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USSR MILITARY
AFFAIRS. No. 861**
November 10, 1972[Download Report](#)**TRANSLATIONS ON
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AFFAIRS. No. 861****NOTE****JPRS****CONTENTS**[Page toc a](#)[Page 1](#)[Page 2](#)[Page 3](#)[Page 4](#)[Page 5](#)[Page 6](#)[Page 7](#)[Page 8](#)[Page 9](#)[Page 10](#)[Page 11](#)[Page 12](#)[Page 13](#)[Page 14](#)[Page 15](#)[Page 16](#)**Moscow, My s Atomnykh - 01 January 1972****NEW BOOK ON NUCLEAR SUBMARINES**

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[1](#) [Article Piece 1 of 22] [2](#)[View Report Citation](#)[Article Bookmark](#)[Export Article Citation](#)[Email](#)[Add to My Collection](#)**NEW BOOK ON NUCLEAR SUBMARINES****[Excerpts from book by Vice Adm Anatoliy Ivanovich Sorokin; Mos
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NEW BOOK ON NUCLEAR SUBMARINES

[Excerpts from book by Vice Adm Anatoliy Ivanovich Sorokin; Moscow, My s Atomnykh, Russian, 1972, DOSAAF Publishing House, 254 pages]

Title Page

Vice Adm A. I. Sorokin

WE ARE FROM THE NUCLEAR SUBMARINES
(My s Atomnykh)

DOSAAF Publishing House

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About the Book and Its Author

The first edition of the book We Are from the Nuclear Submarines, by Hero of the Soviet Union Vice Adm A. I. Sorokin, came out 3 years ago. It was so warmly received by its readers -- young sailors and all other naval personnel -- that it is simply unobtainable today. For this reason the book is being published in a second, enlarged and revised edition.

It will be of equal interest to young boys dreaming of a life at sea and those who are already quite at home on the sea.

This book deals with today's heroic life of men who man the instruments and machinery of today's ominous undersea vessels -- missile and torpedo-armed nuclear submarines. Hero of the Soviet Union Vice Adm Anatoliy Ivanovich Sorokin tells his story vividly, with ability and enthusiasm.

These men deserve to be publicized, men who have reached the North Pole under water, who have girdled the planet submerged, who have conquered the Arctic and Antarctic.

The valor and gallantry of today's navy is inseparable from that of the Great Patriotic War. Soviet fighting men of different generations have common traditions and common paths. Bold assaults by Kolyshkin, Shchedrin, Gadzhiyev, Fisanovich, Alekseyev, Shabalin -- many, many navy men who have written golden pages in the history of the Russian Fleet -- these traditions are being continued and built upon by the new generation of seamen.

"Life always has room for deeds!" This idea, based on a thorough study of combat experience and navy service, runs through Sorokin's entire story.

Is it not so?

Who does not know the names of our famed submariners?

The entire world is familiar with the nuclear submarine *Leninskiy Komsomol*. A new generation of Soviet seamen holds high the sacred banner of our navy's fighting tradition.

The world thrilled at history's first world-girdling voyage by a group of nuclear submarines, directed by the author of this book.

In recent years more than 1500 sailors, petty officers, officers, admirals and generals have been decorated for successful performance in combat training. Many have been named Hero of the Soviet Union: V. A. Kasatov, A. I. Sorokin, A. P. Mikhaylovskiy, V. T. Vinogradov, N. I. Usenko, and others.

A. I. Sorokin is an experienced submariner. He has dedicated more than a quarter of a century to the submarine service. He has an intimate knowledge both of the history and capabilities of the ships he has commanded. For this reason there is great weight and meaning to his words directed to the lovers of military adventures: "We have never attacked first... But if we are attacked -- our response will be devastating..."

The Communist Party and Soviet government, consistently pursuing a peaceful Leninist foreign policy, at the same time are aware of the military danger caused by the aggressiveness of the imperialist powers, and the United States in particular.

The 24th CPSU Congress emphasized that the Soviet Union will continue waging a resolute struggle against imperialism, will offer firm resistance to aggressor intrigues and acts of sabotage. The party will continue enhancing the vigilance of the Soviet people, strengthening our homeland's defensive might. Missile-carrying nuclear submarines of course constitute the principal naval striking force in a modern war.

Soviet submariners are ever on guard!

This book tells of the difficult deeds and today's heroism of navy life, the stern romance of the naval profession.

Excerpt from Chapter 3

Submarine development proceeded principally in the direction of improving seaworthiness and handling, increasing surfaced cruising speed, range, maximum depth of dive, beefing up torpedo and artillery armament, improving radio communications and sonar equipment. Speed and range submerged improved little, as it was assumed that passage to combat operations areas and approach to engagement would be effected principally with the submarine surfaced.

