

THE SUBMARINE REVIEW

JANUARY, 1984

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FROM THE PRESIDENT

The holiday season will have passed when this issue of the Submarine Review reaches you. But still my lingering best wishes for our submarine community will be transferred on to you. The New Year--1984--signals the start of a wide range of activities, highlighted by the annual Submarine League Symposium and Business Meeting on the first Tuesday in May, 1 May 1984. I would ask that each of you note this affair on your calendar.

Our ambitious goal of 1984 Submarine League members by the first of the year has evidently fallen short of the mark. As of 1 December 1983 our membership totaled 1257 of which 337 were submariners on active duty. Although we've been averaging about 85 new members for the past few months, our enlistment of new members appears to be accelerating so that very possibly I will be able to announce the reaching of our 1984 goal at our 1 May meeting.

Our contribution/donation program has taken a very healthy jump with the Corporate Benefactor program adding many "Founders" names to the League's Honor Roll. Founder's Recognition Day saw 24 corporate benefactor representatives in attendance for superb briefings by Admiral Steve White and Vice Admiral Ron Thunman on major issues faced by the Submarine Force. The intention of the Submarine League is to make this an annual affair.

With 1984 upon us, reflections on George Orwell's 1984 allow a few observations about the Submarine League and its Submarine Review. The use of "doublespeak" in Orwell's country of Oceania might apply to our Review in that "the Silent Service" should not be silent in their active discussions of submarine matters in the Review. Oceania's unacceptable use of "doublethink", with ideas like "slavery is

freedom" relates to what has already been expressed in many Review articles—that peacetime submarine operations cannot be the same as those in war and therefore applying the war experience of some of our League members to today's submarine problems is a useful activity. Unlike Orwell's country of Oceania which had eliminated all history prior to the takeover by a current "inner party" regime ruled by Big Brother, the Review will aim to renew an understanding of historical submarine experience—even back to the beginnings of Da Vinci, Holland, Wilkins, etc. And, unlike the "inner party's" use of thought control, the direction taken by the Review has been toward a free expression of ideas, with the ferment they create in furthering the art of submarining and improving submarine systems. The great payoffs in war from an intelligent skipper's departure from submarine doctrine is not only good material for our Review but also suggestive of new strategy and tactics for use with our present nuclear submarines.

I'm interested in your thinking and ideas, so let me know your thoughts about articles you are interested in contributing—to help the dialogue being generated in the Submarine Review.

Have a happy and healthy '84!

Shannon

Editor's Notes

This quarterly issue of the Submarine Review marks one year of publication. In summarizing the general tenor of the articles which have appeared in the Review, it might be observed that, for the most part, submarine matters of today were being examined on the basis of historical experience.

Many of the articles seemed to suggest that there should be more concern as to the possibility of another way "in our time". But that may only be the attitude of old submarine warriors who worry about the incredible growth of a competent Soviet submarine force and who are true believers in the increasing importance of "sinking the Navy" in today's environment of antiship missiles--as explained in the article on semi-submarines in this issue. With the development of a new U.S. attack submarine for the '90s as a focus, the direction of U.S. submarines in future wars seems up for debate. Frank Lynch's "The Genesis of the Fleet Boat" would appear to indicate that some thaw in the frozen strategic thinking about submarines "operating independently" might be in order today--particularly in light of Soviet use of their submarines in combined/coordinated operations with other units, and the probable U.S. need to return to a "fleet" concept for submarine support of battle groups. It would seem that, as in the 1927 General Board Meeting described, the characteristics of the new submarine should reflect the needs of the fleet commanders who have the responsibility for achieving the Navy's objectives through the use of military force. But are the theater commanders influencing the characteristics of the new attack submarine through some sort of General Board? This seems to be the question which Frank Lynch raises. And this sort of dialogue might prove the usefulness of the Submarine Review, as more than just entertainment for dyed-in-the-wool fans of the Submarine Service.

THE SEMI-SUBMARINE

In a provocatively titled article in the September 1983 issue of the Naval Institute Proceedings, "Sink The Navy!", Capt. Charles C. Pease carries to an extreme the thesis that the

threat posed to surface vessels today and tomorrow, by precision guided missiles and particularly nuclear weapons, dictates a re-examination of the functions of existing types of "maritime platforms". Where possible, he feels, there should be an evolutionary development in which functions traditionally assigned to surface vessels would be assigned to submarines and "semi-submarines"--specifically designed to carry out such functions effectively and with significantly less vulnerability.

The basic premises that underlie the arguments Capt. Pease advances, and they are wide-ranging, are these:

- o for a variety of reasons, including cost and the increasing need for complex and, frequently, large sensors and weapon systems on ships, new construction surface combatants have not been hardened since the end of World War II;

- o during the same period, lethally accurate precision guided weapons have been developed and put into use, by a number of world powers;

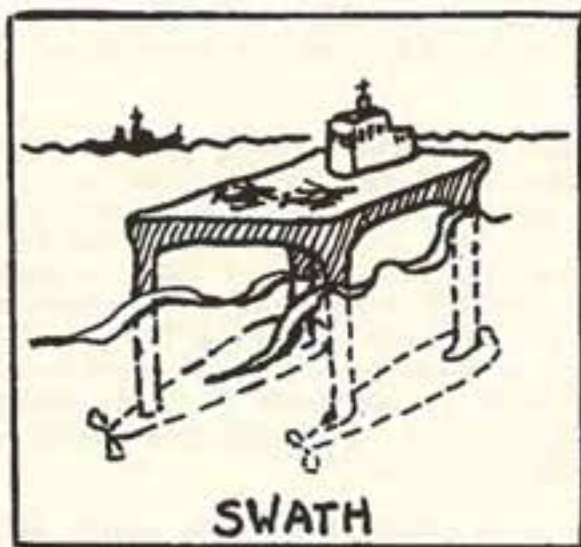
- o the U.S. has not been able to devise and install a "leak proof" active defense system against such weapons, for her surface forces (Aegis will help significantly, but may not be sufficient);

- o U.S. battle formations are vulnerable to nuclear barrage attack from cruise or ballistic missiles, or a combination thereof. This type of attack might well be used in a war in which the U.S. seeks to protect sea lanes, or project forces across the sea (e.g., a NATO scenario);

- o submarines, and to an extent, semi-submarines are far less vulnerable than surface ships, both in respect to detection in the radar, visible and infrared spectra, and in their

probability of sustaining damage.

After examining possible scenarios for battle, primarily as they relate to a carrier battle group, Capt. Pease concludes that there is sufficient cause to re-examine the functions of surface ships in such a manner as to identify systems that could be submerged. Where certain functions are not easily submerged they might be transferred to airborne or spaceborne platforms. But those functions which are not readily re-allocated, Pease suggests, might be packaged in numerous small special-purpose surface vessels whose design would be hardened in such a way as to incorporate extra protection against blast, radiation and electromagnetic effects of near-miss nuclear detonations. He suggests that even these functions might better be packaged in a semisubmersible hull.



"Semisubmersible" is a term that has been used to denote several widely different vessels. One, which is non-naval, is a type of drill platform used in offshore oil exploration and production. Another is the "SWATH" (Small Waterline Area Twin-Hull) ship, which provides a remarkably stable platform, and can be designed to operate at relatively high speeds, but in most versions does not actually submerge. In his article, Capt. Pease, however, used the term "Semisubmersible" to describe a vessel with low freeboard which normally operates on the surface, but can submerge to shallow depths for concealment or protection. He further envisages its super structure to be possible in a truncated pyramid form, with sloping armored sides, which can deflect projectiles, missiles, and fragments--a hull-form remarkably similar to that of the Confederate ship VIRGINIA, the ex-MERRIMAC.

Essentially, this modern semisubmersible would be an AAW support vessel, fitted with radars, SAM missiles, and, presumably ASW weapons as well, although these last are not mentioned in the article.

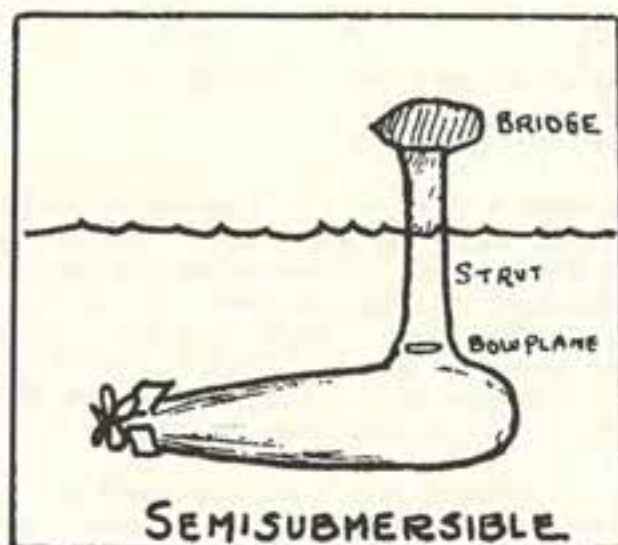
But first in the evolutionary process of "sinking the Navy" Pease feels that certain new submarine types can readily be produced: a fleet auxiliary tanker to be used primarily for replenishing carriers with jet fuel; a submarine ammunition and dry stores ship; and eventually a submarine aircraft carrier using V/STOL aircraft. Most of these vessels have been proposed at one time or another in the past. In some cases they have had the benefit of considerable design study. But none has been built.

Whether a semisubmersible AAW vessel modelled on CSS VIRGINIA, as illustrated in the Proceedings article, is in fact feasible, and what its speed, range, seakeeping ability and other characteristics might be, are difficult to judge

without study—or at least without more design information than has been provided. Capt. Pease however asserts flatly that there is no technical reason why such vessels could not be produced within the next few years.

Navy planners, designers, and tacticians might well consider the desirability of other semisubmersible ship types, with different missions as well. Some, with characteristics, and missions quite different from those envisaged by Capt. Pease have been suggested in the past and studied to the point of conceptual design. Such designs were considered producible.

One such design was conceived as a unit capable of very high transit speeds. It combined a submerged body of revolution, similar to the modern SSN hull, with a small "bridge" structure above the waterline supported by a strut structure connected to the underwater hull. The strut structure kept the hull at a depth of over three times hull diameter to eliminate the drag from



surface wave action. This arrangement also made possible use of an air supply system for normal operation. The vessel could thus be powered by an air-breathing propulsion system—either gas turbines, diesel, steam turbines, or some combination form of propulsion. The bridge structure would provide facilities for navigation, communications and sensing systems. Crew quarters, weapons, stores, fuel, and auxiliary machinery would be below in the main hull. (See illustration). Of primary attraction would be its capability to button up and submerge on battery power for short periods of time—to get away from surface missile attack or the effects of nuclear air blasts.

One tentative design for an experimental test craft of this type had the following principal characteristics:

L.O.A.	90 ft.
Hull diameter	18 ft.
Displacement	440 tons
Total HP	25,000 (provided by a gas turbine)
Approximate Speed*	54 knots
Crew	9
Range at max. spd.	1,000 n.m.

*In a near-surface mode.

This semi-submarine, or semi-submersible, was basically a near-surface craft. Its design was based on the same principle as that of the "SWATH" ship, although it did not have twin hulls. Its principal advantage, high transit speed, as compared with the speed of other ships of similar length, resulted from this design, which takes advantage of minimizing wave resistance.

The dimensions, capabilities and characteristics of an operating combatant unit of this type would be somewhat different from those

listed for the test model, and would be dependent on the mission, or missions chosen for it. the originators of this particular semisubmarine concept, first advanced in 1960, thought of it primarily as an ASW vessel designed to operate in forward areas. They believed it might also be useful for certain types of mine-sweeping, although its suitability for this task was not explored in depth. The advantages claimed for this semi-submarine were its high transit speed, its enhanced ability to avoid rough weather conditions, its ability to remain on station for comparatively long periods of time, and its decreased vulnerability, as compared to surface ASW vessels.

Nearly ten years later, a somewhat similar design, also a semisubmarine, was studied in greater detail. This vessel was intended as an ASW platform, but was also usable in anti-shipping missions. It was conventionally powered (i.e., non-nuclear), of relatively small size (about 1,200 tons), and armed with torpedoes. Its crew was small—in the range of 28 to 30 men.

Whereas the earlier semi-submarine design relied heavily on the hydrodynamic characteristics of the semi-submersible hull with a surface-piercing strut, and optimized for speed, the later design was optimized for ASW effectiveness on station. It too envisaged the use of gas turbines. They were located in the super-structure for propulsion in the semi-submerged mode of operation. However only about 3,000 HP was provided with a resultant transit speed of only 24 knots. On the other hand it was to be fitted with enough silver-zinc batteries to generate 400 HP for a high submerged speed and a submerged endurance of some 250 miles at 4 knots. Furthermore it was designed for moderate submergence depths, not just for shallow submergence only.

