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The Submarine Operation
of the Navy - the
Naval Operation of the Future

by

Admiral Yu. Panteleyev

In the past war the principal enemy of the fleet at sea was the aircraft armed with torpedoes and bombs. This is attested to by the statistics on losses of combat vessels by the nations involved. Whereas, in a number of instances, a vessel could evade a submarine and then even pursue it, the evasion of an aircraft by a vessel was very difficult, and the overtaking and destruction of a departing aircraft was completely impossible. It was hindered in this by its significantly slower speed and by the limited ceiling of its anti-aircraft artillery. In other words, in comparison with an aircraft, a vessel possessed neither the maneuverability nor the requisite firepower.

The submarine has actually remained all-powerful ever since World War I.

In our time the aircraft and the submarine have become the major enemies of that leviathan of combat fleets, "the king of the oceans" - the battleship. And this leviathan, which costs billions, has departed from the seas and oceans in ignominy; all naval powers have stopped building it. The same fate has also befallen other large combat vessels. The missile/nuclear weapon has become the basic means of destruction even at sea. Its development has led to the division of naval power into two parts: one part, consisting of nuclear/missile delivery vehicles immeasurably smaller in size than the old battleships and cruisers, has taken to the air (jet aircraft); the other has gone under water, into the depths of the seas and oceans (the submarine fleet).

We visualize a future armed conflict primarily as a battle in the air and underwater. Moreover, where air operations have their own clear-cut organization and definite composition, the concept of "submarine operations" is entirely new and not reflected in our literature, and has not yet received the "rights of citizenship" in our naval art. Is this right? It would seem not. This conviction evolves from the following considerations.

The study of the history of military operations at sea in past wars must be carried out neither exclusively nor largely for the purpose of learning and defining the course and results of the events themselves, but rather for establishing the new trends in naval art which took place in a given war, what the prospects are for their development, and what results they might produce.

It will be recalled that "submarine warfare" has been mentioned more than once in naval art. The Germans especially declaimed about this; nevertheless, neither in the First nor Second World War, after having declared merciless submarine warfare against the Allies, were they able to bring the Allies to their knees. After carrying out a series of bandit attacks against hospital vessels, and after gaining, unquestionably, certain operational-tactical successes, the German submarine fleet was still unable to achieve any kind of strategic goals with submarines alone. Although partly disrupted, the supplying of England proper was not stopped. The failure of German "submarine warfare" is explained by the fact that their submarines, although able to sink enemy vessels at sea, were not able to demolish his military economy entirely, to destroy the basis for the construction of new vessels, and to crush the antisubmarine defense. For each transport sunk toward the end of the war, the Allies constructed two which were more modern.

Thus, in past wars submarines primarily carried out operational-tactical missions; strategic missions were not within their power to accomplish, primarily because of the status of equipment and the organization of the submarine fleet of those days.

Is it correct at the present time to raise the question of the organization of purely submarine operations as naval operations of the immediate future? It seems to us that it is. Moreover, a delay in deciding this question can cause harm to the future increase of the defensive power of our country.

First of all, let us attempt to define submarine operations. The meaning of "operation" as a form and method of achieving operational or strategic goals has a very definite connotation in our military art; it is known to the reader and there is no sense in citing it here. Let us agree beforehand that we do not admit the possibility of resolving all missions of a war, or the achievement of its strategic goals, by any one type of armed force. Victory in war can be achieved only through the combined efforts of all types of armed forces in cooperation with one another. Therefore, we view a submarine operation as an integral part of battle by the armed forces in a naval theater, carrying out the performance only of particular operational or strategic tasks.

By a submarine operation we mean an operation of submarine forces which is conducted in the depths of the ocean or the sea without rising to the surface. The term "underwater vessel" was not applied accidentally. The designation "underwater boat" appears to us to be too general, inexact, and not at all suitable for operational-tactical language. At the present time there are missile-carrying submarines with a displacement of several thousand tons, submarines for antisubmarine defense, and submarines of other designations. It is natural, therefore, that a generic understanding be developed for all submarines, whether the submarine fleet or submarine forces which operate in their own peculiar element - in the depths of the oceans and seas.