Large submarines were highly seaworthy, and had a surfaced range of 12,000-20,000 nautical miles. They were capable of remaining at sea 45 to 50 days without refueling or reprovisioning. In order to reduce time required to reach combat operations areas, to be able rapidly to patrol large areas of ocean and to move in fast for engagement with the enemy, these submarines had a rather high surface cruising speed -- 17-22 knots, while their cruising speed submerged was only 8-9 knots. Maximum depth of dive was 100-120 meters. Their main weapon was the torpedo; a submarine could carry from 25 to 30 torpedoes. All submarines carried one or two 100-150 mm guns, plus one or two small-caliber guns or machineguns.

Submarines began to be equipped with hydroacoustic surveillance instruments -- hydrophones, while later, during the war, submarines were equipped with sonar gear and special underwater acoustic communications equipment.

Beginning in 1942, initially on German and later on those of other nations, submarines were equipped with special search -- "tracking" -- radar receivers, for prompt detection of enemy surface ships and aircraft conducting radar submarine search operations. These receivers were able to determine when radar was in operation and the bearing to it. This equipment was further improved during and after the war.

It usually takes years to grasp the full significance of major scientific and engineering breakthroughs. For this reason we did not realize that we were entering a new age of naval performance, an age of unprecedented speeds and power.

Scientific and engineering advances at the beginning of the fifties made it possible to power submarines with propulsion plants which transform them from vessels which periodically submerged for limited periods of time to genuine submarines capable of remaining under water indefinitely, and with a high submerged cruising speed. This occurred as a consequence of rapid advances in nuclear physics.

Soviet theoretical and experimental research on start-up, operation and monitoring of atomic reactors was conducted by a team of physicists and engineers under the direction of Academician I. V. Kurchatov. This research made it possible to proceed to the design of more sophisticated reactors. Stationary power plants were first designed, followed by mobile propulsion units -- for submarines and the icebreaker *Lenin*.

The process of building a new fleet was not a simple one. Future historians will say: "The most efficient solutions were not found immediately on the difficult road toward building a qualitatively new navy"...

Experience had demonstrated, however, that the missions of a modern-day navy can be handled most effectively by submarines, aircraft and surface ships armed with missiles and long-range homing torpedoes, with extensive utilization of all other naval arms. At the same time experience had shown that there are areas of naval combat operations where nuclear-powered submarines and missiles cannot fully replace surface ships and aircraft carrying conventional weapons.

"It was necessary essentially to completely rebuild the navy," wrote Flt Adm N. D. Sergeyev, Navy Chief of Staff. "One could not expect successful results from this building program if the Soviet Union did not possess a highly developed shipbuilding industry, engineering industry, metallurgical industry, chemical industry, electronics and automatic control technology, if we did not produce highly-qualified scientists, designers, engineers, technicians, and workers.

In the mid-fifties the Central Committee CPSU carefully examined the problems of naval development. At this time Soviet industry began building nuclear submarines. Our fleets began receiving ships and planes armed with nuclear-tipped missiles, and equipped with electronic communications and target search gear.

A new stage began in development of the navy and its operations art. The enormous destructive power of nuclear weapons and the great range of the rockets carrying these weapons defined the nature of modern ocean operations, where submarines and naval aviation have become the main naval arms, and nuclear weapons the principal means of achieving the objectives of an operation."*

New equipment and technology required new skills and knowledge. Everybody went back to school, from captain to ordinary seaman, myself included. We all studied the basis of the new technology -- nuclear power engineering and its naval applications.

Now a brief description of the "heart" of the atomic submarine....

* In the collected volume Korabli-geroi (Hero Ships), DOSAAF Publishing House, 1970, pp 210-211.

A nuclear reactor -- the basis of any nuclear propulsion plant -- makes it possible to utilize the thermal energy of reaction from the fission of uranium nuclei, for conversion into mechanical and electrical energy.

The nuclear propulsion plant on a modern submarine is a complex consisting of a reactor and its associated units, pipe systems and instruments. The system also includes equipment for supplying the submarine with fresh and distilled water, electric power, heat and breathing air.

A submarine nuclear propulsion plant, regardless of its design features, consists of two parts: reactor, and propulsion machinery. In addition every submarine carries auxiliary (reserve) powerplants: relatively low-power diesel generators, storage batteries, and electric propulsion motors. Battery charging can be done with the diesel generators or propulsion turbines operating with reactor on. The auxiliary propulsion plant provides reactor startup from a cold state.

An auxiliary propulsion plant may also be needed, in the opinion of American designers, in case of a reactor malfunction.

The reactor part of the propulsion system consists of the reactor proper, a source of thermal energy, reactor control system, heat exchangers, circulating pumps, auxiliary systems and first (heat-transfer) loop equipment, biological shielding, and a reactor compartment radiation monitoring system.

The machinery section consists of conventional steam turbines, which convert energy to mechanical work, turbogenerators, main and auxiliary condensers, oil, condensate and feed-water pumps, second (working) loop equipment, propeller shaft line, etc.

The ability to approach an enemy unnoticed and to launch a sudden attack is the most important feature of the submarine. For this reason submarine designers have always concentrated their efforts on perfecting this feature.