The later design provided tanks to carry fuel sufficient to provide a range of 7,000 miles, and an endurance of 45 days.

Considerable thought was given to making this vessel an effective ASW platform. Her designed depth capability made it possible for her to go below the normally encountered thermal layers. And, the placement of main propulsion and battery charging power high in the sail sharply reduced radiated noise in the surface mode. Provision was made for a conformal sonar array in the bow and for streaming a towed line array. Importantly, this vessel could close targets detected by sonar and use attack evasion tactics at a maximum submerged speed of 21 knots for 1 to 2 hours.

For armament, the ASW semi-submarine was to carry about a dozen lightweight ASW torpedoes, and a mix of heavyweight torpedoes and anti-shiping missiles. The mix composition was variable, depending on the specific mission assigned.

This semi-submarine was studied in far greater detail than the earlier, fast-transit concept, and seemingly in more detail than the AAW semi-submarine envisaged by Capt. Pease. However, like so many of the ship types suggested in "Sink the Navy!" it requires further study before possible adoption. The idea of a semi-submarine AAW unit also deserves attention.

Such studies should carefully examine intended mission, mode of transit (i.e., whether in company with a task force or proceeding independently), range, armament, armor, and other pertinent characteristics. The study should include both types of semi-submersible: those that submerge for mission effectiveness, and those that normally operate surfaced with low freeboard--which submerge only to escape detection or reduce vulnerability. It should include consideration of whether the semi-submersibles should be

single-purpose, or multi-purpose. If the former seems desirable, a "family" of semi-submersibles with different configurations for different missions might be built.

This study might well be part of a larger study which examines all Navy ship types including submarines, as to their vulnerability and also their effectiveness (if not cost-effectiveness). Vulnerability considerations should include not only vulnerability to precision guided missiles and nuclear attack, but also vulnerability to torpedo attack and to mines. This large study should consider the interaction of existing and proposed ship types in task forces or battle groups, including the implications of having task forces of mixed composition, surface and semi-submersible. It should include consideration of the advantages, costs and possible drawbacks of using submarines for wholly new roles, in particular those briefly discussed in Capt. Pease's article. Finally, it should include the use of semi-submarines in ASW roles.

Capt. Pease is right in this premise: we are in an age of transition in Naval warfare and we cannot sit by complacently trusting in the effectiveness of our present fleet units. We do have fine ships, trained men and good weapons. But we have to examine these assets in the light of today's warfare environment. Recognizing present enemy capabilities, we apparently should be prepared to effect changes.

Victor T. Boatwright

THE GENESIS OF THE FLEET BOAT

On april first 1927 the General Board of the U.S. Navy made a decision which has determined the characteristics of U.S. submarines for the past 55

years. It was then that the mission for the submarine was determined to be that of "operating independently for extended periods in seas which are dominated by the enemy."

This mission, which is now considered to be so obvious as to be a "self-evident truth", was a radical departure from the operational concepts for submarines which had existed until that time.

In 1972 the General Board of the Navy was deeply involved in determining the characteristics of the new post WW-1 fleet. As can be seen from the partial transcript of this meeting, there were more important things than submarines on the agenda.

[-General Board meeting, 1 April, 1972-]

Admiral WILEY (Chairman)--"We are here this morning with the idea of getting some light on the question of submarines. The General Board is at present up to its neck in work and in the interest of saving time without getting into long discussions on the subject, I am going to ask definite questions of certain officers and invite anyone present to make any statement that they may wish."

"I will first ask Admiral Schofield, are you head of the War Plans Division of Naval Operations?"

SCHOFIELD--"Yes".

WILEY--"As such are you responsible for the recommendations for their (submarines) assignment to the Chief of Naval Operations?"

SCHOFIELD--"I am responsible for the recommendations for their (submarines) assignment to the Chief of Naval Operations."

WILEY—"In what plans are submarines assigned missions sufficiently definite to...?"

SCHOFIELD—"War plans, as presently drawn, assign submarines to various commands that will be operating in war. The mission of submarines within those commands are not assigned by war plans."

WILEY—"Can you define the mission of a 'fleet submarine'?"

SCHOFIELD—"That demands a definition of a fleet submarine which I have tried to find. I would like to read a definition from the report of the CinC, U.S. Fleet -

'Fleet submarines; the "B" type is, as yet, a failure; the "V" type characteristics have yet to be tried out. A satisfactory fleet submarine must have a cruising radius equal to that of battleships at the same speeds and must be capable of gaining and maintaining a position around the flanks of the deployment clear of the light forces in the battle line. This requires a surface speed equal to that of the light cruisers.'

We have no fleet submarines corresponding to that definition."

WILEY—"Well, have we, in your opinion, based on your knowledge of submarines, any that may be depended upon to carry out the mission of a fleet submarine?"

SCHOFIELD—"Not as defined by the Commander in Chief. I do not think we have a submarine capable of acting as a tactical unit of the fleet."

WILEY—"Will you please give your idea of the essential military characteristics of a fleet submarine?"

SCHOFIELD—"Personally I am opposed to the development of a type of fleet submarine at the

present state of the art of building submarines in this country. I believe that a fleet submarine should be substituted for by a cruiser submarine type which is of materially less speed, of equal radius, of much greater reliability and lessened requirement for machinery installations."

WILEY--"Well then, your idea of a submarine to take the place of what is called a fleet submarine is the cruiser type and that it should have no tactical relations with the battle line?"

SCHOFIELD--"It should have no relations with the battle line."

WILEY--"Do you consider high speed as subordinate to other characteristics?"

SCHOFIELD--"Yes sir, distinctly subordinate to other characteristics, and distinctly subordinate to the characteristic of reliability. I consider that a prime requisite."

WILEY--"Based on our specific problems, could you give your opinions as to the number of cruiser submarines we should maintain?" I will withdraw that question."

SCHOFIELD--"We never have too many. I should say we should aim toward a minimum of twelve."

WILEY--"Giving due consideration to present war plans, what military characteristics should be embodied in our next submarines?"

SCHOFIELD--"I think the next submarine type to be developed should be capable of wide ocean movements with an objective toward using them as is indicated by the Commander in Chief in the employment of submarines in wartime (which states) --for the observation and reconnaissance from bases;
--for commerce destruction and protection;

- for the protection of our own bases;
- for covering sortie and entry of the fleet from and to bases;
- and for the protection and transit of convoys at slow speeds.

That last function I do not consider important. I do not think submarines are suited for that purpose. Regarding characteristics, I would say a cruising radius of 12,000 miles, a sustained speed of 12 knots, with a maximum surface speed of 15 knots, habitability which would permit operations away from all sources of supply for 60 days, submerged speed and endurance the same as present at a speed of 8 to 10 knots for a brief period of time; a radio with a range of 2000 miles and greater if dependable. And in cruiser submarines I would have two types--one for carrying mines at the stern instead of torpedoes, and the other fitted entirely with torpedoes."

[end of transcript]

Admiral Schofield testified that he was "opposed to the development of a 'fleet' type submarine" and recommended it be replaced by a 'cruiser' type. It is ironical that the characteristics of the 'cruiser' type which he recommended were but marginally different from those of the next generation submarine which was to be called (incorrectly) the 'Fleet Boat'.

Nonetheless, at the outbreak of war the 'Fleet Boat' was assigned the role of a cruiser, operating independently in those areas assumed to be dominated by enemy forces.

The elegance of Admiral Schofield's argument is in contrast to the involved process which determines the characteristics of today's submarines. There was no 'threat' to be contained. There were no 'scenarios' drafted by script writers to provide what the dictionary defines as "an imagined sequence of future

events."

The basic operational requirement was that of providing the Commander in Chief with an instrument, a tool, which he could use to perform his task. Whatever script which might be needed was provided by the CinC's war plans. The CinC was the playwright and the weapon systems were but part of the scenery which he moved about the stage as he put on his production.

This, indeed, is a far cry from today's weapon system planning where the operator is seen as an actor following out the script in a scenario written by some faceless group who have neither the skills to perform as the actors, nor the responsibilities inherent in putting on a good show.

Perhaps the most significant difference between the General Board approach to the determination of a ship's characteristics, and that used today, lies in the role of technology.

In the General Board approach it was determined what the needs of the operational commander were, and then goals were set for technology. Today it is first determined what the technology has to offer, and then scenarios are developed to make best use of this technology.

The process for the determination of the ship's characteristics can be debated, in fact it MUST be debated. Should a ship's characteristics be a means to sell technology, or should they be a means to provide the operator with a more useful instrument to accomplish assigned missions? The 'Fleet Boat' provides a good argument for the General Board approach.

F. C. Lynch, Jr.

(Ed. Note: The following letter serves to explain the Navy's present position, relative to the "new class of attack submarines." It serves as a comparison in thinking about attack submarines--56 years later than the General Board transcript examined in the previous article.)

October 18, 1983

The Honorable Charles E. Bennett
Chairman, Subcommittee on
Seapower and Strategy
and Critical Materials
House of Representatives
Washington, D.C. 20510

Dear Mr. Chairman:

The purpose of this letter is to put the need to start a new class of attack submarines in perspective.

In a shooting war at sea, attack submarines on both sides, with their covertness, mobility, endurance and fire power, will be a key factor in determining victory or defeat. The attack submarine is one of the most survivable offensive naval platforms. Relative invulnerability of submarines is well understood in the strategic world where the SSBN is recognized as the most secure leg of our triad.

The importance of attack submarines in naval warfare has not been lost on the Soviets. From a post WW II position of naval inferiority, they have built a formidable Navy around their submarine force. In the past 15 years they have developed 12 new classes of nuclear and diesel powered submarines compared to our two classes. Today, they have 286 attack submarines, 109 of which are nuclear powered. We have 91 nuclear attack submarines. This disparity is expected to

continue in the future as their nuclear submarine shipbuilding capacity far exceeds ours.

While we have watched their force grow, we have enjoyed the security of knowing that our fewer submarines were more capable due to our advanced technology, particularly our acoustic advantage which is so essential to submarine survivability. We can no longer be comfortable on the basis of technological superiority. Soviet submarines are becoming quieter at an alarming rate, much faster than previously predicted. In addition, they have put to sea the fastest submarine and the deepest diving submarine, developed the cruise missile firing submarine concept, and effectively converted their SALT-excess strategic submarines to other missions, some of which are not yet fully understood.

The U.S. Navy last commissioned a new class of attack submarine in 1976 with essentially 1960's technology. Although they are excellent submarines, the 688 class was originally conceived as a battle group escort. Some degradation of multi-mission capability was accepted to enhance this mission. Steps have been taken to add capability in later ships of the class, but, in the process available space and weight margins have been exhausted. To make the improvements in quieting, platform and combat system capability, required to meet the Soviet submarine threat, a new class is necessary. The required improvements simply will not fit in a 688 hull.

Current and future cost constraints and the need for a balanced Navy are well recognized. The Navy is working hard to reduce cost and size—there is no gold plating. Of significance, most Soviet nuclear submarine classes are as large or larger than equivalent U.S. classes.

If we do not act now, we face the certainty of

losing by inaction the submarine force superiority that we have for so long enjoyed. The loss of this edge will have the gravest consequences in deciding the outcome of any future war with the Soviets. The concept of air superiority has long been recognized as the SINE QUA NON of victory. That same principle must be applied to submarine warfare. Sustained operations of surface combatants, transports and even strategic submarines will be possible only for a Navy which can gain and hold undersea superiority. Our attack submarines will be among the first to fight, and they must be able to do so independently, anywhere in the world. These initial battles may well determine the outcome of the war.

Now is the time to start a new class of attack submarine. This is a critical issue of utmost importance to the defense of our country. I request your support on this vital issue.

John Lehman
Secretary of the Navy

THINKING ABOUT SURPRISE

Submarine officers think more than most other naval officers about achieving or being subject to surprise in battle. Surprise is the very essence of attack submarine warfare. Once a war has started, surprises come in a rush involving a great variety of subjects: weapon capabilities; operational capabilities; intent of the enemy; enemy force levels; own logistic capabilities; aspects of intelligence. Because of its often devastating effect, surprise attack at the outset of a war is of special importance. Further, the rapid development in the last 40 years of the techniques of terrorism has greatly expanded the variety of surprises which might occur at the

outset of a war.

In his excellent, well-worth reading book "SURPRISE ATTACK", Richard K. Betts of the Brookings Institution has analyzed the surprise attacks which have initiated wars during the last 40 years. They almost invariably have produced enormous shock effect. His studies are made primarily from the point of view of a U.S. NATO planner, but much can be derived from them to affect U.S. submarine thinking.

