THE

SUBMARINE REVIEW

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FROM THE PRESIDENT

When you receive this issue of THE SUBMARINE REVIEW, the NSL Technology Symposium and Annual NSL Symposium will be history. Both were sellouts. One of the real memorable events of the Annual Symposium was the presentation of the Fleet Awards. Our presentors this year were: Under Secretary of the Navy, H. L. Garrett III, Chief of Naval Operations, Admiral C. A. H. Trost, USN, and RADM Frederick B. Warder, USN(Ret.). Award winners were:

NSL CHARLES A. LOCKWOOD AWARD LT Dwayne C. Clark, USN USS LEWIS AND CLARK (SSBN 644) (GOLD) STCM(SS) Michael J. Rinehart, USN USS FRANCIS SCOTT KEY (SSBN 657) (BLUE) MM1(SS) Thomas R. Shnaper, USN SUBMARINE NR-1

NSL JACK N. DARBY AWARD CDR John H. Almy, USN Commanding Officer, USS TINOSA (SSN 606)

NSL LEVERING SMITH AWARD CWO2 Burt R. Standridge, USN USS DIXON (AS-37)

NSL FREDERICK B. WARDER AWARD EM1(SS) Stefano Bruno Neis, USN PCU WEST VIRGINIA (SSBN 736)

These awardees were presented a formal citation, honorarium, copy of "Submarine Operations in WW II," an NSL plaque and LIFE membership in the NSL. It was a real pleasure to meet these fine young men who are truly dedicated to their country and the submarine service.

The NAUTILUS CHAPTER has recently elected new officers. We welcome at this time:

President - LCDR William P. Murtha, USN(Ret.) Vice President - LCDR Dan O'Lone, USN Secretary - Mr. John Marshall Treasurer - Dr. Bill Browning

The HAMPTON ROADS CHAPTER has also elected new officers. Welcome to:

President - CAPT John E. Whelan, USN Vice President - J. G. Burritt Secretary - CDR Thomas E. Pauls, USN Treasurer - CDR Frank W. Reifsnyder Jr., USN

We also welcome Henry Palmer as the new President of the MID-ATLANTIC CHAPTER. All other officers remained the same.

The Chapters are the real essence of the NSL and we applaud all of these members for their service and dedication.

Literary Honorariums:

 "SUBMARINE MANEUVERING INSTABILITY" - Jan '88. by Henry Payne. Award \$400.00
"REQUIEM FOR THE SILENT SERVICE" - July '87. by LCDR Dave Hearding, USN. Award \$250.00.
(A three-way tie)
 "NUCLEAR SUBMARINE OPERATIONS IN SHALLOW WATER" October '87, by Phoenix
 "PRE WW II FORESIGHT" - July '87 by Dick Laning
 "MEGATRENDS IN ASW" - April '88 by LCDR Tom Donaldson, USN and LT Doyle Riley, USN Award \$100.00 each.

We continue to welcome and solicit articles from any source that can be published in THE SUBMARINE REVIEW. The REVIEW plays a vital function in keeping our members informed and advised of changes facing the Submarine Service. Most any topic can be approached from an unclassified aspect and still discuss the relevant considerations of the subject. We appeal to our younger members to become active and express their thoughts on appropriate submarine subjects.

It is once again my very sad duty to report the loss of an NSL official. Our Treasurer, Jason Law, died on 20 April 1988, after a courageous battle with cancer. Jason relieved Jim Keane as Treasurer in 1983, during the early, formative stages of the NSL.

Jason, with his CPA credentials, set about organizing the NSL financial accounting system in a most professional way. Our most recent audit of NSL records brought plaudits from the auditor, a praise not often received, and due entirely to Jason's meticulous attention to detail. Recently, Jason had been in the process of training John Vick as his relief, but was still concerned about each detail and the League until the last day. We all give our heartfelt condolences to Sue in this time of sorrow.

The Seventh Annual Symposium will be held on 8-9 June, 1989. Please plan to attend.

Shannon

NUCLEAR SUBMARINES AND THE PRINCIPLES OF WAR

Down through the ages, students of warfare have expounded basic "principles of war" which affect and control the outcome of battles. These so-called "principles of war" when knowledgeably used, provide the fundamental elements for creating a successful result -- a victory.

Similarly, through all periods of history the principles of war have been seriously debated, with only a few principles being generally accepted across the board as being applicable to all types of warfare, including sea warfare, and particularly for submarine warfare. However, in today's environment of high technology, there is a confluence of supporting technologies which give credibility to additional principles of war -technologies such as satellite navigation, surveillance and communications, electronic warfare equipment, and computer collation of vast amounts of information along with computer-aided decision making.

submarines employing long range, Nuclear powerful "smart" weapons should make today's naval warfare planners drool at the indicated latent capability of the submarine for winning battles -against even the strongest combination of enemy warships. The covert, highly maneuverable nuclear submarine, using long-range, big-warhead programmed missiles and torpedoes can now use the offensive to attack with a maximum of surprise, with weapons which can effectively maneuver in their trajectories to provide a concentration of force on a well-defended objective -- a target or a group of targets. (The words underlined comprise the five timeless well agreed upon "principles of war" which submarines enjoy with a uniquely high level of competence.) Additional "principles" are embodied in the nuclear submarine's unusual capability to control the tempo of operations, to mass the battle efforts of a group of submarines without their having to be in close proximity to each other, to use a calculable level of weapon power to do the job with an economy of force while producing a bonus shock or disorienting effect on enemy defenses -- under all-weather conditions.

In light of these unequivocal statements, let's examine the only recent battle action of a nuclear submarine -- the British CONQUEROR's sinking of the Argentine cruiser GENERAL BELGRANO on 2 May, 1982 in the Falkland Islands War. The CONQUEROR clearly took the "offensive" with the precise "objective" of sinking the GENERAL BELGRANO (and not her two escorts) before the Argentine cruiser left the threatening zone to the south of the Falklands. This called for precise timing -- critical to the "tempo" of operations. Utilizing the great "all-weather", "maneuver" capability of the nuclear submarine, CONQUEROR made a perfectly positioned "surprise" attack with an adequate "concentration of force" -- three obsolete MK VIII torpedoes (an extremely austere "economy of force") -- to accomplish her mission.

By contrast, World War II diesel-boat submariners can recall how futile it was to be ordered to sink a specific escorted Japanese cruiser which would shortly transit through their patrol area. Then, it was recognized that submarines could effectively attack only targets of opportunity. Hence, priorities of ships to be sunk were established, with aircraft carriers heading the list for warships and oil tankers heading the list for merchant ships. (Battleships as targets were considered too improbable as were troop-laden merchant ships.) If a U.S. submarine skipper had a chance to choose between various targets in a grouping of enemy ships, he followed the priorities as listed -- but that was a rare occasion.

The Offensive

Today, taking the offensive is crucial to winning battles. There is too big a gap between the offense and defense due to present technology, to depend upon a strong defense for victory. U.S. maritime strategy calls for U.S. nuclear submarines to play an offensive role -- for which they are well fitted with their high maneuverability, covertness and high level of acoustic efficiency. Against an enemy which would wage a worldwide seawar, the unlimited endurance of the nuclear submarine and its ubiquitous quality, which poses a threat to the enemy wherever and consequently dilutes his defenses, makes the gap between offense and defense even more profound. Significantly, in the Falkland Islands War when an Argentine 209 diesel-boat was loose in the area of British naval operations its ubiquitous quality caused the British ASW forces to expend most of their ordnance on suspected contacts -- most of which were false contacts caused by the ocean's many anomalies. The 209-boat reportedly made two unsuccessful attacks. However, nuclear submarines would carry the war to the enemy on a sustained basis far more effectively than any diesel submarine today and more effectively in fact than any other U.S. naval unit.