A purely submarine operation can take place only when purely submarine missions are carried out in ocean depths by a submarine fleet and where the possibilities exist for their fulfilment by submarine forces. In the immediate

future, just as at present, the submarine forces may conduct operations primarily in conjunction with the aviation and, in some instances, also with the surface fleet. But such operations will not be designated submarine operations; it would be more exact to call them operations of submarines.

As is known, at present submarines operate in close coordination with aircraft and surface vessels which are supporting their operations. We devote a great deal of attention to this problem. Much is said about aerial reconnaissance on behalf of submarines and about the support afforded by surface vessels to the deployment of submarines from their bases or to their return. Some of these situations have become prescribed requirements. During any naval exercise a thorough minesweep of the channels of a naval base is instituted directly prior to the departure of the submarines from the base. Also, in order to support this departure of submarines, all antisubmarine defense forces (protivolodchnaya oborona - PLO) in the area of the naval base are deployed. (We have in mind destroyer escorts and aircraft of PLO.) Finally, a special direct escort is organized to support the departure of submarines from the bases. This great number of ships at sea and aircraft circling about, all engaged in driving off enemy minelaying submarines and in "sweeping away" mines, without even knowing if there are any at all, most blatantly reveal that an operation is being prepared.

Even during the past war a number of measures for the so-called support of submarine deployment started to become outmoded, while submarines more and more gained the right for complete independence of action. Today this trend is becoming evident with an even greater force. Of course, the execution of all or part of the measures indicated above is not excluded even now in certain cases. However, it is entirely clear that such methods for supporting the deployment of submarines or supporting their combat activity are rapidly becoming outmoded and it is necessary to seek new measures.

One more example. In order to force the enemy antisubmarine defense line with our submarines, it is considered essential to carry out decisive strikes from the air and sea against his PLO forces. But the execution of this strike makes it patently clear that our submarines are getting ready to force that particular line. In this manner, our actions will serve as a distinct combat alert for the enemy PLO. Is it not time for the submarine forces themselves to secure the forcing of the PLO line covertly underwater, without all the uproar on the surface of the sea and in the air? It seems to us that such a time is here, or practically here. Evidently, operations for forcing the PLO line will constitute one of the first submarine operations of the submarine forces.

What kind of operational and strategic missions can the submarine fleet resolve independently because of this developing situation?

As is well known, the military leadership of NATO countries still attaches special significance to its aircraft carrier large units, viewing them as mobile airfields from which aircraft can take off with nuclear weapons. According to the plan of the NATO leaders, these "airfields", being mobile, must be in their positions at the right time in the Atlantic, in the Norwegian Sea, and in the Indian and Pacific Oceans, from which they can destroy designated targets on the territory of the USSR.

Aircraft carrier large units, the fleet's "Enemy No. 1", are powerful but far from invulnerable. They can be destroyed, first of all, by missile strikes of our aviation. But the enemy may try to create strong counteractions with his PVO forces and weapons against these strikes. At the present time it is extremely difficult to conceal the deployment of large masses or of separate groups of aviation and their approach to aircraft carriers, because the eyes of the enemy have become very keen and his ears sharp. The "sudden" appearance of strike aviation from behind the clouds is also excluded, inasmuch as to bank on the inadequacy of enemy equipment or on errors by his leadership is worse than foolhardy. Aircraft also cannot

"hover" in one zone for a long time, awaiting the arrival of the enemy. For the enemy can deploy his aircraft carrier strike large unit (avianosnoye udarnoye soyedineniye - AUS) prior to the beginning of a war under the most plausible pretexts (cruises, training exercises, etc.).