A nuclear propulsion plant, in addition to speed, provides a submarine with excellent concealment, as it does not need to surface to recharge batteries. Usually battery charging for a diesel-powered submarine requires 5 to 6 hours, while recharging time extends to 8-10 hours and more if the batteries are completely down. Nuclear submarine cruising at shallow depths, where it can use its extensible antennas to communicate with command center, its periscopes, celestial navigation equipment or radar gear is reduced to a minimum.

A modern submarine produces almost 100 times the power output of a prewar model; maximum depth of dive has increased more than fivefold, and submerged cruising speed has increased 3-4-fold. Missile-armed submarines are capable of destroying surface ships at a range of hundreds of kilometers,

and they can fire ballistic missiles from a submerged position at strategic targets from a distance of thousands of kilometers.

Today's submarines differ dramatically from those of earlier years! Diesels and electric motors have been replaced by a powerful nuclear propulsion plant. This enables a modern submarine to travel as fast under water as on the surface -- at express-train speed. Possessing such a powerful heart, submarines when necessary can girdle the globe submerged, without coming up even to fuel.

The external appearance of submarines has also changed.

The greatest influence on submarine architecture has been exerted by nuclear propulsion plants, speed, maneuverability, and ballistic missiles.

The shape "seen" by designers in nature -- in whales and dolphins -- was the most advantageous. A dolphin, for example, can move at speeds up to 55 kmh. Could this capability not be exploited?

Experiments conducted by the designers of nuclear submarines were in some ways similar to testing by aircraft designers.

An enormous increase in propulsion plant output and speed required a more sophisticated shape.

Nuclear submarines increasingly approached the perfect "aerodynamic" shape -- the teardrop.

Scientists were well acquainted with the shape which produced minimum resistance when moving through a homogeneous liquid or gas. In particular, such shapes were extensively employed and are employed in airship design. At the dawn of submarine engineering -- at the end of the last century -- submarines as a rule had a cigar-shaped hull with a low length to width ratio. These were "pure" submarines: with an electric motor, torpedoes and a very short range.

At the beginning of the 20th Century they were superseded by so-called "diving" submarines. They had a long range in surfaced position and submerged only briefly for an undetected approach to target and attack. Improvement in "diving" submarine hull design continued in this direction up to the middle of World War II, when the rapid development of radar surveillance equipment and ASW compelled technicians and consequently submarine designers equipped with the latest scientific advances to revise the matter of selection of principal cruise configuration in favor of cruise submerged, providing submarines with good concealment and reduced vulnerability.

The development of nuclear propulsion plants and missiles which could be fired while submerged accelerated the process of evolution of a new-type submarine hull and produced somewhat of a return to earlier shapes, but at a higher level of development of naval architecture.

Nuclear propulsion plants do not require atmospheric oxygen to operate.

The use of atomic energy successfully solved the problem of a "single engine" for submarines.

Nuclear propulsion plants make it possible to increase substantially a submarine's propulsive power and as a result substantially to improve a submarine's operational qualities. This has resulted not only in an increased maximum speed submerged but also average overall speed at sea, since the fuel supply is practically unlimited.

The use of nuclear propulsion plants increases a submarine's range and its autonomy of operation. The duration of continuous operation of a nuclear submarine submerged is determined primarily by the physical stamina of the crew.

Since the end of World War II the principles of naval organization and views on navy combat utilization have changed radically.

Ballistic missiles have become the principal weapon of the warships of the missile-nuclear age, in the unanimous opinion of military experts. Experts claim that it is missiles which provide navies with the capability of launching strategic strikes.

Nuclear submarines carry nuclear warhead missiles, and all old concepts of "seapower" have become extremely relative. The figures cited by experts are rather eloquent. Naval weaponry has made a leap from TNT to atomic and hydrogen bombs. An atomic explosion is equivalent to the explosion of conventional bombs with a charge measured not in tons or even in thousands of tons, but rather in millions of tons of explosive. One is incapable of conceiving of such magnitudes. A megaton is the weight of all explosives used against Germany in the form of bombs and shells during the 4 years of the war, multiplied 18 times. A single megaton bomb is equivalent to 50 atomic bombs such as the one dropped on Hiroshima.

The nuclear propulsion plant and nuclear weapons together have increased striking power a millionfold. A large unit [soyedineniye] of nuclear submarines armed with guided missiles can at great speed and without stopping cross seas and oceans washing an entire continent...

The Americans maintain giant nuclear submarines in the ocean depths, armed with nuclear-warhead missiles. These missiles can be launched under water, which complicates search and attack by ASW forces. These missiles have a range of several thousand kilometers. In view of the fact that more than half the earth's population lives no further than 100 kilometers from the shores of the oceans and seas, one can imagine the colossal power in the hands of modern submarines. This makes them the backbone of the navy, the basis of its inexhaustible combat potential.

Torpedoes with nuclear warheads have increased the submarine's combat capabilities. In the past it has required five to 10 torpedo hits to destroy a battleship, aircraft carrier, or even cruiser, while with a modern torpedo carrying a nuclear warhead, not even a direct hit is required. If a torpedo detonates within the "critical radius," computed in kilometers, depending on warhead size, no armor or structural protection will be able to keep a ship from going down.