Surprise

Great stealth is built into U.S. nuclear submarines, but to a lesser degree in the weapons they employ. Thus, the nuclear submarine can virtually always gain an attack position without alerting its target. This is true for the firing of long range missiles as well as torpedoes. Given a quiet weapon launch and a covert midcourse trajectory for the submarine weapon, the total submarine weapon system -- of which the submarine is a part -- should provide the highest element of surprise in attack of any powerful warship in the annals of history. In fact, its capability for generating "surprise" is revolutionary. Not only can the nuclear submarine totally surprise an enemy target in a one-on-one attack, but a "massing" of several submarines can be coordinated for a similar type of surprise attack on a grouping of targets. Whereas the submarine wolfpacks of WW II enjoyed sporadic moments of attack-surprise, in general the wolfpacks operated overtly on the surface like surface raiders. At times, however, a convoy might move across an undetected submerged submarine and be subject to an unexpected attack. Today with all submarines submerged at all times. a coordinated group of submarines can be in widely dispersed positions and generate a surprise

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weapon attack from many quadrants and at such a long range from their targets that there is little chance of the enemy being alerted to the attack ahead of time.

Maneuver

The capability to effectively "maneuver" forces -- whether it be men to and on the field of battle or ships on the seas to concentrate their weapon power against the enemy -- is a decisive element in winning battles. In fact, it was the greatly increased maneuver capability of WW II submarines, when operating on the surface as opposed to submerged, that made surface operations far more profitable. The large wolfpacks of German submarines -- seven or more per U-boat wolfpack -- had devastating results until they were overwhelmed by the great numbers of Allied ASW units brought into action. Even a single submarine, by operating most if its time on the surface was usually far more successful. The WAHOO, for example, and as noted by Admiral Dick O'Kane in his book "Wahoo" on her first two patrols which averaged over 500 hours of submerged operations per patrol, sank only two ships. But from the third patrol on, with a new skipper who had less than 50 hours of submerged operations for each patrol, the number of ships sunk on the third patrol were five and for the fourth patrol nine. Mush Morton of the WAHOO understood the great value of "maneuver." The same sort of excellent results were inherent to U.S. wolfpacks -- even though no more than three submarines per wolfpack were ever used. In a two-day battle in August 1944 against Japanese convoy HI-71, Munson's RASHER, Underwood's SPADEFISH and Henderson's BLUEFISH had seven confirmed ship sinkings including the Japanese carrier TAIYO, while also damaging at least six more merchant ships.

It should be recognized that today's convoys will be at least double the speed of those of WW

II. and that today's enemy surface warships will be of about the same speed and maneuverability 85 those of WW II. but nuclear submarines will be more than three times as fast submerged as the WW II diesel-boats when submerged, and double the speed of surfaced diesel-boats under all-weather conditions -- and particularly in heavy weather on the surface of the oceans. The maneuver capability exhibited by the CONQUEROR in sinking the GENERAL BELGRANO signaled a new era of warfighting capability vested in the nuclear subma-This same sort of maneuver capability when rine. employed by submerged coordinated wolfpacks of submarines using long range weapons, should revolutionize sea warfare. This sort of optimism is however tempered by the general caution against communications which tend to destroy the covertness of submerged submarines. Yet a submarine force that is resolved to sail in harm's way will recognize that to get big payoffs there is some risk involved.

Within the foreseeable future there should be significant sound quieting of all nuclear submarines -- enemy as well as friendly -- and the probability of close proximity dog fights will put a high premium on submarine mobility. But for the present, platform mobility using long range weapons has become less important than maneuver of weapons in their trajectories and particularly in their terminal phase when an enemy has been alerted many seconds earlier.

This shifting of the importance of maneuver from the submarine firing platform to the weapons it employs, is best exemplified by the SSBN and the ballistic missiles it might use in strategic war. The SSBN should have little need to "maneuver" prior to firing but the ballistic missile it launches may in time need some degree of mid-course maneuvering to ensure arrival close to its land objective, and certainly the MIRVed warheads will need a deceptive maneuvering

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capability in their terminal phase to assure destruction of a grouping of targets in the enemy's homeland.

Concentration of Force

In the past, a maximum concentration of force at sea was achieved by a congregating or massing of capital ships into tightly knit tactical formations which when properly maneuvered could pour the fire-power of their big guns into major targets of the enemy. At Trafalgar, Nelson's ships-of-the-line in close order were slowly maneuvered to cut through the enemy's line of capital ships, in such a fashion as to concentrate the broadsides of successive ships against the two flagships of the enemy. By destroying the enemy's major units in a matter of hours, the follow-on British actions then encountered a shocked and disorganized enemy which was decisively defeated through subsequent ship sinkings.

By contrast, today several nuclear submarines from diverse positions at long standoff ranges can produce the massed effect of concentrated weapon power on a grouping of enemy ships at a level of destructiveness never before contemplated for battles at sea -- and do this in a matter of minutes. A few Soviet OSCAR submarines, for example, could rapidly salvo, with surprise, about 100 missiles carrying one ton warheads at more than 100 miles standoff ranges -- at a U.S. carrier task group. Such a concentration of force should overwhelm the best of defenses and cause such devastation and "shock" as to assure a decisive victory, after rapid mop-up operations, following the coordinated attack. If the potential of nuclear submarines to concentrate force is properly capitalized on, a revolution in naval warfare is indicated. Even a single nuclear submarine can produce such a level of concentrated force as to assure destruction of the biggest of

capital ships of today's navies -- and in short order.

The Objective

Before WW II the "objective" for submarines attached to a fleet was, as far-out scouts and screens, to warn the fleet of possible surface threats and to destroy such threats if possible before they could make contact with the main body of the surface fleet. Our U.S. submarines were so employed at the Battle of Midway on 3 June, 1942. Their objective, then, was quite impractical due to air reconnaissance having taken over most of the scouting function. And as screens, their scouting line disposition promised at best the possibility that one or two submarines would ever make contact with the enemy ships -- and then with little chance of getting into a torpedo-shooting position.

Today, "the objective" for nuclear submarines in war must be clearly postulated or the great value of the nuclear submarine will be squandered. If naval planners are kept aware of the special qualities of nuclear submarines relative to the principles of war, they will be assigned missions with clear objectives which can be carried out with precision. A coordinated, surprise, longrange weapon strike with missiles or torpedoes against an enemy grouping of ships is one such use with a clear objective -- creating a win in a very short period of time. Or, as is presently contemplated, using our nuclear submarines in a rapid forward offensive against the enemy's submarines -- knowing that most of the enemy's submarines are defensively deployed close to their homeland.

Tempo

When a special opportunity to attack an unprepared enemy, or one lacking all-weather capabilities in a moment of adverse weather, or when the enemy is geographically restricted, a strike needs to be generated swiftly to catch the enemy at his moment of greatest weakness. Nuclear submarines are best configured to do this in carrying out well defined objectives. Whereas the tempo of submarine operations in WW II was erratically slow and virtually uncontrollable, the tempo of today's submarine operations can respond to a maritime strategy calling for a quick decimation of the enemy's submarine fleet and the producing of decisive actions early in a conflict -- ensuring a short war while reducing he likelihood of causing a nuclear exchange.