The submarine fleet possesses incomparably great capabilities for combat with the AUS. It may be deployed in complete secrecy, during the period of exacerbation of the military-political situation, to those very areas of the ocean or sea, designated by the enemy as zones for the deployment of his forces for a strike against our installations. And it may very well be that the enemy aircraft will not have time to take off for the delivery of a strike, as they will go to the bottom together with their "airfield" after being attacked by nuclear weapons of the submarine forces which had been covertly deployed beforehand in the appropriate areas of the ocean or sea.

For the execution of an independent submarine operation to sink the enemy strike aircraft carriers, is it sufficient to have only atomic submarines with nuclear weapons? No, it is not sufficient! The resolution of this mission requires an entirely new organization of large units of the submarine forces. In the interests of ammunition supply and technical servicing, submarines are still grouped in large units on the basis of class and type (submarines with atomic engines, submarines with diesel engines, submarines with torpedoes, submarines with missiles, etc.). Such large units are not suitable for carrying out independent submarine operations.

Upon receiving a combat mission to destroy an AUS, a submarine (or a group of them) must, at the present time, first of all be guided to the target either by aircraft or by a reconnaissance screen of submarines. The commander of an attacking submarine does not see or know who is providing his tactical support or where it is and is forced to operate independently; he watches nothing except the target. Submarines beneath the surface do not yet represent dependably controlled large units.

It appears to us that it is now essential to create separate submarine large units capable of independently resolving tactical or operational missions. We have in mind submarine squadrons of vessels with atomic propulsion. Such a squadron must consist of strike submarines (with missiles and torpedoes), reconnaissance submarines with powerful hydroacoustical equipment, antisubmarine defense submarines, minelaying submarines, and supply submarines. Upon receiving its combat mission for operations in a prescribed area of the ocean or sea, the submarine squadron, independently, with its own submarine reconnaissance forces, must find the assigned target and direct its strike forces against it. On the basis of his intelligence data, the commander of the operation must plan the main direction of the strike and determine the forces to be used against the main target, the operational makeup of these forces, and the forces to be used in a strike along the auxiliary axis. In a number of instances the covert laying of mines (anchored or floating) may delay enemy deployment and in this manner support the operations of the strike submarine forces. It is doubtful that the existing hydroacoustical equipment of the enemy will be able to determine accurately the entire depth of the operational makeup of the submarine forces and the large number of attacking submarines deployed at various depths. In any event, the ranges of this equipment are still much less than the ranges of our modern long-range torpedoes, let alone missiles.

It is evident that an ocean-going atomic submarine, carrying powerful nuclear armaments, must have its own reliable defense under water from enemy submarines (antisubmarine defense) and from mines (while moving at corresponding depths). In order that the submarine commander can devote all his attention to the major task - the attack of the assigned target. With the development of the means of underwater television, sonar, and communications, the control of a submarine squadron becomes possible and submarine battles and engagements with all their underwater aspects - reconnaissance, deployment, strikes against protective forces and against the main target - assume realistic forms.

Of course, an operation for the destruction of an AUS may be conducted, as we have already indicated, either by aircraft alone or in coordination with submarines. We do not exclude such a variant, for it does not contradict the basic views indicated above. But we reiterate that even for joint operations with aircraft, the submarine forces must be organized along a new principle. This is primarily necessitated by the strengthened defense of the AUS and by the rising cost of atomic missile submarines, which require considerable support in all their operations. (We have in mind reconnaissance, PLO, and PVO, i.e., those types of defense which a battleship required for itself on the surface of the seas in its time.) It can be said that since "naval power" has gone under water, all of its defense must also go under water.

We have already spoken of the impossibility of aviation's remaining a long time in waiting zones, of its significantly lower capability than submarines for covert tactical deployment, and of the great dependence of aviation upon the condition and availability of an airfield network. To this must also be added the dependence of aviation capabilities upon the weather. Thus, by no means can aviation always guarantee the complete success of its operation against the AUS on all expanses of the world's oceans.