The U.S. Embassy, Marines, French Army and Israeli Army in Lebanon were not dummies. Yet they were caught in succession within weeks by the same mode of devastating surprise attack. In each case, a heavy truck load of high explosives was suicidally driven at high speed through flimsy defenses and exploded in headquarters buildings, causing many casualties.

Hardly HI-TECH, a kamikaze truck could just as well drive into any U.S. submarine base, force headquarters, shipbuilding yard, The Pentagon or onto submarine piers and subs alongside. A kamikaze boat could do the same from the water side.

Maybe a hundred such attacks could be made simultaneously. The U.S. keeps insisting it won't start the next war. If one starts, some other country must be responsible for it; and the enemy can be counted on to take advantage of surprise. The Russians have sponsored the training worldwide of thousands of "terrorists", and supplied them with worldwide networks of communications, supplies, safe-houses and other infrastructure. Terrorism has become another weapon of war. A fine treatment of this subject is in "COUNTERATTACK", by Christopher Dobson & Ronald Payne. It's the story of the West's battle against the terrorists.

Habituation, ambiguity, and distraction are prime tactics of terrorism to overwhelm routine intelligence activity. The inability of the U.S. to control its borders allows thousands of unidentified aliens to be available for terrorist work. Books like "THE PUZZLE PALACE" have so revealed the functions and abilities of NSA that surprise attackers could reliably plan their attacks so as not to be betrayed by friendly communications.

So far only one form of surprise attack--the high speed truck--out of the many possible, has been mentioned. The complexity of countering such an activity is enormous. This is particularly true since many thousands have been trained and equipped to fight this way. Is there adequate activity within the submarine community to protect the vital fraction of U.S. power which SSBNs and SSNs represent? Or, in the event of a devastating attack, would submarine Admirals be forced to lamely say, "Gee, I thought the FBI was supposed to prevent that sort of sneak attack on U.S. territory." One felt real sympathy for the marine Colonel in Beirut as he faced TV.

The FBI is a weak reed on which to lean for the protection of a force so vital to U.S. Defense--her submarines. It has proven itself inadequate over 60 years to conquer the Mafia, which has grown to the point of controlling a fraction of the government itself. When the smuggling of drugs became a \$10 billion business in Florida alone, the FBI and allied agencies were unable to intercept more than 10 percent of the traffic. Further, not only has the Mafia expanded to an over \$100 billion annual business, but new mafias, including offshoots from Japan and China were being formed. To the degree that peacetime legal constraints have inhibited the FBI and local police; a standby War Powers Act is indicated to provide for a one week sweep and termination of such activity.

There can be no doubt such organizations as the Mafia can be bought by a foreign power. Let's face the fact that the internal security provided by existing agencies is probably inadequate. This being the case, it seems inescapable that military, naval, and submarine officials should press for more effective action by others, or provide it themselves. A Submarine Force Commander will be as responsible for his submarines destroyed by sabotage or "terrorist" attack as for those destroyed in battle.

As a start, it might be suggested that each Submarine Force Commander should annually conduct a study of the vulnerabilities of his force to surprise or unconventional attack and how to reduce those vulnerabilities. Personnel doing the studies should not be limited to run-of-the-mill submarine officers but should include specialists of various kinds. In Britain, a special Air Force Squadron has proved highly effective in handling terrorism. Similar such organizations have proved to be necessary in France, Italy, Germany and Switzerland as well.

Almost by definition, a surprise attack is one which is considered by the activity attacked as sufficiently improbable that no countering measures need be taken. One such kind of attack, which should be given more thought than it receives, is that in which Russia launches an all out war on only the U.S. Navy using no nuclear weapons. A clear cut victory in such a war could lead to the hegemony which Russia wants--with its control of an undamaged world. It would be launched when mutual nuclear deterrence is effective. And it would most probably be on a worldwide basis, using every means against ships at sea as well as in port.

Recon satellites, sub and air launched missiles and mines, plus sabotage, make such an attack practical, where it could not have been so at an

earlier time. At a minimum it should be recognized that all ships in port, as well as at sea must be readied for such an attack. The Soviet "first salvo" is likely to include far more activity than just weapon fire. At present, U.S. ships in port appear to be as unprotected as if Pearl Harbor had never happened. Such an attack would probably include cruise missiles, which could home in on individual ships in port. (I remember being told that air launched torpedo attack in Pearl Harbor would be impossible because it was well known that air launched torpedoes would hit the shallow bottom of the Harbor.)

Such an attack could be greatly facilitated by mine fields covertly laid, in peacetime, which remained passively inactive, until activated by remote signal. The covert laying of such minefields by innocent seeming merchant ships is certainly feasible.

It is apparent that the U.S. should be thinking about conducting such a surprise attack on its own. In so doing, thoughts about how to achieve surprise would alert the U.S. to possible enemy measures.

Another area of vulnerability has to do with the process of determining the loyalty of persons recruited for sensitive positions. Limited by liberal democratic philosophies, the U.S. uses a system of background checks invented by the British for use by a small insular population during a major war. Even so, it has been discovered that about a dozen turncoats held highly sensitive positions in Britain for up to 30 years! The validity of this system in the much more variegated population of the U.S. and over a much longer time, has got to be suspect.

Before WWII, loyalty among Americans was almost a given. Immigrants from enemy nations had turned out to be loyal to America. But the combination

of uncontrolled entry of aliens and the power of the KGB and other foreign agencies as demonstrated during the Vietnam era and recently in the KGB-directed "nuclear freeze" effort--using the Media against national policy--has been truly sobering. The loyalty of tens of thousands of U.S. citizens has seemingly been fractured! The story of a subverted media and the subversive organizations responsible has been told in two books: "The Spike", a novel by deBorchgrave, and "Target America" by James L. Tyson and Reed Irvine. Perhaps the worst part of this developing subversion is that the U.S. has taken no corrective action.

If the probability of disloyal Americans has to be accepted, vulnerabilities expand rapidly. Communications and operations must be considered comprised. Weapons sabotage becomes an expected thing, and difficult to prevent. Every can of food or other package loaded aboard a submarine must then be inspected to ensure that it is not an explosive or toxic bomb. Ships undergoing refit to prevent their crippling-destructive effects must hence be guarded against such actions.

If the Navy gives this subject the attention it deserves, it will likely demand funds for corrective action to prevent \$billions spent on nuclear submarines from being needlessly wasted, while seriously jeopardizing national security. Almost 50% of U.S. strategic submarines are in port at any one time, and possibly susceptible to such enemy subversive activity.

If the Submarine Navy is seemingly being overloaded with the author's concerns, it is because correction of this situation might best be launched by such a small but totally important elite.

The essential importance of intelligence in these matters is pointed up in the definitive

study of the Pearl Harbor disaster "At Dawn We Slept" by Gordon W. Prange. LtGen. Walter C. Short, commanding U.S. Army forces in Hawaii just prior to the attack, had received an ambiguous war-warning message from Washington which he felt gave priority to "defense against sabotage." Short's actions were "a sin of commission--placing Hawaii's defenders on a sabotage alert." This not only distracted attention and energy from the real danger coming Hawaii's way but huddled his unarmed fighter planes together so that the Japanese would encounter pathetically little interceptor resistance "on reaching Oahu while providing Nagumo's planes with easy targets. Thus, Short's measures were to help the Japanese achieve one of their important objectives--nailing the Hawaiian Air Force to the ground and preventing it from effectively interfering with the Japanese attack or retaliating against the (Japanese) task force."

Here, Gen. Short's lack of intelligence information about what turned out to be a negligible sabotage threat was as serious as his lack of intelligence about the real threat--which he ignored.

Some finer feelings, it seems, may have to be bruised to ensure that our U.S. submarines are properly protected by government activities--which are provided with the authority and assets necessary to prevent a disaster to U.S. freedom.

Capt. R. B. Laning, USN (Ret.)

SUBMARINE INTRUSIONS IN SWEDEN'S WATERS

(A Review of the Report by the Swedish Submarine Defense Commission on Submarine Violations and Swedish Security Policy)

From October 1 to November 1 of 1982, the

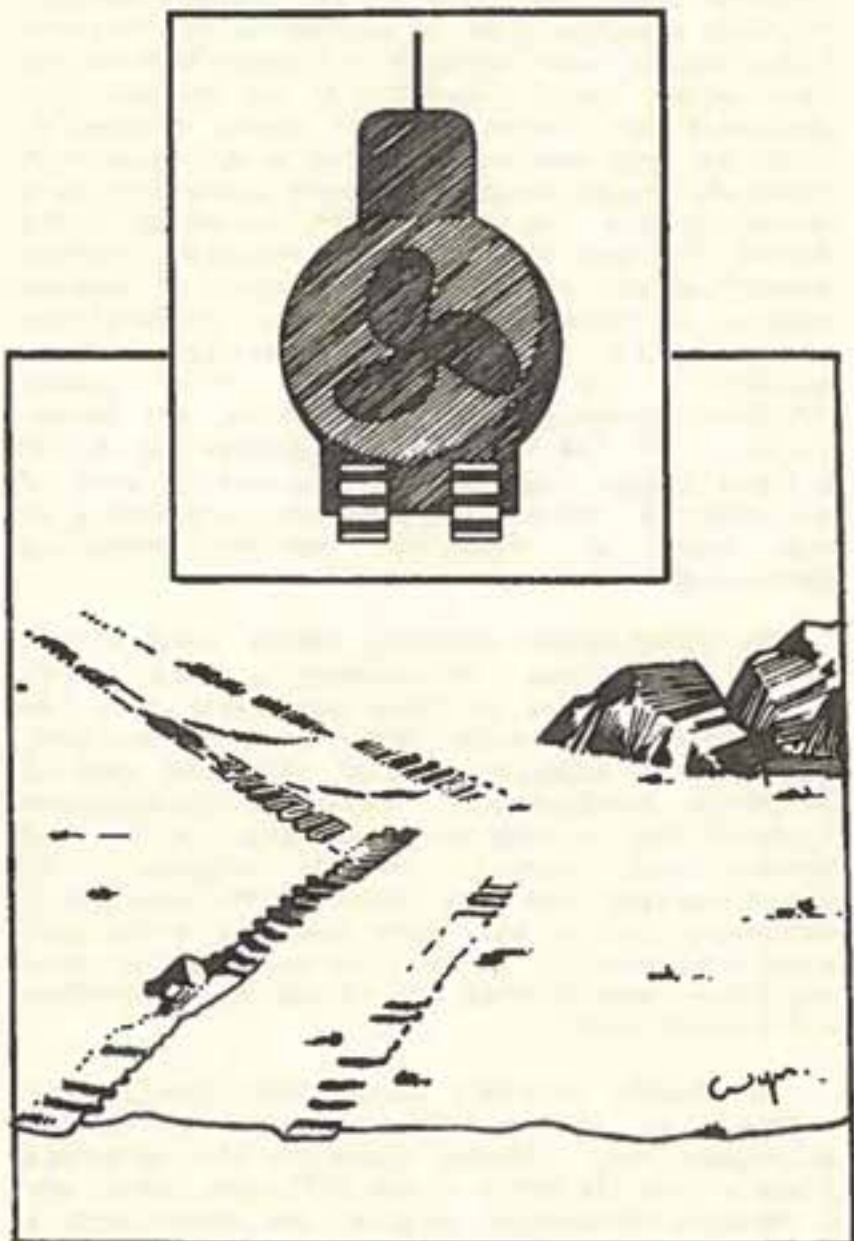
Swedish navy staged its largest antisubmarine warfare operation since the Second World War. Dozens of ships and helicopters, using depth charges and mines attempted to - unsuccessfully - flush out and force to the surface up to six "alien" submarines that had penetrated into the Stockholm archipelago, mainly the Horsfjaerden area. The action that became known as the "Horsfjaerden incident" is the focus of the recently released English-language version of the 109 page report of the Swedish Submarine Defence Commission. The scope of the five-member panel's inquiry is much broader, however, as are the conclusions reached and recommendations made. Two concerns dominated the inquest: one, the overall pattern of and possible motivations for over twenty years of violations of Swedish territorial waters by foreign submarines, and two, the state of Swedish antisubmarine warfare defenses. The conclusions reached on both counts are, in the Commission's view, worrisome to say the least. One hundred and forty-three probable, possible, and certain submarine intrusions are reported between 1962 and 1982. This number excludes incidents not cited for security reasons, and those that have evaded detection. The geographic scope of the submarines' activities encompasses the entire Swedish coastline, and appears to be closely linked with Swedish military exercises and the location of military facilities. The Report leaves no doubt about the nationality of the intruders. While admitting the lack of hard, physical proof, circumstantial evidence, including sonar analyses, points overwhelmingly to the Soviet Union.