Shock

The shock effect of many ship sinkings in rapid succession -- from a convoy -- was reported by WW II crew members of Allied convoys going to Murmansk. They told of ships ramming each other, incorrect whistle toots indicating direction of submarine attack, lost discipline of the escorts and ships of the convoy which scattered wildly to become easy prey of the submarines, shooting wildly at each other and killing survivors by depth charging the waters where there were no submarines. Panic and disorganization compounded the damage done by the U-boats' torpedoes.

Today the bonus effect from the shock created by a submarine attack on a grouping of ships should be greatly magnified. making it easy to destroy large numbers of ships following an initial attack. Only weapon-load restrictions should limit the follow-on destruction.

All-Weather

This has not been a principle of war up to now. But today it has become an important one. With all-weather precise navigation, 24-hour-a-day worldwide communications, and with wide-area ocean surveillance, the nuclear submarine can capitalize on its unique capability to fight, unimpeded by weather conditions. Even in WW II, submarines held a marked advantage in low visibility and heavy weather engagements. Bob Ward's SAILFISH, for example, in typhoon weather and at night -- on 4 December 1943 -- made three successive torpedo attacks on the heavily escorted Japanese aircraft carrier CHUYO, first wounding her then sinking her with a final salvo of three torpedoes at 1700 yards. Significantly, the seas were so mountainous and the flying weather so bad that all enemy ASW units were unable to function.

Summarizing the advantages held by nuclear submarines in today's sea battles, as illustrated by their potential relative to the principles of war, it seems evident that the role of submarines in our Navy is expanding and that the utilization of nuclear submarines is the best guarantee of "victory at sea."

PHOENIX

THE SHALLOW WATER CHALLENGE REVISITED

Background

We should be nurturing an ongoing capability to operate attack SSNs in shallow water. During World War II the Japanese spent a lot of transit hugging coastlines, sometimes behind time minefields. Today the Soviets can be expected to do the same thing along the Northern Sea Route, which is entirely made up of coastal shallows. The Northern Barents Sea and the Sea of Okhotsk (both ice covered part of the year) are identified as SSBN operating areas in the 1987 edition of Soviet Military Power (GPO). Both seas have shallows that could be used to advantage by Soviet SSBNs.

The Maritime Strategy moreover specifies that during Phase II of a crisis (seizing the initiative): "We will wage an aggressive campaign against all Soviet submarines, including ballistic missile submarines."

World War II Experience

One of the most dramatic submarine attacks in history was carried out by HMS TRENCHANT on 8 June 1945. The Japanese cruiser ASHIGARA was intercepted and sunk at the northern end of Bangka Strait between Bangka and Sumatra during an attempted transit from Jakarta to Singapore. Hezlet, the skipper, positioned TRENCHANT in shallow water inside an Allied minefield in northern Bangka Strait. ASHIGARA came by on course 340° T, 17 knots, hugging the Sumatra coast. TRENCHANT on course 280° T fired a spread of eight steam torpedoes, track angle 120°, firing range 4700 yards, and five torpedoes were seen to hit. Patrol report comments reflect AHSHIGARA's dilemma:

"The target had made a navigational alteration of about twenty degrees to starboard, with the coast of Sumatra to port. At this point the stern wave of the enemy increased and I am of the opinion that he increased to full speed to avoid the torpedoes. He could not alter away as he would have run ashore and an alteration towards was the wrong avoiding action."

It is obvious that the Japanese never expected a submarine to threaten from the confines of shallow water within a strait.

Can we expect to carry out such an attack with our SSNs?

During a 1944 patrol in the Kara Sea, U-957 took part in an attack that underscored the

problems of fighting in ice-covered waters. On 18 September 1944, a convoy was intercepted on the Northern Sea Route near the western end of Proliv Vilkitskogo -- the strait connecting the Kara and Laptev seas, located between the Siberian Mainland and Severnaya Zemlya. Schaar, the skipper of U-957, pressed home his attack amidst patches of drift ice. The attack periscope was peened over by an ice floe, hence tracking involved sonar bearings part of the time. Using the secondary aircraft periscope, an attack position was reached. One torpedo fired at a merchantman exploded prematurely, probably due to a collision with ice. As escorts started to harass the Uboat, the second periscope was bent over during evasive maneuvers, U-957 retreated westward, went deep and blind. Schaar periodically trimmed down aft and probed the surface for ice with the bow. Eventually, U-957 returned to base with buckled bow torpedo tube shutters added to her list of casualties.

The Soviets probably never expected to be attacked by a submarine in ice-floe waters. From the German point of view, the susceptibility of weapons to ice floes came to the forefront during this patrol.

Fecent Trends in Submarine Displacement

It would seem that the Maritime Strategy and development of SSNs are out of step when it comes to opposing Soviet submarines in shallow waters or ice-covered shelves. Bigger and bigger submarines seemingly make shallow water ops less feasible. The latest point on a nearly linear (with time) plot of ever-increasing submerged displacement of SSNs is summarized in Table 1.

Table 1

Tonnage of U.S. Nuclear Attack Submarines

Class	First Del	ivered	Submerged Displ.(tons)
SKATE	19	957	2860
SKIPJACK	19	959	3500
PERMIT	19	961	4465
STURGEON	19	966	4780
LOS ANGEL	ES 19	976	6927

The Weapon Problem

Lack of maneuverability in close quarters, inherent in large submarines, is a serious problem. But of equal seriousness is the kind of weapon for use in a shallow water environment. History and today's technology would show that a quiet, wakeless, "cool" torpedo is indicated. Others have recommended RPVs. In retrospect, during World War II, we had a good idea -- with the Mk 27 submarine-launched mine. This weapon had an 877 pound charge that could be delivered 4500 yards away at 10.5 knots. Upon reaching the preset range, it bottomed.

Attacking an SSBN lying doggo on the sea floor or resting against the ice canopy in shallow water is a tough challenge. A quiet, "smart" wire-guided weapon of some kind should be developed on a high priority basis.

The Delivery Vehicle

The STURGEON-class SSN is probably as close to an all-purpose submarine as we can get. It can operate in any environment in the World Ocean. The later LOS ANGELES-class should be able to do almost as well.

We must exercise foresight with regard to the real problems attendant to employment of attack submarines in other than deep waters. The shallow water problem will not go away. TPR

WHAT WOULD MAHAN SAY ABOUT SPACE POWER?

Alfred Thayer Mahan concluded that sea power could enhance U.S. power and prestige as it had for Great Britain. At a time when the U.S. Navy's principal missions were coastal defense and raiding commerce, Mahan developed a philosophy of sea power that won recognition and acceptance far outside naval circles.

If Mahan were alive today, he would most likely point out that control of space will be equally as important as the control of the seas has been in enhancing the power and prestige of any dominant world power. He would probably base his argument on the fact that the nation that controls space will ultimately see and hear almost everything that transpires around the world. He also explain that all targets in the might atmosphere or on the earth's surface are only 200 to 400 kilometers from platforms in low earth orbit. A missile could travel as little as 200 kilometers and sink an enemy ship or destroy an airplane or surface target unless they were properly protected by antisatellite (ASAT) weapons. Currently, 350-nautical-mile ranges are typical for antiship cruise missiles and 1,500 nautical miles for comparable land-attack weapons.