The struggle for securing the possibility of the first strike in the initial period of war will be an important problem for both sides; therefore, in a number of instances, the operational deployment of forces even during peacetime will be unavoidable. Even today submarine forces can occupy necessary waiting positions and from them conduct covert and prolonged observation of the enemy. Aircraft cannot do this. Sonar is incapable of determining either the hull number or the designation of a submarine; for this reason, during an intermittent sonar sounding for submarines it is difficult to determine immediately the number of submarines operating in a given area, since the same submarine may be detected several times.

We are correct in asserting that "underwater danger" is more serious than aerial danger, for it is more difficult to gain rapidly the particulars of an underwater situation than of an aerial one. After intercepting the enemy, the submarine forces are capable of delivering strikes against him repeatedly and of organizing a pursuit while reloading their torpedo nuclear weapons underwater. All these considerations speak for the advantages and the reality of submarine operations.

Although recognizing the vulnerability of aircraft carriers from the sea, as well as from the air, foreign authors for the time being are still timid but, nonetheless, are expressing views on the growing obsolescence of aircraft carriers as floating, maneuverable "airfields". The attention of these authors is turning to missile-carrying submarines which can use their missiles from the depths of seas and oceans and, especially, from the areas of the Arctic (through the many unfrozen patches of water in the midst of ice) where an aircraft carrier cannot operate at all. It is natural, that in contrast to the AUS, with its numerous support vessels and aircraft, the appearance of our missile-carrying submarines in the ocean and their tactical deployment at great depths can, as we have indicated, be carried out covertly without the knowledge of the surface fleet of the enemy, his aviation, and, even more so, the shore facilities for the detection of submarines. Neither aircraft carriers nor the most powerful aircraft can counteract the arrival of submarines in the Arctic area. The sinking of one or two submarines during their passage into the Arctic by surface vessels or aircraft will not have a decisive effect. In the near future only enemy submarines will be able to counteract the deployment of our submarines. And only our submarine forces, organized into submarine squadrons and carrying out submarine operations, can counteract this formidable force of the enemy.

We shall discuss briefly the plan of operations for the destruction of enemy missile-carrying submarines in the Arctic area, i.e., under the ice in the depths of the

Arctic Basin. Here, neither an aircraft nor a surface vessel can aid a submarine in the usual manner in any way. Our submarine squadron (a large unit of submarine forces in a given theater) must first of all have its own underwater reconnaissance, consisting not only of reconnaissance submarines but also of technical equipment for submarine detection, installed by special minelaying submarines under the ice (buoys for detecting enemy submarines, mine obstacles, and nets). The creation of such means is not an insoluble problem. In addition, our strike missile-carrying and torpedo submarines for combat against enemy missile-carrying submarines in the ocean depths under the ice must have a mobile underwater patrol and a direct underwater defense consisting of PLO submarines and submarines for detecting mine obstacles (submarine mine detectors, a type of submarine mine-sweeper). A squadron commander must command such an operation from one of the submarines. Control of the forces must be based on reliable means of underwater communication and television. The validity of such an operation has already become apparent; however, the materiel base for its resolution is still more theoretical than practical. Let us recall that this is not the first year that American atomic submarines have studied the under-ice Arctic area.

During the conduct of submarine operations it is absolutely necessary that each submarine know its place in the formation and its place in relation to the bottom of the ocean or sea and to the nearest banks and islands, first of all for security of navigation, as well as for the tasks of tactical deployment and placement of technical means of combat (buoys, mines, nets). One of the most important navigational aids for helping submarines determine their position must be a well-made naval chart showing depths of the Arctic basin and a series of other important data (underwater currents, the steepness and unevenness of the bottom, as well as its characteristics). Such a "submarine" chart should be in the making now and should be periodically updated with new data (areas of sound channels and other hydrological elements) for the most detailed portrayal of the entire underwater environment. However, the availability of even the most detailed charts

cannot guarantee that there will be an exact pinpointing of the submarine's position. A question arises concerning the creation of underwater hydroacoustic beacons for submarines, concealed from the enemy and operating when triggered by our submarines. Theoretically, the creation of such a beacon, operating on the basis of a coded format, also presents no problem.