The Swedish Navy's failure to initially detect the Horsfjaerden intruders, and its subsequent inability to prevent their escape, are evidence of Sweden's inadequate antisubmarine defenses. The Commission faults a more than 20 year old defense policy that had effectively downgraded ASW from a primary to a corollary mission. Amphibious

invasion being perceived as the primary threat, Sweden's sizeable fleet of destroyers and frigates had gradually been replaced by fighter-bombers and fast patrol craft. By 1972, it was decided that dedicated ASW forces were no longer necessary, that the anti-amphibious forces would henceforth carry the burden of coastal convoy protection as a corollary role. As late as 1980, according to the Report, the need to detect and prosecute intruding submarines had never been the subject of express comment in Sweden's annual defense deliberations and decisions. It took the so-called "Utöe incident" of 1980 and the Soviet "Whiskey-on-the-rocks" one year later for Sweden to act. An ASW improvement package worth 200 million kroner (\$20 m.) was approved as part of the 1982-1987 Defence Plan, as was a tightening of the rules of engagement against violating submarines.

The Horsfjaerden incident itself involved six submarines, three minisubmarines and three mothercraft. Four of them penetrated into the Horsfjaerden area proper, while one mini- and once conventional submarine pushed into the central Stockholm archipelago. Swedish countermeasures included the setting up of barriers, active and passive sonar pursuit, and the dropping of 47 depth charges and five mines. The Commission adamantly rejects the rumor that the submarines were deliberately allowed to escape. It also disclaims reports that one of the minisubmarines was in fact sunk.

The Report provides fascinating photographic evidence of the rumored existence of Soviet minisubmarines. Photos taken of the seabottom clearly show the marks of two different types, one a caterpillar-tracked vehicle, the other with a reinforced keel and driven by two propellers. Also shown is the imprint of one of the mother submarines at rest on the bottom.



A drawing from the commission report of observed tracks. The tracks indicate that a vehicle can detect and avoid obstacles on the sea floor. Boxed is a possible underwater vehicle.

A key question is, of course, why? The Commission addressed a variety of possible Soviet motivations, but none of the answers is entirely satisfying. Rejected out of hand is the suggestion that training exercises are involved. Also denied is the idea that the Soviets may be engaged in a form of gunboat diplomacy designed to intimidate Sweden, as is the theory that the Soviets may be exploring possible sites to hide their Golf class ballistic missile submarines. The Report concludes that the most plausible explanation is a systematic Soviet intelligence-gathering campaign aimed at preparing for the eventuality of military operations, including the landing of saboteurs and minelaying. Given this assessment, the Commission rightly concludes that Sweden is faced with a most serious threat to its national security. It urges a large increase in research and development, and procurement for ASW, and proposed a revision of the armed forces' instructions so that foreign submarines may henceforth and "if necessary" be attacked "without prior warning..."

Sweden, of course, is not the only victim of clandestine Soviet submarine operations. Submarines have been observed well inside the territorial waters of all of the Scandinavian countries, 170 times between 1971 and 1981 in Norwegian waters alone. What make the Horsfjaergen incident and the other Swedish violations different is that the victim is a neutral country. It makes no difference whether or not the Soviet Union's activities are a part of Soviet plans for a possible war with NATO, or in preparation of unilateral action against Sweden; the conclusion is unavoidable: neutrality is no guarantee of Moscow's peaceful intentions.

Jan S. Breemer

RAY'S FIFTH WAR PATROL

RAY departed Freemantle, West Australia, on her Fifth War Patrol on 9 July 1944, bound for the South China Sea via Lombok Strait, the Java Sea and Karimata Strait. I had relieved LCDR Brooks J. Harral, USN, on 28 June for my first patrol in command. Brooks had turned over a fine ship; I was full of confidence. As it turned out, however, I was not happy with my first torpedo attack.

The early morning of 18 July, RAY made contact with a fully loaded unescorted tanker in the Java Sea. In a series of six attacks over a three hour period, the tanker was sent to the bottom after eight hits--but with an exorbitant expenditure of 22 torpedoes. This forced RAY to return to Freemantle for a reload. I expected some harsh words from COMSUBS SEVENTH FLEET, Rear Admiral Ralph W. Christie, but his only comments were, "You sank the bastard, didn't you? When do you want to go back to sea?"

Two days later, RAY headed north for Lombok Strait to resume her patrol.

On 3 August, RAY was heading west in the Java Sea when an intelligence message was received informing of a troop transport leaving Balikpapan for Makasar that evening. Her course and speed were also given. A quick calculation indicated that RAY could intercept the transport.

At 0330 on 4 August, RAY made a radar contact, bearing 300°T, range 21,000 yards. Tracking was commenced. The transport was on schedule! It was a bright night with a full moon, so in a few minutes a convoy of two ships was sighted. RAY was on their track and closed for the attack. At 13,000 yards range, RAY was submerged to radar depth and at 8,000 yards was taken to periscope depth. The convoy consisted of a transport of

7,000 tons, a small freighter and two escorting PC boats. RAY was swung off the transport's track for a stern-tube shot. The MK 18 wakeless electric torpedoes in the after torpedo tubes were ideal for the glassy sea conditions topside.

At 0427, RAY fired four torpedoes on a 70°S track at a range of 900 yards. They were spread along the target's length. 40 seconds later I saw the first torpedo hit in the after part of the ship. Sonar indicated her screws had stopped; evidently her power plant was knocked out. Seven seconds later, a second torpedo was observed to hit under the stack. Following this the target broke in two. The nearest escort was headed for RAY with "a bone in his teeth", so RAY was taken deep and rigged for depth charge. RAY had started down when another hit was heard and timed for the fourth torpedo fired. A minute later, the first depth charges went off, not too close, thanks to the electric torpedoes used. Meanwhile, sonar reported noises of the transport sinking. RAY continued to draw away from the escorts who were rolling off depth charges as she pulled clear. By 0530, RAY was back at periscope depth with nothing in sight.

Inasmuch as I felt RAY would be the object of a hunt, RAY was kept submerged for the remainder of the day and then headed back into the Java Sea. That evening a curious message was received from COMSUBS SEVENTH FLEET asking if RAY was all right and if so, to report with a one-word plain language message. To this I replied with "OKAY!". Later, after returning to Freemantle, I learned that our "code-breakers" had intercepted a Japanese message reporting the loss of the transport along with several thousand troops and that the escorts had sunk the submarine that had been responsible. That had Admiral Christie worried and hence the message.

RAY passed through Karimata Strait and headed

north along the coast of Borneo on 9 August. Four days later, while patrolling off the northwest coast in the morning, a radar contact was made on a plane at 12 miles. Aircover for a convoy? RAY submerged to avoid detection and upon surfacing thirty minutes later sighted smoke bearing 153°T. A convoy was apparently moving northeast along the coast of Sarawak. The convoy was 5 miles off the Borneo Coast in less than 60 feet of water. It had an air screen, yet a submerged approach was out of the question. So RAY surfaced and went ahead on three main engines to get in position for a night attack.

The northwest coast of Borneo is bordered by a large shelf of shallow water extending out 50 miles. This is what RAY headed into after dark. Within two hours radar contact was made bearing 226°T, 18,350 yards. Tracking soon revealed that the convoy consisted of twelve ships, five of which were escorts. The leader appeared to have radar; just what wasn't needed in the shallow water! The convoy, hugging the coast, had its escorts in a semi-circle on the seaward side. Getting in was going to be tough!

At 2310, battle stations were set and an approach begun. RAY was flooded down with decks awash to reduce her silhouette. The sea was flat with a light haze hanging over it. With range 5,000 yards to the center ship of the convoy; escorts were on either bow of RAY and at 2,700 yards. Getting by them without being detected seemed unlikely so it was decided to "blast" our way in. RAY was turned for a stern tube shot and, at 2350, four Mk 18 torpedoes were fired from aft at an escort minelayer on 110°P track, range 2,000 yards, 0° gyros, spread for 400 feet. The first torpedo jumped out of the water shortly after firing. All four missed--erratics.

I felt discouraged at this point, but also very angry, so another end run was commenced at 18

knots. By 0044, RAY was ahead of the convoy. A larger tanker was selected as the primary target. A large freighter overlapped her bow and was 800 yards closer. RAY penetrated the ring of escorts and passed astern of the port bow destroyer, with range to the target at 4,000 yards. Getting closer seemed necessary but the same minelayer was headed for RAY, at 3,500 yards. Being in only 12 fathoms of water, some means of escape had to be considered. So at 0100, RAY commenced firing six Mk 14 torpedoes from the forward tubes on a 95°P track, range 3,800 yards, 0° gyros and spread for 700 feet. RAY was turned away at flank speed, 2,800 yards from the near escort, who never apparently spotted RAY.

At 0102 a torpedo hit was observed in the freighter to the left of the tanker. Almost simultaneously the tanker was hit amidships with quite a large explosion. Eight seconds later there was a second hit forward of the MOT, then a third hit was observed just forward of the ships superstructure. This hit threw a huge ball of flame, about 150 feet wide, high into the air, which persisted for several minutes. No ship could survive the explosion we heard. The tanker appeared to be broken in two, and continued to burn furiously. Attention was then focussed on the freighter. She was smoking heavily. At 0111, with last range to the tanker at 8,000 yards, radar reported that two "pips" had disappeared from the radar screen. Their positions were those of the tanker and the freighter. Every other ship in the convoy was found to be in place, with a large gap in the convoy's center where the two torpedoed ships had been. Both seemed to have sunk at that time. With the moon up by the time torpedoes could be reloaded, the idea of another attack was discarded and RAY headed north to get out of the shallow water.

For the next four days, RAY patrolled off the west end of Balabac Strait, remaining submerged

during daylight. On 18 August at 0943, a medium bomber was sighted to the south. Aircover for another convoy? At 1049, sonar picked up echo ranging and seven minutes later, smoke was sighted bearing 182°T. The bomber was circling over the smoke as an approach was begun. RAY was in a good position dead ahead of the convoy. There were a few whitecaps on the water but the day was clear, so RAY ran at 120 feet depth in between periscope observations, avoiding detection by the air screen.

The convoy consisted of at least eleven ships, five of which were tankers, two were transports, and the rest were freighters--with five escorts. I could see three columns of ships with the biggest ones in the center column. Three destroyers formed an outer sound screen ahead of the convoy while two minelayers protected the outside flanks. This might have been the remnants of our convoy of 14 August, joined by a few more tankers and transports.

The approach went like clockwork. RAY penetrated the destroyer screen without being detected. With torpedoes in only the forward tubes, RAY was headed for the center column to get the biggest ships. At 1250, six Mk 14 torpedoes were fired at a large tanker on a 110°P track, range 1,800 yards, 0° gyros, spread for 600 feet. At 1251 the near escort speeded up and came at RAY. I took a last look at the target to see the torpedoes nicely intercepting and about to hit. Then RAY started down to 370 feet at full speed. At 1252 three hits were heard and timed in the tanker. A fourth hit was timed for a freighter in the far column. This was definitely a torpedo hit; I'd heard enough of them by now to know.

At 1254 the first of forty-three depth charges began to explode above us and they were close. But we had a nice thermal layer at 270 feet which enabled RAY to draw away from her attackers. At

1340 there was a heavy explosion that rocked the boat. This was followed by loud breaking-up noises. The tanker probably sank at that time. By 1526, the depth charging had stopped and RAY was brought to periscope depth. Three escorts were observed searching to the north of RAY. They remained in RAY's vicinity all afternoon forcing her to stay down until dark. When RAY surfaced that evening I remember saying to Bill Smith, my Executive Officer, "Let's go after the convoy, fire our last four torpedoes and go home through Balabac Strait."

Fortunately, the enemy changed those plans. What I didn't know was that Balabac Strait was mined and had claimed the lives of ROBALO and FLIER in the last few days. In fact, the Commanding Officer of FLIER, Commander Jack Crowley, and a handful of survivors from his sub were at that time marooned on a small island in Balabac Strait. They had witnessed RAY's torpedo attack, later verifying the sinking of the tanker. Had RAY attempted to return to Freemantle via Balabac, she might well have met the same fate.

RAY headed up Palawan Passage in pursuit of the convoy, avoiding the three lagging escorts, but contact was not regained, forcing the conclusion that the ships had anchored for the night. All day of 19 August, there was no sign of the convoy. At dawn on 20 August however, the bridge watch sighted the smoke of the convoy to the east of RAY and an end-run on four main engines was commenced. All that day, RAY worked her way toward the head of the convoy but never made it by dark, being driven down by the convoy's air cover. At sunset, the ships were seen to enter Paluan Bay on the northwest coast of Mindoro.