Another advantage of controlling space is that, although the platforms in orbit might have limited maneuvering capability, they have almost infinite range. Once the initial energy is expended to launch a system into orbit, no additional energy is required to maintain the same speed for months, years, or even decades.

Control of space, like control of the seas, depends on more than mere physical presence. Mahan wrote about blockading ports that provided access to the seas. Similarly, it is possible to blockade the gateways to space -- the space ports. Three of the current major space ports are vulnerable to blockade by sea: Cape Kennedy, Vandenberg Air Force Base, and Kapustin Yar, the Soviet space port on the Volga River. Hostile ships equipped with surface-to-air missiles or sprint-type interceptors could effectively blockade both of our launch sites. A similar ship in the northeastern corner of the Black Sea could negate the Soviet launch facility. The blockade of these space ports is predicated first on control of the seas in the vicinity of these facilities and also on control of the sea lines of communication to these regions. Therefore, in order to secure unimpeded access to space, we must retain control of the oceans around these launch sites.

However, while both of our space ports are vulnerable to blockade from the sea, the two busiest Soviet Kosmodromes, Plesetsk and Tyuratam, are land-locked and cannot be blockaded in the classical sense, short of a land invasion. The Soviets have a clear advantage.

The access to space is also not without its equivalent "narrow seas." Any satellite launched in any direction from a given location will pass over a point directly on the opposite side of the earth after completing the first half of its orbit. (Actually, the precise location is slightly off-set by rotation of the earth in 45 minutes, typical for a satellite in low earth orbit plus maneuvering, if any.) Control of areas opposite space launch facilities could deny entry and exit to the respective space programs just as control of Gibraltar or the Straits of Hormuz could deny entry and exit to some critical ports. The main difference is that Mahan's "narrow seas" could be controlled from the shore, while the "narrow seas" of space can only be controlled from the oceans, at least for now.

The "narrow seas" for Plesetsk, Tyuratam, and Kapustin Yar all fall into the southern part of the Pacific Ocean (see figure 1). These three regions are too far from land for air coverage.



All Soviet space launches (including their ASATS) will pass over one of the three areas in the South Pacific during the first half of their orbit.

The corresponding points for Cape Kennedy and Vandenberg Air Force Base are in the southern parts of the Indian Ocean (see figure 2). Therefore, the United States can only guarantee its access to space by both securing our launch facilities and gaining control of the locations in the Indian Ocean, which can only be achieved by naval forces. At the same time, the U.S. Navy can deny Soviet access to space from two or three locations in the southern Pacific.



The corresponding entry points for the U.S. space program are in the southern part of the Indian Ocean.

The Soviet direct ascent co-orbital ASAT weapon, commonly launched from Tyuratam, presents a new twist, however. It is designed to destroy our space assets in low earth orbits, including some of our Navy satellites. Like other launches from Tyuratam, it must overfly the specific region in the South Pacific and, consequently, missiles from a sea-based platform could intercept it. Therefore, control of the sea in this area is also vital if we are to defend our satellites against Soviet co-orbital ASATs.

Mahan would probably have concluded with the observation that in the emerging space age, control of space will be the dominant element in the equation of global power, and that control of the seas will be more important than ever, since such control is necessary to guarantee our access to space or deny access to our enemies. Also, we can best defend our space assets from a few specific locations on the oceans as long as the Soviets maintain a co-orbital antisatellite capability.

Aadu Karemaa

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THE BATTLE QUALIFIED SUBMARINE WARRIOR

Our Navy currently possess 135 submarines for making war on future enemies of the United States. A major concern of our Navy's top commanders is the acquisition and retention of young officers with warrior-like traits who can be developed into top-notch submariners, -- and, with the technical, tactical and leadership capabilities which will enable them to rise to command of a submarine.

A young officer who is already a member of, or thinking of joining the submarine service must have a strong aspiration for becoming skilled as a submariner and qualifying as a warrior. The question then arises, what is a "qualified submarine warrior?"

A dictionary definition states that a warrior is "a man engaged or experienced in war." It does not say that he is a man who wears a uniform or performs military duties in peacetime -- an important distinction. An even more exact definition of a warrior is, "a person who has demonstrated in battle that he can intelligently and effectively perform his military duties under the sustained life-threatening conditions of battle."

A qualified submarine warrior then, is a man who has demonstrated his performance effectiveness as a member of the crew of a submarine engaged in battle -- where weapons were used and enemy counter-action was probable. No distinction is made here between officers and enlisted men since both are essential to a submarine combat team's effectiveness. Some of the men exposed to combat will never be warriors and are usually transferred to a tender or ashore after a patrol or two.

It is highly unlikely that any of today's submariners have fought in a battle. Yet, before qualifying as a submarine warrior, submarine battle experience must be gained as to the term "battle tested." Until tested in battle, no submariner can determine whether he has the essential characteristics and capabilities for effectively carrying out submarine duties under battle conditions.

Battle is a matter of life or death. It is the ultimate challenge and ultimate performance test imposed on a military man. Every man aspiring to become a battle-qualified submarine warrior must thus accept the fact that he may someday face the risk of death in battle. Musashi, the 16th century samurai, wrote that "a warrior is resolute in his acceptance of death." If he is not willingly to face that possibility he should pursue another profession. Even if he is willing to accept the risks inherent in combat, that still doesn't qualify a submariner as a warrior. In fact, there will be very few, if any, qualified warriors in the submarine service until a future war has progressed for a few months. The battle experience necessary for developing and qualifying a submariner as a warrior cannot be simulated in peacetime. There is no substitute for battle experience. It is essential to submarine warrior qualification. But a willingness to take risks in peacetime service is likely to produce a warrior submariner as opposed to merely a manager of a submarine.

The Importance of Battle Experience

Emphasis is placed on battle experience because of differences in the nature and importance of reliable job performance under submarine combat versus civilian working conditions. With regard to the latter, the time sequence of actions in the civilian work-place is relaxed compared to battle conditions. Human errors can normally be detected and corrected long before disasters occur. The relatively leisurely pace of civilian work is rarely encountered in submarine operations, and even more rarely in battle. A submarine crew must perform as a team, and the team - like a chain is only as strong as its weakest link. For weeks on end, with no days off for recreation, each man fulfills a vital role. He has no substitute on the beach to step in at a moments notice to replace him. In short, each crew member is required to be able to do his assigned job at all times.

An even more important consideration is the nature of the human nervous system. It has limited, but varied capabilities among human beings for handling the effects of stress, strain and shock, and the emotions of fear and terror. The shocks of battle imposed on top of the stress and strain of prolonged exposure to imagined or actual enemy threats can produce significantly adverse effects on human performance. Human minds, muscles and organs may perform erratically or not at all under combat and battle conditions. In particular, an individual's first encounter with a life threatening condition may leave him unable to think rationally or control his movements and body functions. Examples of erratic behavior by a few individuals when first exposed

to battle conditions will serve to illustrate this and show the importance of battle experience.

The Disappearing Lookout - On a dark and stormy night in the late fall of 1942, a U.S. fleet submarine on its first war patrol was cruising off the south coast of Honshu. The two lookouts stationed on the periscope shears diligently scanned the horizon with their binoculars in search of targets. Suddenly the port lookout noticed a dark smudge on the horizon. The blurry image gradually developed into a small ship heading directly toward his boat. In his mind he pictured it to be a Jap subchaser closing for an attack. A wave of panic overcame him. Without hesitation he hurled his binoculars over the side and dropped to the bridge deck. There, he silently elbowed the Junior Officer-of-the-Deck aside and quickly disappeared down through the Conning Tower hatch into the supposed safety below.

