weight of the water displaced.

Gross tonnage (GT): The entire internal cubic capacity of a ship expressed in tons of 100 cubic feet to the ton. Certain spaces such as ballast tanks, inner bottoms, deck shelters, wheel houses and the like are included.

Dead weight tonnage (dwt): The total weight-carrying capacity of a ship in 2240 pound tons. It includes cargo, fuel oil, fresh water, stores, crew, etc., which brings the ship down to its maximum permissible draft.

Knot: The sea-going unit of speed and is one nautical mile (6080.27 feet) per hour.

Draft of a vessel: The vertical distance in feet between the waterline and the keel. It is indicative of the load carried.

Strategic mission: A mission directed against one or more of a selected series of enemy targets with the purpose of progressive destruction and disintegration of the enemy's war-making capacity and his will to make war. Targets include key manufacturing systems, transportation systems, communications facilities, and other such target systems. As opposed to tactical operations, strategic operations are designed to have a longer-range, rather than immediate, effect on the enemy and his military forces. (D., p. 286)

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*D. - Dictionary of Military and Associated Terms. The Joint Chiefs of Staff., January 3, 1972.

Submarine striking forces: Submarines having guided or ballistic missile launching and/or guidance capabilities formed to launch offensive nuclear strikes. (D., p. 289)*

Surface striking forces: Forces which are organized primarily to do battle with enemy forces or to conduct shore bombardment. Units comprising such a force are generally incorporated in and operate as part of another force, but with provisions for their formation into a surface striking force should such action appear likely and/or desirable. (D., O. 291)

*D. - Dictionary of Military and Associated Terms. Joint Chiefs of Staff, January 3, 1972.

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