At 2036, while RAY lolled around at slow speed off the harbor, a radar contact to the east was made. Radar interference was also detected and we communicated by keying the SJ radar. The contact

was identified as HARDER, skippered by the indomitable Sam Dealey. RAY was then headed toward HARDER to pass on information about the convoy. Our two ships were closed to 25 yards as Sam and I conversed by megaphone. We agreed that RAY would join his wolfpack for a dawn attack. RAY would approach the convoy from the west, HADDO from the northwest and HARDER from the southwest as the convoy sortied from Paluan Bay. That meeting with Sam Dealey was memorable for me because HARDER was sunk by an anti-submarine vessel only four days later.

The next morning RAY submerged at 0457, 3 miles south of Cape Calavite Light--1 mile off the coast. The water was deep so the large ships would hug the shore as they rounded the Cape. At 0545, sonar picked up "pinging". Then I raised the periscope to see the convoy standing out of Paluan Bay. At 0555, three explosions were heard in the direction of the convoy. Torpedoes from the HARDER? They were followed by thirteen depth charge explosions. Through the periscope, I could see the destroyers making their attack, but could see no evidence of damage from HARDER's torpedoes.

The water was smooth so I had to make periscope observations quickly with very little scope above the surface. The setup looked fine. HARDER had drawn the attention of all escorts, except a destroyer that was about 4,000 yards to seaward of the convoy and aft of the leading ship--a 7,000 ton transport coming down our alley.

At 0618, RAY's last four torpedoes were fired from the forward tubes on a 60°P track, 1,300 yards range, spread for 600 feet. During the firing, the target changed course away to conform to the coastline. This caused the first three torpedoes to miss ahead; I saw their tracks. The fire control solution was corrected using another periscope observation before firing the fourth torpedo. The last torpedo hit amidships right

under the stack causing a terrific explosion as her boilers erupted. This stopped the transport dead in her tracks. She was mortally wounded and was soon to go down to her grave. My TDC operator, Lt. Leonard Erb, had indeed scored a "bullseye" with that final shot!

The attention of the escorts had been diverted from HARDER to RAY with the heavy torpedo wakes on the glassy sea. I observed the escorts closing with a fury, then RAY went deep to 380 feet at full speed. At 0623, she received the first of one hundred and twenty-six depth charges, sixty-four of which were definitely intended for her. The first few attacks were very close and shook her up badly, but the "Mighty RAY" was tough and took them in her stride. By easing down below 400 feet, our attackers were gradually lost astern. It was later learned that HADDO, commanded by LCDR Chester W. Nimitz, Jr., had sunk two ships of the convoy and GUITTARO and RATON further north each got a ship later in the day.

At 0809, RAY came to periscope depth 3 miles from the spot of her attack on the transport. Nothing was in sight, but one escort was milling around close to the coast probably picking up survivors. RAY remained submerged for the rest of the day and was then headed for Freemantle, where she arrived on 31 August—thereby earning an extra liquor ration, one for August and one for September. RAY had been on patrol a total of 51 days (with 2 days of reloading at Freemantle) and travelled 14,237 miles.

COMSUBS SEVENTH FLEET credited RAY with sinking five ships, (three tankers and two transports) for 43,365 tons and damaging two freighters for 11,500 tons. After a shaky start, it had turned out to be an outstanding patrol.

Excerpted from: "The History of a Fighting Ship - U.S.S. RAY (SS271)" by Rear Admiral William T.

THE SUBMARINE ASW TORPEDO

A new attack submarine, the SSNX, has been conceived and its characteristics are being justified to insure the necessary funding for this program. However there has been no mention of how this SSNX complements its primary weapon -- the anti-submarine torpedo. R. C. Gillette in his Submarine Review article of July 1983 noted the desirability of building a submarine to optimize the effectiveness of its major weapon, while Dr. Richard Pariseau in a Proceedings article of July 1983 suggests a different context for future use of the ASW torpedo than the expected one-on-one situation against what he terms, a "passive target." These premises, which appear sound, suggest a need to examine the direction being taken with the SSNX designs relative to its ASW weapon compatibility, or conversely, the kind of ASW torpedo needed to best complement the SSNX.

The SSNX concept is basically an improved ASW submarine with capabilities for secondary missions. It will provide an even quieter submarine than today's best attack boats. It will be faster than the 688. It should provide the improved acoustic capability necessary to meet the threat of likely sound quieting of enemy submarines and give good passive ranges out to the maximum employment range of the ASW torpedo. It should also be more able to handle an expanding number of missions including under-ice ASW. Hence, it appears to be a submarine which with the right weapons, is well designed to meet the threat of the '90s.

But what sort of primary weapon--the ASW one--is then indicated for use with this highly competent platform to best engage enemy submarines

which are likely to aggressively counterattack and be protected by coordinated multiple forces, as described by Dr. Pariseau in his Proceedings article.

ASW Torpedo Stealth

The stealth of the SSNX seems to call for an ASW torpedo which is very quiet and covert. This means wakeless as well. The entire weapon system, platform plus weapon, can then minimize the element of surprise in its attack. With a growing capability of enemy submarines to countermeasure incoming torpedoes and counterattack with their own torpedoes, surprise is at a premium.

Today's torpedoes are electronically guided, giving them increased hitting precision. This makes them particularly susceptible to countermeasures. The need to have a torpedo that is not detected in time for its target to adequately take countering actions is apparent. Although today's highly sophisticated torpedoes have electronic means to counter most of a target's countermeasures, past electronic warfare (EW) experience has shown that shortly after the introduction in way of a new electronic technique, the enemy has produced an effective counter to it. But sufficient warning time to counter efficiently has been necessary. For example: when in WWII the Germans unveiled the radio-guided, bomb in a mass air attack against Allied shipping at Bari, Italy, some 16 merchant ships were sunk and 9 badly damaged in the single attack. However, within two months, a similar type of attack on a concentration of Allied ships in Salerno Harbor was thwarted by 2 U.S. destroyer escorts who jammed the radio signals to the German bombs. The DEs had been hastily configured with high-power jamming transmitters which were set to the bombs' guidance-frequency. Thus, just one ship was hit by a German bomb! In fact, the EW history of WWII as well as that for recent wars have shown the

considerable susceptibility of electronically guided weapons to electronic countermeasuring. Even for covert high speed weapons which produce short warning times, EW countermeasures can be successfully activated. This was illustrated by the use of chaff in the Falkland Islands War to decoy Argentine, aircraft-launched Exocet missiles away from their targets.

The torpedo is a slow weapon. It takes six or more minutes to go 10,000 yards--a reasonably close firing range for today's terminal-homing ASW torpedoes. This means that if the torpedo making noise in being launched and in its trajectory, gives its target sufficient time to carry out effective evasive maneuvers, i.e. run away at high speed from the torpedo as well as activate countermeasures coordination with target maneuvers. Moreover, when under the sea, more time is required for the effective use of countermeasures than in the environment of air. Getting off-board jammers or noise decoys into place well clear of a submarine takes a considerable period of time. Hence, a torpedo which is detected a few hundred yards away may still prevent effective evasion measures.

The element of stealth should also be built into the ASW torpedo's guidance and homing system. Thus, a quiet or passive method of guidance, i.e. wire guidance and three-dimensional passive acoustic homing, are best used, with a passive acoustic sensor on the submarine providing accurate ranges to the target. The employment of active acoustic target localization by either the firing submarine or torpedo should only be a last-second effort. A target which can be heard passively at long range by a firing submarine should be detectable by a torpedo at a much closer range. To fire at an enemy submarine whose position is so poorly known as to require an active terminal-homing system of several thousand yards deny the value of a quiet torpedo's

inherent stealth.

Systems analysis has shown present ASW torpedoes to have a high hit probabilities against a "passive target" in the one-on-one situation. This has produced very favorable exchange rates for U.S. attack submarines. But given a competent alerted target, the probability of hitting decreases and exchange rates approach a one-for-one ratio. However, while high speed in a torpedo and extensive counters for enemy countermeasures improve hit probabilities -- even against an alerted target -- exchange rates are likely to suffer because high speed in the torpedo should provide its target with increased warning time. Counterfire from an elusive target or response from protecting forces are the consequences.

Quiet covertness in the SSNX; ASW torpedo system would be of little value if major improvements in sound quieting were made by enemy subs. Similarly, a breakthrough in non-acoustic means for detecting the firing sub or its ASW torpedo would evidently impact on torpedo characteristics and tactics for its use. If this happens, salvo fire of very high speed torpedoes is indicated. But such ASW weapons are necessarily different from the stealthy ASW torpedo. Moreover, to try to incorporate characteristics needed for massed fire into the stealth torpedo would probably make it prohibitive in cost.

The technology for a stealth ASW torpedo exists today -- but its speed would be marginal against targets operating at very high speed. For such targets the high speed of the firing submarine becomes critical for gaining an intercepting firing position.

ASW Torpedo Speed

The SSNX is a very fast submarine which can close virtually all contacts to a favorable firing position. Only a few of the latest submarines have greater speed. Such subs, however, pose a hitting problem for a torpedo with equal or lesser speed -- if the target submarine is traveling at maximum speed. But this is highly unlikely in war, since the noise created by very high speed operations makes the submarine particularly susceptible to destruction by airborne ASW systems.

The importance then of very high speed in a torpedo is lessened because of a capability of high speed in the firing platform. Torpedo trajectories to intercept a target rather than chase it, appear to be practical. This is particularly true if the target is not alerted in time for it to change course and speed to create a stern chase by the torpedo. (Torpedo detection devices were mounted in WWII U.S. submarines. Noisy straight running torpedoes could thus be detected in sufficient time to maneuver so as to outrun the closing torpedo or make it pass harmlessly down the side. Similar torpedo detection devices may be used by enemy submarines today.)

ASW Torpedo Hitting Range

It seems imperative that the planned, great advantage in detection range for the SSNX over potential enemy submarines -- despite recognized efforts at their sound quieting and improvement of their passive acoustic capability -- be capitalized on to maintain high exchange rates. This advantage and the continued capability for detecting submarines at long ranges, combined with a capability to use the ASW torpedo stealthily at long stand-off ranges, provide the means for combatting enemy submarines in other than one-on-one situations.

To this end, not only should the torpedo of the SSNX be covert, but it should also have the guidance necessary to produce hits against a target which may change course and speed during the many minutes the torpedo is in the water. Thus, to be consistent, the torpedoes' guidance should be covert and non-alerting. Wire guidance provides this sort of capability, but it should be two-way in the information carried by the wire, i.e. directions from the firing submarine for control of the torpedo in its trajectory, and target information derived by the torpedo's sonar back to the firing submarine. The latter capability provides the means for an operator on the sub to evaluate the target's acoustic countermeasures and then give the torpedo the necessary tactical instructions to thwart the enemy's countering efforts. Wire guidance also makes practical the efficient use of a covert torpedo at such long ranges that the firing submarine is not likely to be subjected to counterattack by either an aggressive target or by supporting units in company with the target submarine. Since wire guidance of forward launched torpedoes requires the firing submarine to be locked into a closing course during guidance phase, it is particularly desirable to have firing ranges as great as possible.

It is significant that a wire guided ASW torpedo which leaves a wake may provides valuable tactical information to aircraft protecting an enemy submarine. The location of the firing submarine at the time of firing may be disclosed and aircraft attack follow.

Quietness in a torpedo facilitates wire guidance whereas a noisy torpedo tends to blank its target's radiated noise making guidance more difficult.

The Warhead

With the SSNX designed basically for ASW, it needs an ASW torpedo with a warhead of sufficient power to destroy the submarines of the '90s. The Soviets see their submarines as the first line units of their fleet. As such they are steadily increasing the hardness of their submarines -- using double hulls of increasingly greater thickness and greater separation. Big warheads on ASW torpedoes are thus required if high explosives are used. If a nuclear warhead is contemplated, a smaller nuclear warhead on the torpedo, with its far greater power would be used.

The submarine launched missile-carried ASW torpedo in development significantly, has too small a warhead to insure single-hit destruction -- though it may create sufficient damage to start an enemy submarine towards its eventual destruction. A tactical nuclear warhead on the missile-carrier torpedo thus appears necessary to meet criteria which calls for destruction of a submarine target.

Cost

When the SSNX is projected costs to the better part of a billion dollars, the cost of its primary weapon is of little comparison significance. As Admiral I. C. Kidd, a former Chief of Naval Material, writes: "The cost of the First Stage of this weapon -- the submarine itself -- makes it ridiculous to short change the Sunday punch of such a very valuable platform." However, the lower the cost of the ASW torpedo the greater should be the numbers in the stockpiled and hence the greater the freedom to use the weapon in battle and accept the high expenditure rates of modern warfare.