The shock of this first direct encounter with an enemy had an unpredictable effect on this man. The effect, a fear reaction to danger, was revealed only by the threatened attack on himself.

The Reluctant CO. WW II produced atories of COs who saw a heavily escorted group of ships heading for their submarine and who then ordered deep submergence rather than face the consequences of a pitched battle. In a specific case, a CO was directed to shell an enemy communication station. Apparently feeling that such action would mean a heavy response from the enemy's shore batteries, the CO laid 20 miles off the coast for over 4 days, not wanting to close to gun range and engage the enemy in a battle action.

On the Bottom Without Power - A U.S. fleet submarine on patrol in December 1942 had the mission of laying a field of influence-activated "bottom mines" in shallow waters off the Japanese port of Nagoya. The plan was to launch the mines one at a time from both forward and after torpedo tubes while operating on the surface during darkness. Water depth was about eighty-five feet. As the last few mines were being laid, radar detected a destroyer departing a nearby harbor and standing out toward the submarine. As soon as the last mine was dropped, a course was taken to head for deep water on four engines. The destroyer was then about four miles astern and rapidly closing. The only choice of action was to submerge and employ evasion tactics. Launching a torpedo attack was impossible since there was no opportunity to reload the emptied tubes.

When a water depth of two hundred feet was reached, and with the destroyer two miles astern, the order was given to dive. As soon as the submarine had submerged, a radical course change to the left was made to open out from the destroyer's track. The dive was well executed, but moments later the Maneuvering Room reported that a fire had started in the main electrical control cubicle. The room was then engulfed in smoke, making it necessary to cut off power to the Further evasive maneuvers were imposscrews. sible. The submarine was heavy and would soon hit But the destroyer passed astern, apparbottom. ently having lost contact. As the destroyer continued on its way to sea, the submarine settled on the bottom in a level condition.

"Maneuvering" at General Quarters was manned by two qualified controllermen and the Chief Electrician's Mate. It was later determined that the stressful conditions of mine laying in shallow waters, and "pursuit" by a destroyer were to blame for the personnel errors which caused the casualty. One of the controllermen in shifting propulsion power from the main generators to the battery upon diving had failed to carry out the proper procedure in shifting control levers. Thus, one of the main electrical busses in the control cubicle had been subjected to full battery voltage for a relatively long period and had become red hot. This bus was located near the top of the cubicle and close to the cork insulation on the hull. The cork soon caught fire, generating clouds of acrid smoke. Because of poor visibility and badly watering eyes, the men in the Maneuvering Room failed to quickly determine the nature of the casualty. As a result the submarine lay on the bottom without main power for a considerable time.

The main points to be observed are that under stressful war conditions: (1) a most serious operating error was made. That error could easily have resulted in the loss of the submarine, and (2) none of the three experienced controllermen, including the one responsible, had detected and corrected the error.

Fortunately, the fire was soon extinguished and the Maneuvering Room cleared sufficiently of the smoke to allow an inspection to determine that the cubicle was undamaged. The submarine was soon able to surface and resume operation.

<u>Caught on the Surface</u> - In the fall of 1943 another fleet submarine on her first war patrol was on station within about seventy miles of Truk, the main Japanese stronghold in the mid-Pacific. The submarine was patrolling on the surface at 12 knots. It was pitch dark when the Executive Officer came to the bridge. Two lookouts were on their platforms above the bridge and a third stood aft on the cigarette deck. All dutifully scanned the surrounding skies and horizon with their binoculars. The Officer-of-the-Deck and his JO, who were inexperienced in war, were seemingly standing a taut watch at the forward end of the bridge.

Shortly after the Exec arrived on the bridge he heard what sounded like the start-up of an engine. But his queries to the OOD and subsequently to "Maneuvering" received a "negative" reply. Also, an "All clear" on the SD air-search radar was received on the bridge. The engine noise persisted and grew louder. Seconds later an aircraft sped out of the darkness from the port side of the submarine, crossed over the bridge and disappeared into the darkness to the starboard The lookouts automatically headed for the side. Conning Tower and disappeared below. The OOD and the JOOD followed them down. The Exec watched the exodus, paused a few seconds to hear the diving alarm, and hearing nothing, took charge. He pressed the bridge diving alarm button, dropped into the Conning Tower and pulled the hatch closed behind him as he ordered the helmsman to put on left full rudder and increase speed to "all ahead full." Proceeding to the Control Room, he directed the planesmen to "take her to two hundred feet." As the submarine passed 160 feet the Jap aircraft completed its circle and released several bombs which exploded close aboard -- causing only minor damage.

The reactions of the bridge watch and the Exec illustrate two things. First, unexpected enemy action can make those without prior battle experience completely disregard their duties, and second, that a person with prior battle experience can often size up a dangerous situation in an instant and initiate corrective action in time to avoid disaster.

The Submarine Commanding Officer

The submarine service is quite unique in that submarines normally operate as independent units under broad instructions from geographically remote commanders. For that reason, the submarine commanding officer is a particularly key player in wartime. There is no duality of command aboard U.S. submarines. The executive officer and the department heads support the Commanding Officer, but it is the Commanding Officer who decides what, when, where and how to undertake submarine actions. Therefore, the success of a submarine in war depends in large measure on the skipper's aggressiveness, daring, fearlessness, and intelligence, plus his knowledge of his own ship and enemy capabilities and his use of effective tactics. Perhaps most of all, the success of the submarine depends on the respect and trust his officers and men place in his leadership.

Just as a person cannot become a pro-golfer solely by reading books on how to play golf, so a submarine officer cannot become a qualified warrior submariner just by reading books. A submarine officer intent on becoming a truly professional CO must pursue a combination of book knowledge, instruction and practical experience in operating submarines. Thus, it behooves one aspiring to command to learn all he can from books and more experienced personnel as he diligently performs his variei on-board duties so as to be well prepared for an ultimate command of his own submarine.

Since there is no way of gaining submarine combat experience during peace time, one may wonder if there are not some other means for qualifying as a submarine warrior. There is none, but don't be discouraged. Most of today's Commanding Officers can be prepared to go to war with a full intent of sinking any enemy warships they might encounter.

It can be observed that battle experience in WW II was valuable since there were usually about seven officers and 60 or more enlisted men in each submarine who could become submarine warriors early in their careers. As such they contributed greatly to the success of their submarines and over the next two to three years many rose to command as qualified submarine warriors.

Some Noted U.S. Naval Warriors

One can learn a great deal by reading about our naval heroes and emulating their warrior-like qualities, characteristics, capabilities and methods of fighting battles. In the period between the American Revolution and the end of the nineteenth century a number of U.S. naval officers earned the right to be called "warriors." Among these were John Paul Jones, Thomas Truxtun, Isaac Hull, Edward Preble, Stephen Decatur, James Lawrence, Oliver Hazard Perry, David Porter, Thomas McDonough, and David Farragut. None of these were, of course, submarine officers because no practical submarines existed in those days, but they were warriors, and one can learn a lot from their conduct in battle.