We do not deny, of course, the possibility of submarine forces' detecting enemy submarines through the use of technical equipment installed on the ice surface or in the water through holes cut into the ice. But in view of the great mobility and hummocking of Arctic ice and of the vulnerability of these technical means from the air, it should be taken into consideration that these technical means will be used only occasionally. Therefore, they should not be the principal basis on which the reliability of an entire submarine operation is planned.

Thus, we arrive at the conclusion that combat against missile-carrying submarines under the ice in the Arctic is exclusively a submarine operation, in which the participation of other types of armed forces is completely insignificant. On the basis of all that has been stated, it is now time to consider the creation of submarine sailing directions for the seas and oceans.

Combat with enemy missile-carrying submarines outside the Arctic basin must be planned on the same principles as those in the Arctic. To escape aerial and surface pursuit, modern enemy atomic submarines more and more are increasing the depth of their dives, which are now measured in hundreds of meters. In our time, it is not the structure of the submarine itself, but the depth of the sea or ocean, that will soon limit the diving depth. Combat by our submarine forces against enemy missile carriers at great depths will also be a purely submarine operation with all its inherent characteristics.

The significance of the potential enemy's communication routes from America to Europe, across the Atlantic Ocean and, to a lesser extent, the Pacific Ocean, is well known.

It is necessary to understand correctly the composition and role of ocean shipments in order to assign a mission to the fleet skilfully and to select appropriate forces for the resolution of that mission without expecting more from them than they can accomplish and, at the same time, not assigning them missions which are impossible for them to carry out. Strikes against a convoy on the communications routes, carried out by a group of submarines or by aircraft, can destroy part of the guard vessels and part of the transports. However, this will have no perceptible influence on the situation on the ground front or on the course of the war as a whole, for in a given instant only tactical success is achieved at a time when all ocean communications routes as a whole will have strategic significance. The results of a strike against a convoy must not be judged by individual transport sinkings out of an entire convoy, but by the sinking of the entire convoy, or at least three-fourths of it.

It should be remembered that in a number of instances even the destruction of a convoy in its entirety will not by any means immediately influence the situation at the front, in a campaign, or in the war as a whole. This is all the more reason why it is necessary to destroy a convoy and not to settle for partial tactical successes in the battle against communications routes.

How, then, and by what means, can the destruction of an entire convoy be achieved, a convoy which in a number of instances will proceed in separate groups (large units) which do not fall into the zone of one nuclear bomb? In addition, it should be taken into consideration that some of the vessels will proceed without cargoes for purposes of camouflage.

In the immediate future the resolution of an assigned mission only by missile forces from our own territory is not yet very realistic, since an enormous number of missiles will be required even for one convoy of 100 transports with its escort if a high rate of probability for its destruction is desired. In resolving this same mission aviation will require reliable, uninterrupted reconnaissance of the ocean

and, since it is capable of only a single attack, will not be able to reload in the air, but will be forced to return to the airfields. We are by no means deprecating the significance of strikes against convoys by aircraft, but we must also note all the weak spots of this type of force.

The matter is different insofar as the capabilities of submarine forces are concerned. Even now, unlike aircraft which can only search for hours, submarine forces can search for convoys independently underwater for tens of days; they can wait until the convoy approaches, overtake it and, without surfacing, take up advantageous positions; then they carry out strikes against the escort forces, break through them for strikes against the transports, and moreover, deliver these strikes repeatedly with the use of underwater nuclear explosions. Naturally, the strike of one submarine squadron will serve as reconnaissance and guidance for another, which can, in several hours, deploy for the completion of the first squadron's strikes against the convoy.