According to the foreign press, present shipboard strategic weapons complexes in the U.S. and British navies constitute the Polaris system. A few years ago this system was widely proclaimed by the bourgeois press to be a weapon which will not become obsolete even in the seventies. But in view of rapid development of antimissile defense systems, Polaris has indeed become obsolete. It is about to be supplanted by the Poseidon missile. With practically the same effective range as the Polaris A-3 (4600 kilometers), the new missile carries a "cassette" warhead which contains as many as 10 separate warheads in place of one 800-kiloton warhead. Each of these is considerably smaller than the overall force of the Polaris warhead, but has a better capability of penetrating an antimissile defense system. In addition, the new missile can hit up to 10 different targets.

By initiating development of the Poseidon and planning to stop production on the Polaris, the Americans have "let down" their British allies, whose submarine construction program is based on the Polaris A-3. This faced the lords of the Admiralty with a dilemma: either invest huge sums in the production of the Polaris missiles they need, or spend even more on adapting their submarines for the Poseidon...

According to the foreign press, the United States has begun studying the possibility of arming new types of nuclear submarines with ICBMs with a range of 8-10 thousand kilometers.

Scientists and engineers were forced to solve a great many technical problems in designing missile-carrying nuclear submarines: missile weight, size, fuel, launching and guidance systems, extremely complex missile-associated equipment, location of missile fire control instruments, etc. A mere listing of this problems would cover several pages.

A submarine, which is submerged, receives a missile launch signal. Automatic preparation of all systems for launch is initiated, during the process of which pressure in the launcher and missile is equalized with pressure outside the submarine; the missile hatches open, and the control system firing circuits are readied. Electronic computers compute the necessary firing data.

On command missiles are fired from the submarine at specified intervals; the missiles rise to the surface with the initial imparted velocity and then continue through the air toward the target on a programmed flight trajectory.

A ballistic missile is fired from a launching tube, one of many carried by a missile nuclear submarine. In the lower part of the launching tube, on the first American nuclear submarines, for example, compressed-air reservoirs were provided for firing out the missiles. Subsequently these cylinders were replaced by steam-and-gas pressure generators.

The missile rises to the surface and emerges in a vertical path, after which instruments guide it to the target, which may be thousands of kilometers distant.

"Will the nuclear submarine become the primary naval vessel?" leading Western naval experts ask.

And they answer: "The nuclear submarine has a number of advantages over the large aircraft carrier, but it also has some disadvantages.

"Let us begin with the carrier. The advantage of the aircraft carrier lies in the fact that it possesses the capability of establishing air superiority at the desired time in a specified area of combat operations. After enemy air power has been neutralized, carrier-based aircraft can deliver a bomb or missile strike deep inside enemy territory. Utilizing its powerful radio equipment, an aircraft carrier is capable of maintaining reliable communications, gaining local "air superiority" and jamming enemy transmissions. The aircraft carrier's large carrying capacity means that both conventional and nuclear weapons can be carried on board; a carrier can therefore be utilized in limited conflicts in many parts of the world, which is extremely important during initial periods of political crises. Technological advances now make it possible to build VTOL aircraft; the aircraft carrier of the future will be smaller in size and will be less expensive to build and operate.

"Drawbacks of the aircraft carrier include: large size, consequently possibility of detection at a considerable distance; vulnerability to air and submarine attack, to a nuclear blast wave, and to chemical attack; an aircraft carrier must be accompanied by a large number of escort vessels, which could be utilized to handle other missions, in particular protection of lines of communication.

"A large missile-carrying nuclear submarine has the following advantages: it is difficult to detect and destroy at a great depth; it cannot be detected by radar; its crew is not vulnerable to chemical attack; the total destructive force of its 16 missiles is equivalent to that of the ordnance carried by all aircraft based on a large aircraft carrier.

"A missile-carrying nuclear submarine has the following disadvantages: it cannot be utilized in a limited war; it can be destroyed by a small ASW vessel; it is costly to build.

"In view of the above, one can assert that a large missile-carrying nuclear submarine is capable of performing the missions of a strategic bomber

force. The ballistic missiles carried by nuclear submarines offer advantages which fully justify the cost of building, maintaining and operating these craft. For this reason nuclear submarines at the present time supplement but in the future will supplant large aircraft carriers and will occupy the status of principal naval vessel.

"Countries whose navies contain both nuclear powered and conventional submarines will always have the capability of selecting optimal strategy, depending on the nature of any future military conflict."

The above statement is from an official NATO naval journal.

The Soviet Union cannot remain indifferent to the war preparations of the imperialists. Under these conditions we believe that our principal mission is to increase with unabating persistence the combat might of our army and navy, as well as their preparedness to defeat any aggressor if war is imposed on us.

The arsenal of our modern Armed Forces has become enormously more powerful. The Strategic Missile Troops offer a solid shield of defense of our nation's peaceful labors; missile-carrying supersonic aircraft fill our skies; the crews of Soviet nuclear submarines, missile cruisers and destroyers are improving their combat readiness in the world's oceans and seas. Our arsenal ranges from missile-warhead strategic missiles to the most sophisticated infantry weapons. No aggressor is capable of standing against the might of these weapons, which our nation has entrusted to the heirs of the fighting traditions of our war heroes.