Battle experience builds an individual's self-confidence in being able to face the toughest of submarine situations. Dick O'Kane's battle experiences on WAHOO as noted in the January REVIEW prepared him to be the most successful warrior CO. Frank Lynch's serving with Sam Dealy in submarine battles, developed the warrior characteristic to its highest form. George Street, Eli Reich, Red Ramage, Freddie Warder, George Grider, Gene Fluckey, Hank Munson, and Gordon Underwood are a few of the WW II submarine skippers whose patrols can be studied to understand how battle experience produces the consummate submarine warrior. There are many others, of course, who contributed to the decimation of Japanese sea power. Thus, there is no intent to not describe the efforts of those fine warriors -only the limitations on length of this article prevent better credit.

The Future of Submarines

The advent of long range nuclear armed missiles, satellite ocean surveillance and communication systems, and computer aided Command Control and Intelligence systems foretells the rapid obsolescence of massive surface fleets. The future belongs to the submarine. The need for submarines and for officers and men to man them will increase with time. There is a bright future for submariners with the daring, dedication and skill to learn submarining and eventually become qualified warriors during actual combat.

William P. Gruner

A RESERVE SUBMARINE FORCE?

The utilization of our reserve submarine officers and enlisted men has been marginal. The number of submarine-related reserve billets are quite limited, with many that are available having only a remote association with the submarine community, and as easily filled by non-submarine trained personnel as by submariners.

While surface reserve forces continue to go to sea on ships and many of the air reserve forces maintain their flying status, the reserve submariners are left stranded ashore. This is a significant loss of valuable talent, training and tax dollars previously invested in these individuals. It also accounts for why many exsubmariners do not affiliate with the reserves. Reserve submariners need to periodically go to sea in submarines.

There is no question that it would be impractical and a great burden on the active duty nuclear submarine crews to incorporate reservists in their operations. What is needed are additional submarine assets. Conventional submarines assigned specifically to units for a reserve for training and drilling could fill this gap.

These submarines could be operated quite

economically and would not need any elaborate electronic equipment. The installed equipment for example could be LORAN or OMEGA units, NAVSAT receivers and ship to shore communications gear. Other electronics could be scavenged from ships being decommissioned. Since the purpose would primarily be for training and short duration operations close to homeport, they would not require large storage spaces. Two operational torpedo tubes would be sufficient with an onboard storage capacity for six or eight exercise torpedoes. An after torpedo room would be a nice extra in that it would allow experimentation and development of tactics against enemy submarines operating in groups. The torpedoes utilized could be basic straight runners. Fire control need only consist of a DRT plotter, speed strips and human computer power through a small desktop computer with appropriate software gainfully employed. The only areas where additional money might be used is in sound silencing and sonar equipment.

One of the greatest burdens to the active duty nuclear submarine force is acting as targets for the other branches of the Navy. While surface ships and aircraft practice their ASW tactics the nuclear submarines are at times forced to travel prearranged courses and depths thus providing little training opportunities for themselves and certainly having a negative effect on the the crew's morale. The creation of a reserve convensubmarine contingent could provide tional additional vehicles to offer the same excellent ASW training opportunities while freeing the nuclear forces for more important missions. Additionally, reserve submarines could provide nuclear submariners with the opportunity to practice their trade of ASW, and particularly to practice with a conventional submarine, of which the Soviets have a great many for use in war. U.S. reserve submarines could also provide an excellent platform from which swimmer delivery exercises could be performed.

Research and development sometimes finds itself restricted to the availability of platforms. A reserve submarine contingent would provide unlimited availability and at probably a much lower unit cost. Research and development need not only concentrate on hardware. A lot of work can be done in the area of tactics. Torpedo evasion and minelaying are just a couple of areas that need increased attention. The knowledge gained through the reserve force could then be passed on to our nuclear counterparts.

These reserve submarines might also provide needed work for some of our dormant shipyards. The tooling up to build a few reserve units could prove extremely beneficial should this nation find itself in a protracted armed conflict in the future. Additionally, should these reserve submarines prove to be capable vessels they might become an export item. Naturally some modifications would be necessary such as fitting them with additional torpedo tubes.

The idea of developing a new class of submarine for the reserve force has great potential. But we should not forget the number of diesel submarines currently in mothballs -- which fitted with innovative features could lead to a new class of reserve submarine. The activated diesel submarines could thus serve the purpose of a test bed to determine the usefulness of conventional submarines without the expense of new construction.

A threat to our surface ships and submarines is an enemy submarine lying in wait in shallow water at the entrance to our various ports. The reserve submarine fleet could provide a very important service, destroying such enemy threats. This is the main reason for ensuring proper sound silencing and equipping them with state of the art sonar gear. They might also be employed for minesweeping as well as minelaying in our coastal waters. In peacetime they could be effectively utilized to safeguard incoming and outgoing naval traffic.

The purpose of developing a reserve submarine force is not to serve the same functions as our nuclear force. It is to free the nuclear submarines from the mundane tasks they are currently assigned and provide them with more time devote to the tasks they are uniquely capable to of handling. In doing this we should improve retention of our submarine reservists. Additionally, our reserve submariners would do what they have been trained to do. Should armed conflict ever become a reality the reservists could more easily augment the crews of our nuclear force by being kept current on tactics and doctrine. However, the coastal protection roles they would be playing might probably make them far too important to sacrifice to the nuclear submarine fleet.

Richard D. Laning, Jr.

THE U-BOAT CAMPAIGN OFF THE U.S. IN 1942

It seems well worthwhile to recall the German's U-boat offensive in 1942 off the east coast of the United States and in the Gulf of The U-boats that came over to our coast Mexico. were mainly Type VIIs with -- according to our submarine experts -- insufficient fuel tankage to allow them any patrol time, if they got to our coastal areas at all. They theoretically didn't have the endurance or enough torpedoes to be a real threat to U.S. coastal shipping. So the United States was totally unprepared for a German offensive against mainly our oil tankers carrying oil from our Gulf of Mexico oil wells to our east coast oil consumers.

Admiral Doenitz, who planned this U-boat

campaign, had developed a group of larger submarines for carrying oil and extra torpedoes. He called them his "milch" cows. They were for resupplying his Type VIIs on station in the Western Hemisphere. We hadn't paid much attention to these logistic support submarines, merely seeing the German submarine threat as one of small, diesel attack submarines of very limited range and a small load of torpedoes.

As the Supervisor of shipments of Texaco oil products from the Gulf to U.S. east coast ports, I was highly interested as a spectator to what was happening throughout 1942 to my oil shipments. When the American tanker S/S RAWLEIGH WARNER, out of Port Arthur, Texas, was evidently lost in late June in the Gulf of Mexico, my best friend, Captain Jewel Levington, the Master of the WARNER disappeared along with his ship and its crew of 33 men -- without a trace. A cloud of smoke rising from the waters of the Gulf on June 22nd might have been from the torpedoed WARNER.

Of all the ships sailing out of the Gulf which were undoubtedly sunk by the German U-boats, the WARNER alone had no survivors or any evidence of floating debris to tell the tale of how she was lost. I'd heard rumors that there were some cases where the Nazi submariners gunned the survivors in the water to prevent their telling of how their ship was lost, but I never talked with a survivor -- and I talked with a lot -- who had seen this happen.