At the present time, and for the immediate future, it is difficult to assume that the enemy convoy escort will quickly and easily detect all the submarine squadrons (2 to 3) deployed in a given zone of the ocean at various depths and be able to determine where, how many, and what type of submarines are deployed. Atomic submarines will always have superiority over a convoy in speed with all the benefits ensuing from this, including the guarantee of concealment of actions.

The place of departure of convoys and their place of assembly at sea can be established not only by aviation, but by reconnaissance submarines; and in the future the entire mission for the destruction of a convoy can be resolved completely within the framework of a submarine operation. It should be kept in mind that the development of PVO means makes aerial reconnaissance very complex and less reliable than reconnaissance with the aid of submarines.

The parameters of a submarine operation for the destruction of a convoy are already indicated. In its battle against communications routes the German-Fascist fleet adopted "wolfpack" methods with the use of reconnaissance submarines. And only the weakness of technical means during the period of World War II - the lack of underwater television and means of reliable covert communication, prevented the Fascists from resolving the problem of submarine operations completely. Allied communications routes were not disrupted. At the present time the means and methods of radiocountermeasures in our country and abroad have improved significantly. The achievements in this field are not to the advantage of guided missiles and aircraft but do not at all affect the ocean depths, where the means of hydroacoustic concealment and counteraction by submarines are still a long way from results capable of decisively breaking up a maneuver and strike by submarine forces.

Thus, a submarine operation during operations against enemy communications routes becomes plausible in all respects. In a given case we also do not exclude the coordinated operation of submarines with aircraft when this is possible, we say, that a purely "submarine operation" is more effective when it is conducted with decisive goals in mind against communications routes where not a single, but a prolonged and methodical, action is required.

To the extent that the threat to sea communications routes from missile strikes increases, a future war could, unquestionably, see the appearance of submarine tankers, submarine vessels for transporting troops and cargo, and, finally, special submarine amphibious-force-landing vessels. During the past war there were attempts in our country and abroad to create submarine transports. Thus, we delivered ammunition and supplies by submarines to the besieged naval bases of Hanko and Sevastopol. True, these were not special submarines, but combat vessels with limited capabilities for taking on various cargoes, but the idea of creating submarine transports and underwater communications routes received its first practical application.

Thus, in a future war there will undoubtedly be missions for the destruction of enemy underwater communications routes and for the protection of our underwater communications routes. It is apparent that missiles and aircraft will not be able to destroy submarine transports in the ocean and sea depths. Of course, it is possible that they could achieve partial tactical successes as a result of an underwater atomic explosion capable of destroying one or two submarine transports. However, these successes will not lead to the breakdown of communications routes or to the disruption of deliveries over them.

Underwater communications routes will be at various depths and along different courses, and the submarine transports will proceed in a dispersed manner. Under these conditions, who will be able to find quickly and destroy such a submarine convoy? It is apparent that only properly organized submarine squadrons of the submarine forces are in a position to resolve this important operational and, in a number of instances, even strategic, mission. Aircraft and, even more so, surface vessels, certainly cannot do it.

It is necessary to mention certain special missions which, though not tied in with strategic tasks, have come up in the past and apparently will face the fleet in the future. We are referring to diversionary operations of different magnitudes, carried out for the purpose of destroying radar stations and radio stations of communications of special designation, and also to resolve other missions of the most varied nature, especially on islands or on a sparsely populated and poorly protected shore. These missions cannot by any means always be resolved by a missile, no matter how it may be delivered. Modern technical means permit an installation to be reliably protected even from a ground nuclear burst. Very frequently it will be necessary not only to knock this or that installation out of commission, but, what is much more important, to obtain documents and seize the "tongue". Neither an airborne landing nor a missile can accomplish this mission.

For the resolution of a number of missions of a diversionary nature the temporary presence of subunits of our armed forces at an enemy installation will be required.

Only submarine forces can suddenly and covertly land such a force and also quickly and covertly remove it. In past wars there were many examples of such use of submarines, but the scale of these operations was limited.