The Melee

Even if the SSNX maintains a significant quieting and acoustic advantage over enemy

submarines, there are environmental conditions in which neither submarine is likely to hear the other until the range between them is small. For this situation something other than the heavy ASW torpedo is indicated. A Lightweight, very high speed weapon, used salvoes, with acoustic terminal homing.

The technology is at hand to develop an ASW torpedo which properly complements the SSNX. Given the same planning and timeliness -- as used with the SSNX -- to define the torpedo's characteristics, it should be developed and be operational with the arrival of the SSNX in the fleet. To try to make this new ASW torpedo be an all-purpose torpedo -- for melees, antiship, to destroy oil rigs, to hit radically maneuvering submarines making 40+knots, etc. -- will only tend to degrade its primary capability and make it far too costly for wartime application! As Admiral Kidd notes: "With the ever increasing costs of high complexity, high capability weaponry, there will become increasingly aggravated instances of perceived need to cram just as much capability into a single item as possible. There is a point of diminishing returns in this philosophy."

Phoenix

ARCTIC SUBMARINE BEGINNINGS

An American, Simon Lake, made public his ideas for the utilization of a submarine for Arctic exploration in the New York Journal in Early 1898.

Lake immediately followed this announcement with the preparation of designs for a submarine capable of navigation, exploration and scientific study in ice-covered waters. Certain features of Lake's basic design were apparently prompted by the need to overcome many of the

problems which had been encountered by the famous Norwegian explorer, Fridtjof Nansen. These had been brought to Lake's attention by Alfred Riedel, one of Nansen's closest associates. Simon Lake's subsequent design for an under-ice submarine which he presented before the faculty of John Hopkins University in 1889, possessed the following major characteristics:

- (1) A large storage battery which would enable the submarine to travel submerged some 150 miles between charges.
- (2) The capability to break through thin ice or to bore through thick ice in order to obtain access to air for running the engines in order to recharge the batteries.
- (3) A telescopic conning tower capable of cutting its way through up to 14 feet of ice enroute to the surface in order to permit crew access to the surface while the submarine remained submerged beneath the ice.
- (4) The ability to use small mines to blow holes through the ice of sufficient size for the submarine to surface within them.
- (5) The use of guide wheels or "runners" on top of the hull, which would enable the submarine to slide or wheel along the underside of the ice pack.

Lake applied for and received U.S. Patent 638 342 for these designs. In 1902, he constructed the "Protector" which he especially fitted out for under-ice operations (i.e., with an inverted toboggan built over its conning tower). During the winter of 1903, Protector successfully navigated under an 8-inch thick ice field in Narragansett Bay and became, on January 20, 1904,

the first submarine in history to surface through ice.

Simon Lake then generated interest in the Russian Admiralty for the idea of under-ice navigation. He suggested to them that it would be easier and safer to send "large submarines across the Arctic and off the north coast of Russia and Siberia" than by conventional routes to the Pacific. In 1905-06, Lake submitted his plans for a submarine especially suited for under-ice navigation to the Admiralty. The Russian Navy subsequently not only purchased the "Protector", but also six more Lake-designed submarines of the later class. Several of these, such as the "Kefal" and "Kaiman" were successfully operated in ice-covered waters off Vladivostok and the Gulf of Finland in the years immediately preceding World War I.

It was not until 1928, when Sir Hubert Wilkins returned from his successful flight across the Arctic, however, that serious attention was given to the "Arctic Submarine". Inspired by discussions held with Stefansson during a 1913-1916 Arctic expedition, and apparently following a program outlined by the Royal Meteorological Society in 1919, Wilkins was convinced it was the time to attempt to reach the North Pole and to explore the depths of the polar sea by submarine.

In 1930 he announced his plan to methodically and leisurely use a submarine for polar exploration and he began extensive preparations for what was to subsequently become the world's first submarine expedition to the Arctic Ocean. This voyage was not only for exploration, but also for scientific and commercial purposes. Amazingly, it remains to date the only Arctic submarine expedition conducted with commercial intent.

Two of the main objectives of Wilkins' expedition are of particular interest in this regard:

- o To demonstrate dramatically the fact that submersibles may be used for opening up and development of the Hudson Bay district and other northern areas;
- o To demonstrate that submersibles may be used to transport at cheaper rates North American products -- through the Hudson Bay route or across the Arctic -- to Europe, and so benefit primary producers and industrialists.

Simon Lake was particularly interested in seeing such a voyage made, as he believed that the trip would jolt the public into realizing that the submarine's place in the scientific and commercial field would be as important as in the military field. He foresaw that it would "open up to civilization a vast Arctic territory which only needs proper transportation facilities to make it one of the most productive of the Earth's surface." He predicted that "if it were successful, in a few years thereafter, regular cargo-carrying submarines of large size would be taking the shorter Arctic route during five or six months of the year."

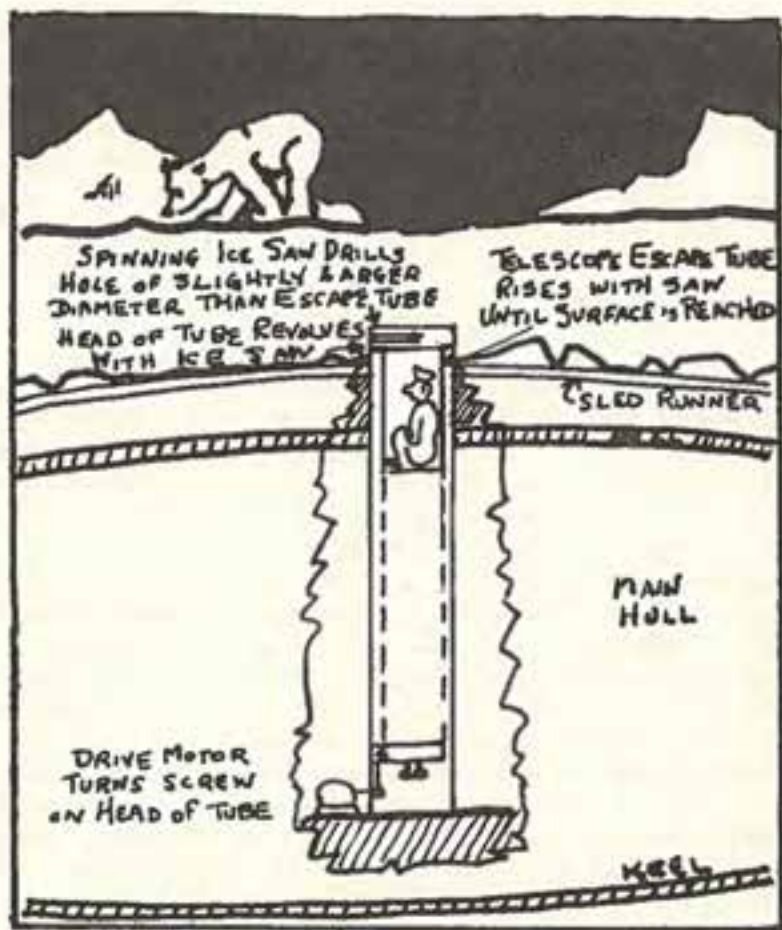
Thanks to the courtesy of the U.S. Navy Department and the U.S. Shipping Board, the submarine O-12 was placed at his disposal and the constructor of the vessel, Simon Lake, undertook to rebuild it and make it suitable for traveling underneath the Arctic pack ice. His plans included a number of controversial modifications for the O-12: a "sled runner" that permitted the submarine to glide along the underside of the ice, an "ice drill" to cut through 13 feet of ice, and an airtight chamber with a bottom hatch through which scientific instruments and collectors could be raised and lowered. Joining Wilkins in his

venture to cross the Arctic Ocean from Atlantic to Pacific via the North Pole were Sloan Danenhower as prospective commanding officer, a former U.S. submarine officer, and Professor Harald Sverdrup as chief of the scientific staff.

Upon completion of the rebuilding, in the spring of 1931, the O-12 was christened the "Nautilus". "Nautilus" was 175 feet long, displaced 550 tons submerged, and was estimated to have the capacity to cruise 125 nautical miles, completely submerged for up to three days. Wilkins basic plan called for cruising submerged for 16 out of every 24 hours, and then breaking or boring through ice to recharge batteries, and for navigation and scientific observations.

Wilkins' expedition scientific plan, as prepared by Sverdrup, placed its main emphasis on meteorological and physical oceanography observations, as they were convinced the greatest impact of the polar regions on the peoples of the world was its effect on climate. Their scientific equipment included a diving chamber with hydrographic winch in the foremost compartment of the submarine. It was from there that deep sea oceanographic observations were to be taken. Sverdrup, in particular, felt that determination of the bottom topography of the polar basin -- through the use of their new sonic depth sounder -- would be indispensable to the study of world ocean currents. He also felt that the data would be essential for understanding changes and the solution of many problems of (world) economic importance.

Although Wilkins' expedition was well planned, it did not meet its goals. It did, however, prove that an extensive scientific program could be carried out under the conditions on board a submarine. Certainly Sverdrup made a considerable amount of observations concerning the physical oceanography of the region north of Spitzbergen.



"NAUTILUS" BORING THROUGH THE ICE

Unfortunately, the submarine was old and inadequate. A series of severe material failures in combination with probable sabotage and damage which occurred in a dive under ice, added to a quite late start for the ice pack (i.e., 18 August) meant that Wilkins had to turn back after only three weeks.

Nonetheless, public interest in Arctic submarines was aroused; and at least for a while future support was promised. Wilkins, in fact, submitted to contractors in 1934 plans for a brand new submarine, especially built for operating in polar regions. He hoped--but in vain--that such a submarine could be built during the following year. In conclusion, it can be said that the concepts, techniques, and data which were developed and collected as a result of this pioneer expedition did much to ensure that submarines would one day be capable of operating and collecting valuable scientific data through the polar basin.

Excerpted from The Arctic Submarine: Its Evolution and Scientific and Commercial Potential, by Captain Alfred S. McLaren, USN (Ret.)

DISCUSSIONS

WEAPON REFORMERS

The vital concern of the weapon reformers is not cost-effectiveness, per se, but a concern that America will not survive if the use of utmost technology causes our weapons to be second-best in combat and fewer in numbers than those of an enemy using simpler weapons.

Most reformers are not looking for economies to

fund other non-defense programs but instead are looking for ways to assure America's survival with sufficient numbers of weapons that work and are effective in combat. Reformers are opposed to high technology that forfeits to the enemy the advantage of surprise. They are opposed to high technology that is unreliable and unsupportable in the harshest war conditions. They are opposed to high technology that is unproved in realistic battle-type testing. They are opposed to high technology that warns the enemy of one's presence and perhaps serves as a homing beacon for an enemy weapon. They are opposed to high technology that costs so much it cancels programs or causes cutbacks or stretchouts, driving up unit cost and denying funds for additional numbers of weapons that work. They are opposed to high technology that is disproportionately costly for the advantage gained. They are opposed to high technology that in fact makes a weapon less combat-effective rather than more combat-effective. And they are opposed to high technology that makes a weapon into a multirole item that does several things but does nothing superior, as needed in combat.

Reformers do not believe that the military is infatuated with high technology. They simply understand and are trying to communicate the fact that reality in battle is far different from what many perceive during peacetime. There is a big difference between what the user perceives in weapon performance and reliability and what the designer conceives.

J.A.N.

STRATEGIC ASW

The recent comments by CNO Admiral Watkins

concerning war fighting in the Arctic Ocean are bound to start a spiral of academic and press inquiry into the subject of strategic ASW. (Ed. note: Strategic ASW is, primarily attack submarines versus ballistic missile submarines--SSBNs.) The CNO's comments as noted in the Submarine Review and in Air Force Magazine represent an open and major change in U.S. defense doctrine.

Although Clausewitz and Mahan taught that the enemy military forces were the proper object in war, strategic nuclear forces have often been thought to be exempt from this principle. In the past, the U.S. has also disavowed the development of defensive capabilities which could negate the actions of Soviet strategic forces. Anti-ballistic missile capabilities and civil defense measures have not been pushed. Rather than deterrence by defense, dissuasion through the terror of offense has seemingly been preferred.

Under the concept of allowing one's own cities and forces to be vulnerable to an opponent's attack, it was hoped that our opponent would be "educated" to recognize that such policies were logical and less expensive. Each side would then be assured of threatening the "assured destruction" of his opponent. This mutual vulnerability is better known as Mutual Assured Destruction (MAD).

Unfortunately, the USSR has taken numerous steps which have led the U.S. to conclude that they do not subscribe to MAD. In fact, the Soviets have evidenced a totally different concept of deterrence. Their view is that defense is both logical and necessary. They have taken efforts to protect their national command center, their military forces, and their civilian population. In short, the Soviet view of deterrence is to have superiority over all possible enemies and the capability to fight a war and limit damage to

their homeland should deterrence fail.