Today the Soviet Navy is armed with nuclear ammunition and missiles. A combination of the various kinds of new and traditional weapons and the diversified carriers of these weapons has transformed the modern navy into the most universal armed forces branch and ensures their successful performance not only of the navy's traditional missions -- destruction of enemy naval forces, disruption of enemy lines of communication, protection of friendly lines of communication, assistance to ground forces in coastal areas -- but also totally new strategic missions, such as destruction of enemy military installations, manpower and offensive nuclear missiles and bases.

Until recently surface ships and diesel-powered submarines constituted our Navy's main striking power. Now the role of main striking force, capable of operating both against sea and shore targets, has shifted to nuclear submarines and naval aviation, armed with powerful nuclear-tipped missile weapons.

"The basis of our naval power," states Flt Adm SU S. G. Gorshkov, "is the most sophisticated, modern warships -- nuclear submarines. They combine immense fire power, mobility, concealment and the capability of remaining at sea for an unlimited time, attacking the enemy from a position submerged and at great distances... Long cruises by Soviet ships persuasively

confirm the reliability of Soviet equipment and weapons, the excellent combat, physical and morale-psychological training of our crews."*

American experience in operating nuclear submarines has shown that nuclear submarines spend up to 80 percent of their time at sea under water, and as much as 98 percent on some long patrols. One must remember that during World War I submarines were submerged only 5 percent of their total time at sea, with the remaining 95 percent spent on the surface. In World War II total time submerged did increase somewhat, but nevertheless did not exceed 30-35 percent.

Thanks to atomic energy and excellent electronic equipment, our nuclear submarines are capable of reaching any point in the world ocean and accurately hitting both land and sea targets. Atomic submarines have become the most modern warships. The following capabilities make nuclear submarines an ominous weapon: capability of remaining submerged practically indefinitely; the capability of running missions of any distance or extent, unprecedented firepower, great speed, and the capability of hitting targets thousands of kilometers distant.

Few people know what the control center on a nuclear submarine looks like.

Once the commander of the nuclear submarine *Leninskiy Komsomol*, Anatoliy Yakovlevich Zhukov, and a newspaperman had a very interesting conversation in my presence. I should like to present that conversation, for it will enable the reader to gain a clearer picture of the equipment and layout of a nuclear submarine.

Anatoliy Yakovlevich began: "There is considerably more instrumentation in a nuclear submarine's control center than on board any aircraft. It contains everything necessary to operate the submarine and its weapons."

"As a submariner, what type of surface ship do you consider to be your most important 'assistant'?"

"ASW craft and naval aviation."

"And your most dangerous enemy?"

"ASW submarines."

"Why?"

"Under water you hear the enemy sooner, and this means you prepare sooner for the attack. Herein lies an important advantage of submarines over the most sophisticated surface warships."

* Pravda, 28 July 1968.

"Does this mean that ASW is one of the most important military technical problems?"

"Definitely. Seawater is essentially impermeable to the electromagnetic waves used by all modern radar detection systems. Seawater also almost totally absorbs all other types of radiation. Sophisticated sonar gear is needed in order to find a submarine. But the velocity of sound propagation in water depends on the state of the medium: density of the seawater, its salt content and temperature. For example, sound waves, just as light waves, refract when they pass through layers of differing density. This forms so-called 'shadow zones,' where sound waves for all practical purposes do not propagate. Consequently, in order to locate a submarine the crew of a surface vessel must know where and at what depth such a reflective layer has formed. ASW ships are greatly hindered by 'temperature jump layers' -- a phenomenon in the ocean depths where water layers which are inhomogeneous in temperature reflect sound waves. It would seem to be a simple problem: measure water temperature, density, salinity, quickly (today's warships contain plenty of computers!) compute where and at what depth one might encounter reflecting layers -- and you've got your submarine! It is much more difficult than this, however. One can measure water salinity, temperature, and density quickly and accurately. But very soon all these values change appreciably; this means that the place, depth and dimensions of reflecting layers change. In addition, sonar operators are frequently hindered by schools of fish, groups of whales, dolphins and other marine animals. The ocean produces a great many different sounds, which at times are confusing. Sometimes this cacophony misleads even experienced operators... These are merely a few of the difficulties encountered in ASW. But submariners enjoy considerable advantages over the crews of surface ships. As I have stated, it is easier for us to hear a surface ship, to determine on the basis of the noise it produces its class, speed, and course. On a submarine we have literally everything: automatic recording of water temperature, salinity, density. We can determine the dimensions of a protective layer much faster than can a surface ship; we can slide under it and take an advantageous attack position."

"Anatoliy Yakovlevich, can a submarine hear a surface ship without any special equipment?"

"Sometimes, particularly when a surface ship is searching for us. The ship's sonar sends out sound pulses of sufficient force that it frequently sounds like someone is pounding on the submarine hull with a light hammer."