The sinking of the WARNER was the 18th in the Gulf of Mexico and was the only sinking not well accounted for. I did see a report which told of the WARNER carrying a cargo of "high octane aviation fuel." This might explain her loss from a torpedo-induced deadly explosion from which all of the crew were destroyed before any could launch a lifeboat or dive overboard. The WARNER was listed as ship "Number 320" in the official tabulations of Allied vessels lost since Pearl Harbor -- in the Western Atlantic. But the WARNER's loss was only a continuation of a highly successful U-boat campaign which didn't slow down until the U.S. had mobilized an overwhelming number of ASW units to confront this threat, and had started to convoy their ships out of the Gulf. Most importantly, the U.S. landbased ASW patrol aircraft brought into the war effort against the U-boats, began to deny the refueling and replenishment operation of the Type VIIs from the milch cows on the surface, and the Germans didn't have a means to do it submerged.

The toll of U.S. ships destroyed by U-boats mounted, as did the number of merchant seamen lost or missing throughout 1942. On September 18, 1942, a wire news-release said that the sinking of merchantmen the previous month had brought the western Atlantic ship toll to 471. A later release on October 22nd, announced a figure of 502 ships destroyed -- 31 ships in little over a month. Then on November 19th, the sinking totaled 572 -- 70 ships in less than a month! That meant that at about 4,000 tons per ship -- a figure used for our submarine sinkings of unidentified Japanese merchant ships -- a total of some 280,000 tons of U.S. shipping had gone down. And for the war's total to date, about 2.3 million tons of ships were sunk off the U.S. east coast alone. For this figure of 572 ships, there were 3,400 crew members and passengers declared lost or missing and over 15,000 were rescued and safely landed in Allied ports.

In checking all news releases I later found that in the month of June we lost 112 ships to the U-boats -- about half a million tons of shipping and much of it in oil tankers.

Now, I read about the hundreds of diesel submarines which the Soviets might use in a war
against the United States. I picture great numbers of them coming over to mine our coasts and shoot up our sparsely escorted merchantmen at the beginning of the war. And again, I get the impression that there has not been taken into account the probability that the Soviets have logistic support submarines to make another east coast campaign for diesel submarines more than feasible.

Ken Overton

DISCUSSIONS

ZONES OF PEACE

In the October 1987 issue of THE SUBMARINE REVIEW, Dr. Edward Lacey addresses a proposal by Aleksey Arbatov for the creation of sanctuary zones for submarines of the United States and the Soviet Union. These sanctuary zones are sometimes referred to as "zones of peace." Lacey's analysis of the reasons why such an idea is good for the Soviet Union and bad for the U.S., is excellent and should be understood by any sailor who might get involved in countering future threats aimed at jeopardizing the freedom of the seas.

There are two points I would like to elaborate on in regard to Lacey's article. First, to provide some information on Aleksey Arbatov and second, to point out that the Soviets are not the only nation proposing the sanctuary zone concept. There is some support in the U.S. for the idea.

Aleksey Arbatov has an unusually good knowledge of the U.S. Navy. He can cite model designations of naval aircraft for example, and give their specifics in commendable detail. One story about him may serve to paint a better picture of the young man that Dr. Lacey identifies.

He is in his late thirties I would say, is an attractive individual, very articulate and has excellent command of the English language. He is obviously being groomed for a major role in the Communist Party. At a meeting in Moscow several years ago, I had lunch with Aleksey during which he exhibited some of the arrogance that one might expect. I was authorized by the CNO, to extend an invitation to Aleksey, not only to meet with the CNO but also to witness our carrier operations at The only condition was that I had to go sea. along as escort. The invitation carefully pointed out that a reciprocal invitation was not required We were just interested or expected. in furthering better relations. A young rising Soviet star who knew a lot about the U.S. Navy was a prime candidate for more education, in order to help better relations. As one might expect, the Soviets could not handle such an open U.S. attitude and the visit was never consummated.

Now let me introduce another party to this zone of peace initiative. A 15 January 1988 issue of FREE PRESS INTERNATIONAL carries a lead article reporting on a recent FBI report titled <u>Soviet</u> <u>Active Measures in the United States. 1986 - 1987</u>. According to the article, the FBI report provides an alarming view of large-scale KGB efforts to undermine U.S. arms control policies and the Strategic Defense Initiative (SDI). The article also states that the FBI report, for the first time, links the "left-wing Center for Defense Information" directly with KGB disinformation.

In short, I don't believe it would be out of line to contend that Aleksey Arbatov is probably a key player in the Soviet disinformation program and that he will be a leader in pushing for sanctuary zones.

In a recent column in the Wall Street Journal dated 7 March 1988, Admiral Carlisle Trost, the Chief of Naval Operations, expressed concern about



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"zones of peace." He points out that Gorbachev addressed the subject during a speech in Murmansk in the fall of 1987 -- proposing East-West talks aimed at curtailing military activity in the Baltic, North, Norwegian and Greenland Seas, areas vital to the defense of Western Europe and the proposal Gorbachev's United States. would eliminate naval and air presence in these northern waters. Trost refers to this action as a "new peace offensive" by the Soviets. He concludes that if it succeeds, "stability will be reduced and our ability to deter Soviet aggression in Europe will be degraded." So Doctor Lacey is not the only person that thinks Aleksey Arbatov's idea leaves something to be desired for the good of the Free World.

Unfortunately, however, Aleksey Arbatov and his Soviet counterparts are not alone in their ideas for constraining the movements of submarines and other ships on and under the seas of the world. During some of the United Nations Association meetings with Arbatov's delegations, the issue of submarine sanctuaries has been advanced by the U.S. team. The objective of the U.S. arms control advocates is to take some kind of action between the two nations that will "stabilize" conditions; create a stand-off that will prevent either side from taking precipitous action, which was well described by Lacey in his article for the SUBMARINE REVIEW. There are some key people in the U.S. arms control community who are terribly concerned about the ballistic missile submarine capabilities of both superpowers and they believe that sanctuary zones may be one way of keeping things stable.

In addition to the above, there have been concrete actions by official U.S. diplomats to constrain the movements of the two superpower navies. Soon after Paul Warnke was installed in office as the head of ACDA, early in the Carter administration, a series of official meetings were held with the Soviets in the conduct of negotiations about creating zones of peace -- sanctuary zones -- in which the operations of both navies would be constrained. Fortunately, one of our modern Navy's finest gentlemen and statesmen, Vice Admiral Marmaduke Bayne, was the representative of the JCS on the U.S. team. His presence in the negotiating arena eased the concern that many of us had at the time.

Negotiations got pretty serious for awhile. The idea initially was to "demilitarize" the Indian Ocean, which had been a subject of discussion by the United Nation Association - USA in one of their projects on "Controlling the Conventional Arms Race." "Demilitarizing" changed to "stabilization" -- a more palatable term to some of the negotiators. "Ship days", ship counting and restrictions on aircraft carrier movements were included in the discussions. As I recall, one proposal would have constrained the U.S. to one passage of a carrier per year through the Indian Ocean. Put that in perspective with the operations in the Persian Gulf today, and you begin to get a feel for the long range view that the Soviets take in the business of negotiations -- and the short sighted view of some well intentioned but sometimes almost naive U.S. delegations. Fortunately, the Soviets overplayed their hand with their aggressive actions in Ethiopia and the talks broke off. Sanctuary zones died on the vine for awhile, only to be revived again by the Soviets as Dr. Lacey and Admiral Trost have described.

It is interesting that during the Indian Ocean negotiations, one key item was Diego Garcia. There had been concern by the Soviets that the U.S. would use that island in the Indian Ocean as a base for B52 strategic bombers, thereby adding another dimension to the Soviet defense problem. But according to good authority, President Carter had assured Breshnev at a dinner party that the U.S. would not take that action. So the Diego Garcia "bargaining chip" was not even available to the U.S. negotiating team.