The U.S. has belatedly acknowledged that such a defense doctrine is desirable. But the U.S. has not finalized a strategy or procured the forces necessary to implement a strategic nuclear defense.

Despite the fact that current deterrence strategy for the past two Administrations rejects MAD, there are considerable numbers of the American public, press, academics, and legislators who think that MAD is still U.S. policy--or that it should be.

Those who defend MAD argue that efforts by the U.S. to threaten Soviet strategic nuclear forces is "destabilizing". This is the fantasy world where a threat to weapons is bad while a threat to unarmed civilians is good.

As is well known, our Navy has provided a survivable strategic nuclear reserve force--with its SSBNs--which could threaten the "punishment" of Assured Destruction should deterrence and subsequently, strategic defense fail.

U.S. SSBNs have been part of a "countervailing strategy" which uses a triad of forces capable of: providing a secure reserve; prompt and delayed targeting across the full range of enemy strategic targets; flexibility in weapon delivery; and escalation control.

The U.S. is obviously not adding defense to its well thought out strategic offense. Should deterrence fail, our National Command Authority will have the option of employing forces both offensively and defensively in order to limit damage to the U.S. and to inhibit further use of strategic weapons. In some circles, this policy is known as deterrence by threatening to deny victory--or deterrence by nuclear war fighting.

Providing the President with an option to defend his nation in strategic nuclear war is not only a good idea but supports the political end to which war is tailored. Taking a page from Clausewitz or Mahan, it might be realized that the U.S. Navy should engage the center of gravity of the Soviet Navy main fleet--of SSBNs--whether it be actively engaged or withheld.

Another area of discussion which will likely grow out of the CNO's talk is that of sanctuaries or zones where strategic ASW--attack on enemy SSBNs--cannot be practiced. Support for such ideas came from former President Jimmy Carter. Such ideas however are not in the interest of the U.S. under the present accepted national military doctrine, since they represent a way to return to MAD as a doctrine for deterrence. Furthermore, zones free of ASW limit other missions which might be conducted by forces with a strategic ASW capability. ASW free zones tend to undermine the acquisition of good intelligence from submarines--affecting deterrence.

Strategic ASW using attack submarines is a justifiable mission which is morally defensible. One must assume that it was necessary to take this mission out of the closet in order to support new weapons systems. Now that it is out of the closet, we should prepare ourselves for the inevitable examination from strategic thinkers and a legislature which may not agree with the concept of deterrence through promoting a capability to defend oneself should deterrence fail.

Commander James John Tritten, USN

LETTERS

To the Editor:

o Congratulations! When is a Small Submarine a "What" is a stimulating piece of work. I would hope that the general reaction to it is similar to mine.

Perhaps it is deceptive in its humor. I have tried to synthesize its several points, but with no luck. Capt. Taussig has set up several targets, each of which has a unique state of mind, or an outlook, or a piece of turf to defend.

He has identified these targets as "hang-ups". And each of these is characterized as a person, the GS 11, the allocator of funds to the operating forces, the scientist who wants to climb Mount Everest, the formulator of "Operational Requirements", and the "naysayers" who remain unidentified but who are probably the ones who should have thought of the idea in the first place.

Or could it be that the "hang ups" are symptoms of a general cultural norm which prefers cake to bread and performance to capabilities? Which is to say there is an indifference to cost and consequences. Capt. Taussig implies that simplicity, or elegance, is a threat to those who control the development of concepts.

Could an indictment be drawn on any of those persons in the "hang up" roster for not having properly discharged the responsibilities inherent in his job? Or is it a matter of the current military ethic? In either case, what can be done about it?

"Do about what" one might well ask. But the author must have had something in mind or he wouldn't have written the article. And I must have something in mind or I wouldn't be writing this letter.

Is there a common problem which many of the

Review articles are attacking? I think that there is, but I can't get a hand on it. And if there is, indeed, an identifiable problem common to each, what can be done about it? Or could it be that all of us are nothing more than the 'naysayers' which time and technology have long ago passed by?

If there are three or four or five of us who, in our different ways, would each launch an attack which focused on a common problem, I think the results might be significant. One of those who would join the attack with enthusiasm is

Frank Lynch

o The discussion item in the October issue of the Review, Diversify?, is certainly consistent with Liddell Hart's thoughts in his book, Strategy, the Indirect Approach. "Vitality springs from diversity", he wrote, "which makes for real progress as long as there is mutual operation, based on the recognition that worse may come from an attempt to suppress differences than from acceptance of them."

The need for submariners to promote new concepts directed toward diversifying can be answered by using the Review as an open forum of discussion. I hope this direction of the Review will be well supported in the future.

P.E.L.

o The Musashi article in October Review took me back to my copy of Five Rings. One of the most important thoughts which Musashi leaves with the reader is the idea that a warrior (a submariner) should place strategy (how to fight) at the top

of his list of qualifications. Musashi says: "Strategy is the craft of the warrior."

To master his craft Musashi stresses that the warrior should engage in a written dialogue on strategy. He says: "The warrior's (craft) is the two fold way of pen and sword, and he should have a taste for both ways."

It seems that the Submarine Review provides a good forum for writings which can suggest better strategies. Then these strategies can be argued to produce advanced concepts for flexible use of the submarine in battle.

A profound example from Musashi's "notes" is that of an enemy samurai, the pride of his "school of the sword" and armed with a long sword of finest steel, who is "cut" by Musashi with a wooden sword which he fashioned from the blade of an oar. Musashi easily does the job of "killing" his opponent, since the other samurai fell into the narrow routine of his specific school of thought (inflexible doctrine). To Musashi, the enemy's way of fighting was predictable and hence vulnerable to unorthodox maneuvers and improvised response.

Lt. Barnaby S. Ruhe

o (from Karl Hensel) Your account of Old Swordfish pretty much agrees with my memory. Jasper Holmes said it well in his "Undersea Victory". I had detested the idea of taking out a Wolfpack and had repeatedly asked for command of a boat. I was so grateful when a chance presented itself.

I have always felt that it was unfair to the crew to have a 4-striper come aboard in Command--it was just too much rank. And I was the

6th skipper inflicted on them in the first ten patrols. It took a couple of weeks at sea for them to regain confidence.

I think that my most difficult obstacle, in making those night attacks, was not having the TDC in the conning tower with me. We still had the old Mk I in the Control Room, at the other end of a telephone; only Jack Pye's skill and intuition down there made things work out.

We all owed a debt to a young EM. As we lay on the surface without power unable to dive, I took a walk back to the maneuvering room and put the cards on the table "We've got to have one propeller in order to dive and control--JUST ONE! THAT'S ALL I ASK FOR! THAT'S ENOUGH, and you lads have just five minutes to figure out how you are going to give me one propeller. START THINKING!" I returned to the Control Room. An EM remembered that we could get one shaft by pulling a link. We dived to 200 feet on that one prop, stayed there all day, and had the second shaft ready by late afternoon, while chasing electrical grounds.

I have always been lucky in submarines. I think that about sixty of my Naval Academy class went through Sub School, and I was the only one of us fortunate enough to get command of a war patrol. It was a great experience.

RAdm. Karl G. Hensel, USN (Ret.)

o I read with interest Joe Taussig's article on the original Perry Cubmarine and thought you might like an update on some of our activities in the submarine world.

Over the last fifteen years the Cubmarine has grown somewhat in complexity but has maintained the simple and maintainable design philosophies

that Joe Taussig went into rather thoroughly. Where complexity and sophistication have been added to the submersibles, it has been mainly in the sensors and endeffectors.

Examples of where our equipment has been put to use, in spite of the "nay sayers," have been as follows:

--At Kwajalein Missile Test Firing Range a Cubmarine has been operating for well over 10 years recovering various items off the sea bottom floor. We got our first service call about two years ago for a new shaft seal. Those "unsafe" submarines have just been out there chugging away with no incidences to date.

--One of our earlier submarines has been used recently by the Royal (U.K.) Navy for quick access submarine rescue purposes. It was utilized in conjunction with the U.S. Navy DSRV on a simulated rescue exercise in the North Sea. The British discovered that they could take a relatively simple piece of gear such as the L-1 (built by us in 1972 and one of the first lock-out submarines in the North Sea) and by putting a DSRV mating ring on the bottom could provide interim first aid and light rescue capability to distressed submarines. Recently, some extremely complex underwater construction and inspection activities in the North Sea have been carried on by our submersibles, mounted on a large semi-submersible multi-purpose support vessel (MSV), operating in oil fields.

--Cubmarines laid explosive charges for bottom leveling operations and installed and operated subsea jacks to maintain the linear integrity of a pipeline across the Straits of Messina. One mission is noteworthy as it achieved a complicated task simply. A transponder was placed on the exterior of the observation/manipulator bell. The topside support ship's dynamic positioning system

was then acoustically locked onto the transponder. The topside dynamic positioning system would then read the change in location of the submarine and adjust the location of the topside support vehicle accordingly. The observation/manipulator bell, in effect, was then actually driving the topside support ship in a dynamically positioned mode.

--One such manned system, the Mobile Diving Unit on the MSV THAROS, is operated from a tether and is capable of excursions up to 800 feet in either direction to allow the multi-purpose support vessel to stand off a reasonable distance from an oil platform so that operations can take place in extreme weather. Divers can exit out of the bottom of the MDV at mid-water depths to do a variety of inspection or repair tasks on an oil platform.

--Underwater work tasks are also being accomplished with increasing regularity by submersibles that are completely unmanned. A RECON IV vehicle has been modified to install 600-lb. anodes onto a COGNAC Platform which is the world's largest deep water platform and stands in over 1000 feet of water. This system, built for the Royal (U.K.) Navy called TUMS, has the capability to dive to 20,000 feet. The vehicle is completely micro-processor controlled and all power, communications and command links are achieved through a single coaxial cable. The system is designed mainly for search and recovery requirements of the Royal Navy and is capable of operating either in a straight towed mode or in a free swimming mode complete with a variety of sensors to achieve the mission objective.

As you can see from these preceding examples, the underwater world is alive and well and progressing on a successful basis so long as the key words are to "keep it simple" and only make those parts as complex as they need to be to undertake the task at hand.

IN THE NEWS

o NATO naval forces held an exercise in October to test defenses of offshore oil rigs from enemy submarine and bomber attack. Five countries took part in this exercise. Canada's Commodore John Harwood, tactical commander of the operation, said, "Oil rigs are sitting ducks. You have to put a lot more effort into their defense."

o The USS Robert E. Lee (SSBN 601) and USS Thomas A Edison (SSBN 610) are being decommissioned on 1 December 1983, as reported in a NAVOP of 26 November 1983. "The nuclear attack submarines, homeported in Bangor, WA, are more than 21 years old and at the end of their service life."

o Aerospace Daily of Thursday, October 6, 1983, reports that, "The Pentagon believes that a satellite system for blue-green laser communications with submarines would provide little increase in the average data throughput attainable with the ELF system it is developing in Wisconsin and Michigan. This is because the ELF system can be used continuously to all areas while the laser beam would have to scan large ocean areas in order to avoid disclosing the general location of the submarines with which it was communicating. The low data rate received continuously (by ELF) and the high data rate received intermittently (by the blue-green laser system) deliver similar throughput. The laser system is expected to cost considerably more and entail much greater technological risk."

o The USS John C. Calhoun (SSBN 630) was the winner of the U.S. Atlantic Fleet Ballistic Missile Submarine Outstanding Performance Award

for 1983. The Award was presented by Vice Admiral Bernard Kauderer, ComSubLant.

o The Henry B. Jackson (SSBN 730) was launched at General Dynamics' Electric Boat Division on 15 October 1983. The Honolulu (SSN 718) was launched at Newport News Shipbuilding & Drydock Company on 24 September 1983. The USS Portsmouth (SSN 707) was commissioned at the Portsmouth Naval Shipyard on 1 October 1983, and the USS Buffalo (SSN 715) was commissioned at the U.S. Naval Station Norfolk on 5 November 1983.

o A recent report by U.S. scientists on massive nuclear bombing effects indicates that if about 5,000 megatons of nuclear bombs were employed by both sides, a "nuclear winter" would result. Temperatures in the Northern Hemisphere would drop as much as 80° Fahrenheit and this chill would last for many months destroying all crops and most animals. The weather disaster could quickly spread to the Southern Hemisphere, as well, and radiation effects appear to be 10 times what had previously been estimated. Soviet scientists confirm these results in independent studies which they have conducted and conclude that a nuclear war would cause a global climatic catastrophe. In effect, these studies indicate that a massive nuclear exchange can only result in disaster for both sides. Thus, the assumption by the Soviet military that they can fight and win a big nuclear war is apparently ill-founded. With no possible winners, the futility of a nuclear arms race should be more apparent and arms control agreements become more likely.