"What other external sounds can submariners hear?"

"Once I heard the sound of water pouring over the hull -- you know, like a gurgling sound. Probably at that moment the sub was cutting through some kind of mysterious current."

"Do submarines frequently run into schools of fish, and if so what is the result?"

"Sometimes... But there is no danger."

"What if you encounter a whale?"

"Are you kidding? A whale will hear us a mile off, and we can pick him up even further -- there is plenty of time to avoid encounter."

"What dangers lie in wait for the submariner?"

"A depth greater than the submarine is designed to withstand. In such a case the submarine's strong hull is unable to withstand the enormous pressure. An example of this is the loss of the American nuclear submarines *Thresher* and *Scorpion*. Icebergs are also dangerous, particularly the submerged portion which, as is well known, is considerably larger than what can be seen above the surface."

"What sort of emergency and escape gear do submariners have?"

"Special gear and suits enabling them to rise to the surface from great depths. In addition there is various communications equipment. With this equipment submariners can quickly radio their coordinates and the cause of the emergency -- in short everything necessary to repair or raise a submarine. We also have special rescue ships which are constantly ready to come to our aid..."

Zhukov was then asked a more mundane question: "Where does all the garbage go?"

"The submarine contains a special device for ejecting all garbage and trash overboard. It is necessary to make sure that empty cans are pierced full of holes."

"Why?"

"To keep them from floating to the surface. Cans can tell a lot, but most importantly we would reveal our position, violating a principle of submarine activity -- concealment... This would signify mission failure... But we were not the ones who invented can sinking. World War I taught submariners to pay attention to such trifles..."

"Anatoliy Yakovlevich, in addition to missiles, we know that nuclear submarines carry long-range homing torpedoes. What is the principle behind homing?"

"Such a torpedo contains devices which are capable of searching for and tracking a target. This is why a modern submarine can fire torpedoes from practically any position."

"We know that a speed of 25 to 30 knots is considered maximum for conventional propulsion plants. Are there any radical new ideas capable

of surmounting this barrier? Do you not agree that it is this limit which is holding back man's conquest of the world ocean?"

"To the extent that submariners must master the world ocean, one must consider problems of submarine design. What are these problems? First of all there is depth, and then there is submerged speed. Engineers have already achieved certain results. For example, American experimental submarines dive to 600 meters and can travel under water at speeds in excess of 70 kmh. Such speed is a good attribute for combat. Depth is more important for peaceful purposes. Famed marine explorers Jacques Picard and Don Walsh, in the bathyscaphe *Trieste* (remnants of the American nuclear submarine *Thresher* were retrieved with the aid of this device), reached the bottom of the Mariana Trench, the world's deepest, reaching a depth of 35,800 feet! The *Trieste* has a superstrong hull, is completely equipped for submarine exploration and has a simple, low-speed motor. Explorers of the ocean depths do not need 'cosmic' speed. Surface ships are another matter altogether. Here it is indeed important to move as rapidly as possible. The conventional screw, or more precisely the engines which turn it, are already obsolescent. What could replace them? Water-jet propulsion, hydrofoils, air cushion vehicle, jet propulsion... As far as I know, this is the extent of ideas at present..."

Let us continue our "tour" of the nuclear powered ballistic missile submarine...

The forward compartment contains the torpedo-launching equipment and torpedoes. Aft of this are the torpedomen's quarters. The second compartment on the upper deck contains the officers' quarters and wardroom, galley, petty officers' and enlisted men's mess, which can be quickly converted for showing movies. Forward of the reactor room -- the heart of the ship -- is the propulsion plant main control panel.

The ship's control center is the submarine's brain. The submarine and its weapons are controlled from here. It contains a periscope station and torpedo fire control, control stations for rudder and hydroplanes, movement and systems. Aft of the reactor room is the engine room.

A submarine's physical layout may differ from one type to another. Crew quarters may be located in the after compartment, while on nuclear powered guided missile submarines the launching tubes may be located immediately aft of the control center. Equipment location configurations may differ, depending on the submarine's design.

The development of nuclear powered submarines constituted a revolution in undersea navigation. Soviet scientists and seamen have made it serve peaceful purposes. The whole world is familiar with and has thrilled to the exploits of the nuclear submarine *Lenin*. It is well suited for operating in the Arctic: a strong hull, a powerful propulsion plant; it can cruise for an extended period without refueling. Experience in operating

this submarine has provided scientists with much valuable information, which will make it possible to build improved nuclear submarines in the future. In the future nuclear-fueled ships will probably be able to operate year-round at least in the western and eastern parts of the Arctic.

The great fantasy writer Jules Verne made many prophetic predictions; in some things he was wrong, but for the most part he has been right: the might of man knows no bounds.

Who knows what ships will be cruising the ocean depths 20 to 50 years hence...