We have reviewed a number of operations, the aims of which, in our opinion, can most effectively be achieved even today by submarine forces and even more so in the immediate future. We have discussed the destruction of aircraft carriers and missile-carrying submarines, the disruption of surface and underwater communications routes in oceans and seas, and certain diversionary actions of submarine forces.

This is, of course, far from a complete list of all of the missions which could be assigned to the navy and, especially, to its submarine forces. To this should be added the contribution of missiles fired by submarines against naval bases, shipbuilding yards, and other enemy military installations located on shore and in the zone of interior of the enemy country; also, missions involving coordinated action with troops of our maritime front by landing forces in the enemy's rear. However, it appears to us that while these missions can be assigned to our submarine forces today, in the future they can be accomplished with equal success by missile units and long-range aviation. In the resolution of these missions, strategic missiles will completely replace submarine forces, but nothing can replace submarine forces in their battle under the ice and in the depths of the oceans and seas against enemy missile-carrying submarines, his submarine transports, and his aircraft carrier strike large units. Therefore, the question arises as to whether it would not be better to orient our submarine forces in the future chiefly toward those types of operations, the execution of which depends entirely upon them, and in which a missile (ballistic or from an aircraft) cannot at present replace a submarine? Without exception, every type and arm of the armed forces must first of all execute those missions which it has been designated to accomplish and which no one else can accomplish.

It was not just for sport that our naval reconnaissance seaplanes (MBR-2) bombed troop concentrations on the ground front at Leningrad during the first months of World War II. Of course, during this period no one conducted aerial reconnaissance at sea, since it was impossible in those days to replace a naval reconnaissance plane with any other aircraft - all aviation operated on the ground front. Many seaplanes were lost, but the grave situation at the front at that time necessitated such sacrifices. Such use of naval aviation cannot serve as an example for the future, for this was a unique and atypical case for methods of conducting military operations at sea.

The approach of our missile submarines to the enemy shore to carry out a missile salvo will always entail their entry into the enemy antisubmarine defense (PLO) zone; therefore, if the salvo is carried out from a distance, outside the PLO zone, from an area of complete security (more than 500 to 600 miles from shore), then is it not better in such a case to use the ballistic missiles of the missile troops or to use long-range aviation? For the ocean-going atomic missile submarine is a very expensive weapon; it not only carries expensive equipment, but large groups of highly qualified specialists are on board. There is no one on a strategic missile and the results will be the same, and perhaps even greater, than from missiles fired from a submarine. Why risk an expensive submarine weapon and its entire crew in such a poor cause? We might be asked - why then is the NATO fleet preparing to fire missiles at USSR installations specifically from their submarines? It appears to us that this is explained by the fact that neither the USA nor England at the present time has strategic missiles with the range and, mainly, the accuracy of flight, to justify their being fired from USA bases against all our important installations.

If, nevertheless, our submarine fleet will be assigned the mission of destroying enemy shore and rear area installations, in this case the submarine forces must be organized in a new manner. Individual submarine operations off enemy shores must be dropped, because the enemy anti-submarine defense has become very effective. The strike

submarine, or a group of them, must have their own direct underwater protection from enemy submarines; and their own reconnaissance submarines to clear the approach routes and the firing area, which is covered not only by the enemy PLO submarines but also by his mine obstacles and other technical means. Thus, even in this case there is a need for a special large unit of submarines, which we have already mentioned.

In no way by our discussions are we preparing to deprecate the significance of missile strikes from submarines against enemy naval bases or other of his installations. We are discussing only the selection of the most effective, economical, and reliable weapon for the accomplishment of a given mission. It appears to us that with the development and perfection of strategic missiles, missions for the destruction of shore installations by submarines will be eliminated.