o A Soviet Victor III class submarine was observed floundering in the seas 200 miles west of Bermuda on November 3rd. The sub could barely make any headway in the heavy seas, due apparently to a power plant failure. Later it was towed to Cuba. Three of this 6,000 ton class have been launched so far this year. The Victors are

nuclear attack submarines powered by two reactors and make over 30 knots of speed. The distinctive pod mounted on the after stabilizer is apparently for the towing and housing of a linear array. The Victors are credited with carrying SS-N-15 nuclear tipped weapons like the U.S. SUBROC.

o A go-ahead has been given by the Defense Resources Board for a new nuclear attack submarine program to commence in 1985. The Board authorized the Navy to start on preliminary designs for this SSN "to ensure our present acoustic superiority"....over the projected Soviet submarine threat of the 1990s. Construction of the lead ship, which is to be faster, larger and quieter than the 688s, is to begin in 1989, with the first boats sent to the fleet in 1994.

o An article in the September 1983 Proceedings by Captain Charles Pease, USN, Sink the Navy, has received a great deal of press interest and publicity--mainly centered around his thought that submersible aircraft carriers could revolutionize combat at sea. However, Pease pragmatically suggests that the near-term evolution towards a submersible Navy should more likely involve logistic support ships of the Fleet--oilers, ammunition ships, etc. This need to submerge the Navy, Pease feels, stems from the susceptibility of surface ships to destruction by guided missiles (as evidenced in the Falklands War) as well as damage from nuclear near misses. He is particularly concerned with the lack of protection of surface ships against the effects of enhanced radiation weapons, nuclear fallout and electromagnetic pulse effects on a ship's electronic systems.

o An article in the New York Times of Nov. 20, 1983, indicates that the ELF (Extremely Low Frequency) communication system provides a good means of communications--even if of low data rate--to all U.S. submarines under the polar

icecap. Vice Admiral Gordon Nagler, Director of the Navy's Command and Control Office, is quoted as saying, that the ELF system was tested last summer on a submarine under the North Pole ice field, and an operational capability was thus demonstrated."

o By a vote of 55 for and 36 against, the Senate restored the \$336 million in the FY '84 budget for long lead time items to support the acquisition of four SSNs in FY '86.

o An article in Defense Week, 14 November 1983, by Harold Agnew, former director of Los Alamos National Laboratory, argues for "adding protection to our in-port submarine fleet (SSBNs) at existing or at future port facilities." Mr. Agnew notes that Secretary Weinberger visited submarine pens in Finland and Sweden which are dug into rock mountains, have closable portals for blast protection and which can withstand anything except a direct hit by a multimegaton nuclear warhead. The U.S., he feels, has the construction capability to build structures for our in-port submarines which could give similar protection—even for nuclear explosions at sea which could create tsunamis (tidal wave) which could beach the in-port SSBNs. At any one time, Agnew says, "Approximately half of our (SSBN) force is in port" and thus "2500 warheads are at risk from an enemy attack, even a conventional attack." He emphasizes that "clearly, hardened port facilities...should be taken seriously...if 100 MXs carrying 300 warheads, and 1,000 Midgetmen with their 1,000 warheads make a difference to the credibility of our strategic nuclear deterrent."

PERSONNEL NOTES

o On August 30, 1983, Vice Admiral Ralph W. Christie celebrated his 90th birthday and the

Pearl Harbor Sub Base held an "Admiral Christie Day" with a parade and reception at Lockwood Hall. Admiral Christie was Commander Submarines Southwest Pacific during World War II--his submarines making a major contribution to the War in the Pacific through their sinkings of Japanese ships. Admiral Christie is particularly remembered for his quick recognition of the valiant and heroic deeds of others. His dockside presentation of medals to returning submarine skippers along with his pursuit of the posthumous award of the Medal of Honor for Commander Sam Dealey, skipper of the Harder, were recognized as moves which created the needed morale in his force.

o Admiral Harry Train, one of our foremost submariners and retired from his Atlantic Fleet command a little over a year ago, recently completed a 5 1/2 month hike of 2138 miles across the Appalachian Trail. He left Springer Mountain in Georgia on March 18th for the "through hike" and ended 159 days later at the trail's end at Mount Katahdin, Maine. Why did he do it? "I've wanted to do this for at least 10 years", he said. Then he noted, "People have asked me whether I was able to think deep thoughts or philosophize.... The answer is 'No. You can't because if you do, you get lost.'"

o Flag Officers Announcements (Submariners):

(1) Rear Admiral Albert J. Baciocco, Jr., was appointed to the grade of Vice Admiral in his current assignment as Director, Research, Development, Test and Evaluation, Office of the Chief of Naval Operations.

(2) Rear Admiral Edward A. Burkhalter, Jr., was appointed to the grade of Vice Admiral in his current assignment as Director, Intelligence Community.

(3) Commodore Guy H. Curtis, III, Director, Strategic Submarine Division and TRIDENT Program Coordinator became Director, Attack Submarine Projects Office (new position), Naval Sea Systems Command.

BOOK REVIEWS

Axis Submarine Successes 1939-1945

English Edition by Jurgen Rohwer 1983

Naval Institute Press 386

This thoroughly researched and quite remarkable book deals statistically and exclusively with Axis submarine sinkings. It was first published in German in 1968. The current English edition incorporates considerably more material, made available by Doctor Rohwer's continuing research and recently released U.S. and British Ultra war files. This edition is no doubt the last word on the statistics of the Axis submarine war. We are beholden to the sponsorship of the Naval Institute which made publication of this edition possible.

This book is an absolute must for inclusion in every submarine library. It records sinkings in complete detail not only by German, Italian and Japanese submarines but in addition the sinkings of Finnish, French (Vichy) and Romanian skippers. The text presents the exact location, name, date, registry and tonnage of ships sunk, as well as the name of the U-boat and skipper responsible, plus additional footnote data. No significant data pertaining to individual sinkings appears to be left out except the level of attrition imposed upon the U-boat as a result of its attack.

When a long hard look is taken at this statistical history of the Axis submarine war, it is well not to be carried away by the author's employment of the words "submarine successes".

Did not the Axis submarines lose their war in the end and in the process lose the incredible number of 630 German U-boats at sea (generally with the entire crew)? Some 33,000 officers and men were lost. There seems to be a defect in the Author's concept of a submarine war in which all sinkings are "successes" without regard to the cost in terms of U-boat net attrition in boats and its effect on morale--or the fact that the German Navy's war was finally lost.

The German submarine command--in the person of Admiral Doenitz--seemed never to comprehend the ultimate or even immediate tactical meaning of losses. One reads his autobiography in amazement to realize how he treated every loss, whether of an ace or just an average skipper as a mere statistic, without regard to its effect upon the progress of the war. He was concerned only whether replacements to maintain the number of U-boats at sea were adequate.

Admiral Doenitz seemed never to have any awareness of the necessity to change tactics, training or submarine design in order to maintain a winning factor based on U-boat losses vs. enemy ship sinkings. The Doenitz hard-headed, cold-blooded philosophy was to prove fatal to the ultimate success of the campaign. It played into the hands of the dogged and determined allied ASW war of attrition which was based upon learning from errors and losses.

The mental flaw of considering a merchant ship sinking to always be a "success" was indulged in until the U-boat pool went finally bankrupt. In fact, this bankruptcy was not a sudden thing, but rather the ultimate result of unrecognized tactical defeats along with failure to perceive the need for change. Dr. Rohwer's tables show that in March 1941, at the cost of sinking five allied merchant ships, Gunther Prien (hero of Scapa Flow), Otto Kretschmer, Joachim Schepke and

Joachim Matz were lost. These skippers had sunk nearly 700,000 tons of merchantmen and warships and were irreplaceable. To Doenitz, the loss was merely a statistic. To Winston Churchill, however, such losses indicated that the 'the worm was in the apple'. Perusal of the various tables in the book make evident trends which might otherwise go unnoticed. To a history buff, the recognition of these trends is of great importance.

As examples of the above we see:

- o the astonishingly poor performance of the U-boats during the invasion of Norway. Literally dozens of sitting-duck British men-of-war survived because of poor German torpedo performance. Attacks after long submergence had not been practiced; hence the effect of build-up of high pressure in the boat (probably from leakage in the air-operated motor controllers) on torpedo depth control was not understood.

- o a remarkable series of early German successes against major and minor warships of the Royal Navy was enjoyed. Then suddenly Doenitz shifted away from the British Fleet to fat merchantmen, which never posed a threat to the safety of the U-boat. Doenitz didn't comprehend the necessity of disputing the control of the sea--as advised by Mahan. Doenitz chose rather to concentrate on the sheep before gaining control over the sheep dog. Neglected and permitted to savage the U-boats at will, it was inevitable that Allied ASW forces would finally prevail--and they did. U.S. submarines meanwhile waged relentless war against any and all Japanese ASW units.

- o that it was equally astonishing that Japanese submarines after scoring tremendous successes against the United States surface fleet during the first year of the war suddenly repeated the German mistake of failing to dispute command

of the sea. The book lists practically no Japanese success against U.S. amphibious or carrier task forces which roamed the Pacific after Midway. It is still somewhat of a mystery, not cleared up by this book, as to what happened to the Japanese submarines after their initial successes in 1942.

An indirect answer may be found in that part of the book which deals with the Indian Ocean. The Japanese achieved outstanding successes in the Indian Ocean against everything British that floated. There were several Japanese skippers who achieved ace status but of whom little has been heard. Perhaps the Japanese submarine effort in these waters exhausted their potential and left them prey to the revitalized U.S. war effort after Midway. In any event, for the history-minded reader, it is most revealing to become aware of the major naval actions which took place in the Indian Ocean early in the war.

It has been said that World War II's naval war was the equal in effort and combat violence to the next ten (10) wars combined. In submarine warfare every sinking is a combat situation in which ships are lost. The same is true in ASW attacks where ships are sunk and men die. The sheer cataloging of the sinkings by Axis submarines fills this rather large book, yet nothing is said of the 630 U-boats sunk in ASW encounters, whether by air, surface or subsurface units.

I recommend to every naval historian or buff that he study and re-study this book: Axis Submarine Success 1939-45.

Brooks J. Harral

"SUBMARINE", by John Wingate, 1982 Sphere Books Limited, 30-32 Gray's Inn Road, London WC1X 8JL;

212 pages.

For anyone who would like assurance that the submarine arm of Her Majesty's Navy has the "right stuff", John Wingate's "SUBMARINE" is just the ticket. The latest in a trilogy with "Frigate" and "Carrier", "Submarine" depicts the crushing details of a patrol by a British submarine hunter-killer group composed of one diesel-electric and one nuclear submarine in the crucial first stages of a global east-west conflict.

It is the strategy of the western forces to destroy a significant portion of the Soviet SSBNs and wipe out their second strike capability. This, it is hoped, will avoid an ICBM exchange and produce a lasting truce. The submarine hunter-killer group has the mission of detecting the sortie from Kola of two escorted, new-type Soviet TYPHOON class SSBNs and destroying at least one of them before they reach the safety of the polar ice field. ORCUS, the diesel-powered hunter, as "inside man at the skunk factory", has the desperate mission of lying bottomed at the end of the channel leading to the Kola base, discovering the sortie of the TYPHOONS and then alerting the nuclear-powered SAFARI to come in for the kill.

The new TYPHOONS are twice the size of a U.S. Class OHIO, have titanium hulls, superior speed, deeper depth and heavier armament than SAFARI. The killer's job is thus no piece of cake.

The Admiralty has impressed upon both submarine captains that the honor of Britain and the fate of civilization, perhaps mankind, may ride on the success of their mission.

How the two ships carry out their assigned tasks makes an absorbing yarn and Wingate does a fine job of keeping the action going and the

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Articles for this publication will be accepted on any subject closely related to submarine matters. Their length should be a maximum of about 2500 words. The content of articles is of first importance in their selection for the Review. Editing of articles for clarity may be necessary, since important ideas should be readily understood by the readers of the Review. Initially there can be no payment for articles submitted to the Review. But as membership in the Submarine League expands, the Review will be produced on a financial basis that should allow for special awards for outstanding articles when printed.

Articles should be submitted to the Editor, W.J. Ruhe, 1310 Macbeth Street, McLean, VA 22102. Discussion of ideas for articles are encouraged, phone: 703-356-3503, after office hours.

Comments on articles and brief discussion items are welcomed to make the Submarine Review a dynamic reflection of the League's interest in submarines.

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