A FIVE-OCEAN NAVY

In the mid-fifties a new destroyer slid down the ways at an American shipyard; it had been christened the *John Paul Jones* after a pirate credited with founding the U.S. Navy. There is nothing surprising in this. Famous American scholar Charles Lee Lewis notes that "the U.S. Navy placed slave ships under its protection, under the slogan of struggle for 'seamen's rights'... Frequently slavers hoisted the U.S. naval flag; thus the 'Stars and Stripes' became a symbol of the slave trade."

The idea of hegemony over the seas and oceans is no recent American notion. Today they prefer either to ignore slogans borne on the banners flown during the War of Independence, when the American Navy actually was born, or to interpret them in the manner of theologians, arguing that the atomic mushroom cloud over defenseless Hiroshima was evidence of evangelical meekness.

At the beginning of this century Theodore Roosevelt, who built up the American Navy to the world's third most powerful, affectionately dubbed it a "stick" with which to smash the skulls of dissenters.

This "stick" had much work to do. All those who for one reason or another were not filled with ardent love for the American trusts and monopolies fell into the category of "dissenter."

The history of the American Navy was truly "glorious." This was demonstrated time and again by the U.S. Navy particularly during the suppression of the Boxer Rebellion in China: "...Neither the Huns nor the Vandals, nor Genghis Khan, nor Tamerlane perpetrated such acts of cruelty," wrote A. Babel', "as were perpetrated in this war."

Then came the turn of Cuba and Haiti. "The United States left behind thousands of widows and orphans, animosity, hatred, and despair." This was written by an American, a contemporary to these events. Is it surprising that even today American warships are greeted by curses in Latin America?

It is not only two navies which face each other on the seas and oceans -- it is two ideologies, two philosophies...

The Soviet naval maneuvers code-named Ocean, held in April-May 1970, thrilled foreign observers.

For the first time in our nation's history the Red-Banner Arctic Fleet, the Pacific Fleet, the Black Sea Fleet, and the Twice Red-Banner Baltic Fleet carried out extended, coordinated exercises over an enormous area, covering the Atlantic, Pacific and adjoining seas.

Problems were elaborated at these exercises which are of great importance for further improving the combat readiness of Soviet naval personnel; at the same time the maneuvers constituted a severe test of their military proficiency.

This test was passed with honor.

Foreign newspapers, the American New York Times and British Daily Telegraph in particular, contained verbose reports on the "puzzling" movements of an armada of Soviet naval ships in the North Atlantic.

Correspondents questioned Flt. Adm. SU S. G. Gorshkov, Commander, in Chief of the Soviet Navy.

The Commander in Chief commented matter-of-factly on this event: "A group of Soviet naval ships is indeed presently located in Atlantic waters. How many ships are involved? In foreign press reports, as you have rightly commented, it is called an armada. It all depends on one's point of reference. If one considers the strength of the Soviet Navy and the total number of Soviet warships, I would not call this a particularly large group, let alone an armada. This is a normal large unit [soyedineniye] on a training cruise at sea. Nor is there anything puzzling in the fact that our warships are in that part of the ocean. The Soviet Union is a maritime power which possesses a modern navy. It is equipped with new warships, first-class weapons, and our men are excellent seamen. For this reason we are able to run cruises on a regular basis to those parts of the world's oceans and seas where we deem it necessary...

"I believe that the 'surprise' indicated in the news releases of foreign news agencies, in newspaper articles and editorials on the appearance of Soviet warships in the North Atlantic attests to the fact that U.S. and British naval leaders (apparently the bourgeois press reflects their opinion) have not yet rid themselves of traditional ideas of undisputed rule of the seas by the traditional Western naval powers, although these ideas have long since been put to rest by realities. This heightened interest in the cruise being undertaken by our ships, reflects the unjustified pretensions on the part of the Western powers to rule the seas as in the past. Please note that when a group of Western warships undertakes a cruise, bourgeois observers do not raise a hue and cry, while a normal training cruise by Soviet warships disturbs their tranquility. They take to their

typewriters and begin convulsively composing urgent telegrams, news reports, commentary, full of idle conjecture. Hardly a praiseworthy activity. NATO naval leaders apparently are still unable to accept the loss of their past monopoly rule of the seas. Like it or not, however, they must come to grips with the real facts of the present balance of power on the seas..."*

The Commander in Chief has come right to the point: our navy has indeed changed and is constantly taking delivery on increasingly sophisticated nuclear powered submarines and surface ships. In recent years alone the propulsion plant output of Soviet submarines has grown severalfold. And this means that the navy's combat potential has greatly increased, along with greater cruising range and our ships' autonomy of operation. Today Soviet warships cruise in all parts of the world ocean, under the Arctic ice cap and in tropical waters. Day by day our navy men are vigilantly serving in those ocean areas where required by the interests of the Soviet state.

Every day radiograms come to the homeland from distant latitudes.

Here is one of them:

"...The ships of our detachment are piercing a sudden blanket of fog with their bass foghorn notes. With the fog came rain. We are extremely grateful, as we have gone 20 days without rain. A strong gale and high seas had coated the sides and decks with salt. Salt is the eternal enemy of all seafarers. The rain is now washing the ship clean.