The role and significance of first strikes in the initial period of a war have been sufficiently delineated in our military literature. The effectiveness of the first strike depends, first of all, upon the secrecy and timeliness of the deployment of the forces during a threatening period. In a number of military-political circumstances, it will be necessary to carry out such a deployment even during peacetime for, so to speak, protective purposes, without the least violation of existing international practices. Which type of weapon can do this with the most secrecy? Who can covertly occupy positions in the area of probable deployment against us by enemy aircraft carriers and missile submarines, or in the area of appearance of a large convoy with troops? Obviously, only submarine forces can accomplish this, because as we have already indicated, it is a very complicated matter to detect their deployment, to say nothing of determining their exact position and the exact number of submarines in the depths of the ocean and sea.

A few words concerning the supply of submarine forces. Submarine vessels are designated for a long stay under water, which their equipment already guarantees. It is

also necessary to provide for the replenishment underwater of certain types of supplies for submarines. Not too long ago the possibility of refueling a jet aircraft traveling at an enormous speed and height seemed unrealistic, yet today this problem has been resolved. Surface vessels already take on fuel from other vessels while underway, as well as while in anchorage, from storage containers hidden in the depths of the sea. Submarines, however, still come to the surface to take on supplies, and in so doing deprive themselves of all their submarine qualities. It is time to create special supply submarines for supplying submarine squadrons underwater and underwater depots from which a submarine could take on supplies while lying on the bottom.

It should be kept in mind that the possibility of counting on stationary surface floating bases is becoming more and more problematical. There is an urgent need for underwater submarine supply bases in bays near our shores or for special submarines to furnish supplies away from bases. The technical solution of this problem is entirely possible.

What kind of deductions can be made from all that has been discussed?

First of all, it appears to us that the appearance of independent submarine operations in naval art is completely natural. The object and goal of these operations will be such that no other types or arms of the armed forces except submarine forces will be able to engage in or achieve them. We have in mind combat with enemy missile-carrying submarines in the Arctic, under the ice, or in the depths of non-freezing oceans and seas, and also, the destruction of underwater and surface communications routes. In the future, submarine operations will be able to achieve operational, as well as strategic, goals.

Submarine operations will also be conducted in those instances when the accomplishment of a mission jointly with aviation, or by aviation alone, is difficult or, for many reasons, temporarily impossible. We are referring to the

conduct of submarine operations involving the destruction of the carrier strike large unit (AUS) and the destruction of naval bases and the forces stationed there, as well as a number of diversionary operations, including the landing of tactical amphibious forces.

During the conduct of submarine operations with any type of goals, in a number of instances, when it is possible, a joint operation of submarines with various types and arms of the armed forces is not excluded, first of all with the missile troops and aviation; but at the same time it should be remembered that forms of coordinated operations, besides strategic ones, are becoming more and more complex.

In order to support the conduct of submarine operations, it appears to us that it is necessary now to resolve a number of organizational and technical problems:

- first of all, to work out the organization of strike submarine large units (squadrons);
- to organize a system of covert underwater communications and television in order to ensure navigational security of movement in the depths and to maintain position in an underwater formation, as well as to control the large unit during the delivery of strikes against the enemy underwater;
- to create navigational charts especially for the operation of submarine forces at all depths attainable by them (with an indication on the charts of the temperature, density, and transparency of the water, and the relief of the bottom, currents, and other data);
- to work out and create materiel-technical means for underwater navigation (underwater beacons with coded format) in our own as well as in neutral waters; and also, means of obstruction, placed covertly from submarines (light nets in combination with mines);
- to work out a system for all types of underwater supply, for submarines lying on the bottom at points of dispersal

and at definite depths and not moving;

-to create a class of special submarine tankers and submarine transports for the shipment of combat supplies, equipment, and contingents of personnel.

None of these proposals is fantastic, for a number of them already are coming into being. The task now consists of creating an orderly system of theoretical postulates and to give clear-cut "orders" to our technology on the basis of these, lest the realities of combat operations of submarines catch us unawares.

In this article we have attempted to present and, wherever possible, to substantiate, certain problematical questions of submarine operations which are subject to detailed elaboration, because submarine forces must, above all, prepare themselves for the conduct of submarine operations as the naval operations of the future.