"The detachment of warships under the command of Rear Adm S. S. Sokolov is in its third month at sea. Behind us is the visit paid by the guided missile cruiser *Groznyy* to the island of Martinique, an overseas department of France. The island authorities, not to speak of the residents of its principal city and port, Fort-de-France, greeted the Soviet seamen warmly and hospitably.

"Combat training resumed after Martinique. Again our 'companion' appeared on the horizon -- the American patrol vessel *Thomas Gary*. But several days later it suddenly disappeared, and the following morning Capt 2nd Rank Nikolay Ivanovich Ryabinskiy, executive officer of the *Groznyy*, squinting slyly, said: 'Today we'll have missile practice...'

"The Americans had been diverted by our submarines and their mother ship, the *Tobol*. The *Groznyy* fired without any eavesdroppers.

"First two targets the size of a sea-going launch were lowered into the water and anchored. They were placed a fair distance from one another: the missile was to find its own target. I emphasize that although the exercise area was off sea-lanes, extra measures were taken to ensure safety of navigation.

* Izvestiya, 4 April 1969.

"Finally the cruiser, proceeding on attack course, reached the firing point. Antennas rotated on masts and bridges. Soon the cruiser's commanding officer, Capt 1st Rank Aleksandr Petrovich Ushakov, gave the order into the microphone: 'Fire!'

"The missile rose from the launcher with a shriek, trailing a tongue of flame, blinding in spite of the bright sunlight, and turned toward the target.

"Within minutes the report came: 'Target destroyed.'

"'There is nothing to photograph,' came a report from the *Soobrazitel'nyy*, which was closer than any of the others to the target area and was the first to reach the target location after the missile had done its job. 'The target has sunk.'

"There remains only one thing to say: the missile scored a direct hit. The crew of the *Groznyy* were deservedly proud of this performance, not only because of the direct hit (the cruiser had never scored any other kind), but because this performance took place in unfamiliar waters, after many months at sea.

"After the firing exercises the *Groznyy*, as well as its companions, the *Soobrazitel'nyy* and the *Bedovyy*, rendezvoused with the *Tobol* and our submarines.

"The detached force set course for the coast of Africa."

Dozens of such telegrams wing their way daily to the shores of our homeland.

While inspecting a ship during a visit to one of the fleets, the Commander in Chief of the Soviet Navy noticed an elegant little witch-doctor mask hanging from the overhead.

"Whose mask is that?"

"Mine, admiral sir."

"Your name?"

"Sergey Bondarev."

"Well, Sergey. What countries have you visited?"

Bondarev quickly listed about 15 countries and continents.

He then added: "I may have forgotten a couple."

"Been in the navy long?" the Commander in Chief queried.

"This is my second year."

The Commander in Chief turned to a member of the Military Council, Chief of the Navy Political Administration, Adm V. M. Grishanov, who was listening to this conversation with curiosity.

"We write and talk about a new navy. Here it is," the Commander in Chief nodded toward Sergey. "The lad has only been in for a year and a half and has already seen the world..."

Sergey Bondarev is not one of a lucky few. Thousands and thousands of his mates have had a similar experience.

Our navy has truly become a five-ocean navy.

Lovers of military adventures observe with terror the growth of Soviet naval power, and particularly our growing nuclear submarine fleet.

Time magazine, published by Rockefeller Center in New York and printed in Amsterdam, recently carried a major article on the Soviet Navy. Quoting S. G. Gorshkov's statement that "...the flag of the Soviet Navy today waves proudly over the world's oceans; sooner or later the United States must accept the fact that it no longer rules the seas," Time states with some bitterness that "to the extreme regret of the Pentagon, every word is true."

That is a rather eloquent admission! And to the sorrow of the American and NATO admirals, it is an objective statement: the Soviet Navy today constitutes a truly formidable force. It cannot be ignored.

"But attempts to ascribe to the Soviet Union intentions which it does not have," states the Central Committee report to the 24th CPSU Congress, "will not deceive the peoples of the world. We do solemnly declare that we have no territorial claims on anybody; we threaten nobody and are not planning to attack anybody; we stand for the free and independent development of all peoples. But let no nation seek to speak to us in the language of ultimatums and force."

"We have everything we need -- an honest policy of peace, military strength, and solidarity of the Soviet people -- to ensure the inviolability of our borders against any and all encroachments and to defend the conquests of socialism."

The Soviet people are resolutely determined to give all their strength and energy to the cause of the further prosperity of our great homeland. They will continue to manifest unabating concern for strengthening the defensive capability of our nation and our Armed Forces. Military might alone, developed to the highest degree, is capable of cooling the

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fighting ardor of aggressors and securing our country against potential threats.

The Armed Forces of the Soviet Union have always been a loyal guardian of the conquests of the October Revolution. Today army and navy personnel are perfecting their combat skills in day-by-day difficult, military labor, in order to be prepared at all times to carry out the homeland's command with honor.

I should like to say the following to those who plan on joining us, who are conditioning their character and will for navy service: "Love of the sea is a lifelong affair. He who has given his heart to the sea becomes forever a subject of His Majesty the Ocean. And this is a fine thing!"

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