The modern day U.S. sailor, particularly the ballistic missile submarine crewman, has a lot of people concerned about the capabilities of the weapons systems he mans. Some of the concerned are the Soviets and they will resort to diplomatic negotiations, disinformation or whatever, to minimize the impact of the capable submarine units of the U.S. However, not all of those concerned are in foreign nations. There are plenty right here at home, many of them with genuine interests and scholarly approaches to the subject. There are also some who will be used by Soviet "disinformation" programs for whatever reason.

Maintaining freedom of the seas has been a battle since the first boat hit blue water I imagine. Contests to keep those seas free will take place on the pages of our newspapers, in front of television cameras, and in the conference rooms of arms control negotiators, more than they will in battles between armed navies on the waters of the world. You have to beware the diplomatic hazards to navigation as well as those purely nautical in nature.

Jerry Miller

DON'T DISCOUNT THE CHINESE SUBMARINE FLEET

In the April 1988 issue of THE SUBMARINE REVIEW, Commander Richard Compton-Hall, RN(Ret.) gave a fascinating and insightful account of his recent visit with the Submarine Command of the People's Republic of China. I am concerned, however, that this "inside look" at the Chinese submarine fleet may have inadvertantly left the reader with a false impression of China's submarine force. Commander Compton-Hall spent a fair amount of time in his article detailing the shortcomings of the Chinese built ROMEO-class diesel-electric attack submarine which he toured. As a result, he concluded that although Chinese submariners are "very good indeed," Chinese submarine hardware "is poor." This focus on the obsolescent ROMEO-class design overlooks the significant quantitative and qualitative strides achieved by the Chinese submarine fleet since its humble beginnings.

Quantitatively, Compton-Hall states that the Chinese informed him that their submarine fleet consists of only 81 units, vice the 120 reported in the 1987-88 edition of <u>Janes' Fighting Ships</u>. Even if this is true, the Chinese submarine force remains one of the world's largest. Only the United States and the Soviet Union maintain submarine fleets that are larger. Moreover, if we consider only the Pacific basin, the Chinese submarine fleet is comparable -- at least in terms of sheer numbers -- to the submarine components of both the U.S. and Soviet Pacific Fleets.

More important than the size of the Chinese submarine fleet is the fact that it is deploying indigenously produced nuclear-powered and nucleararmed units. The significance of this technological development should not be overlooked in the West. According to Janes! and other open sources, the People's Republic of China has deployed a force of seven nuclear-powered submarines --- three HAN-class attack submarines (SSNs) and four XIAclass ballistic missile units (SSBNs). The indigenous development and production of nuclearpowered submarines is a feat thus far accomplished by only four other powers -- the United States. the Soviet Union, the United Kingdom, and France. (In addition, India has obtained a nuclear-powered submarine from the USSR, Canada has declared its intention to procure several SSNs from the United Kingdom, and Brazil has announced an indigenous SSN development program.) Furthermore, although considerably smaller than their U.S. and Soviet counterparts, the Chinese nuclear-powered submarine fleet is only marginally smaller than those of the UK and France.

The HAN-class SSN has an ALBACORE hull and an overall length of 300 feet. It has a submerged displacement of approximately 5,000 metric tons. The HAN has a single nuclear power plant, and is estimated in the West to have a maximum submerged speed of 30 knots. As Compton-Hall pointed out, the lead unit of the class took ten years to complete and was not launched until 1972. This was apparently due to problems in developing the nuclear power plant. However, the subsequent units were completed more expeditiously.

The lead unit of the XIA-class SSBN was laid down in 1978 and launched in mid 1981. The XIA has an overall length of 394 feet and a submerged displacement of about 8,000 metric tons. It has a single pressurized-water reactor and an estimated maximum submerged speed of 22 knots. The XIAclass units appear to have 12 ballistic missile launch tubes for the Chinese CSS-N-3 submarine launched ballistic missile (SLBM). (Different open sources have declared the XIA as having between 12 and 16 missile tubes, however the latest Janes' estimates 12.)

Of equal significance to the development of nuclear-powered submarines is the indigenous Chinese development of SLBMs. Only three other nations have attained this technological capability -- the United States, the Soviet Union, and France. The CSS-N-3 is a two-stage missile with a maximum range of approximately 2,800 kilometers. It is estimated to have been developed from the Chinese CSS-2 intermediate range ballistic missile. If so, it likely carries a similar payload, probably a single thermonuclear warhead with a yield of from 200 kilotons to two megatons. The CSS-N-3 was first launched from a submerged pontoon in the Yellow Sea in 1982. In September 1985, it was successfully launched from a submerged XIA-class SSBN in the Pacific Ocean.

In conclusion, although Commander Compton-Hall is quite correct in asserting that the People's Republic of China has a long way to go in bridging the "thirty year chasm" between Western and Chinese submarine technologies, we should not discount the Chinese submarine fleet. It is relatively large and deploys both nuclear-powered and ballistic missile equipped units. In short, the Chinese submarine fleet is a force to be reckoned with. It has the potential, should the Chinese political leadership choose to employ it, to play a major role in any maritime hostilities in the North Pacific and adjacent seas.

Dr. Edward J. Lacey

ZERO RANGE SUBMARINE DETECTION

Recent articles in the PROCEEDINGS and elsewhere have emphasized the remarkable quieting of nuclear submarines as they tend to make less noise than sea background even at considerable speed. The effects on our vast investment in detection systems promise to be profound within one or two development cycles.

The use of active sonar, so important in past wars, can be inhibited by the long ranges at which the pings can be detected. If this inhibition is sufficiently great, it will probably prove necessary to resort to high power jamming to reduce the advantage submarines have in passive detection of surface ships.

Various efforts directed towards non-acoustic methods of detection at a distance have so far

failed to show promise of reliable results. The rapid increase in submarine offensive power against surface ships, aircraft, and shore installations means that we may be approaching a crisis in the security of the Western Alliance. It is imperative that we study most carefully alternatives to our present approaches.

One useful method of detection and destruction of submarines is the mine field in which detection is short ranged and uses a variety of influence devices. Mine fields are expensive and most can be swept but at great cost; they are immovable and difficult to inactivate when their usefulness ends. Minefields are detectable and can often be avoided. They are usually cost effective in terms of personnel required to lay, but very costly in personnel to counter.

As illusive as submarines are becoming, man has for centuries been catching underwater things much more illusive -- things which are nonmagnetic, having no need to approach the surface and travelling at a great variety of depths and speeds. We NET fish.

In the mid-fifties, off the coast of New Jersey, a trawler captain was one morning steadily working his net toward the south when suddenly found his trawler headed north at over 20 knots -and STERN FIRST. Just before his stern went under, his net broke clear and his alarmed report reached the Coast Guard. Similarly, among its many firsts, the NAUTILUS (SSN 571) had been victim of the first netting of an SSN while on a record setting speed run from Key West to New London. As I remember, the incredulous CAPT Wilkinson lavishly entertained the trawler skipper to steady his nerves.

About a year later in SEAWOLF (SSN 575) in the North Atlantic, I was headed south at moderate speed and made sonar contact on a trawler headed north. Periscope observation confirmed sonar's classification. We were about a mile off the trawler's track and 5 miles ahead. I could see shapes hanging from his mast and wished I were'nt so ignorant of their meaning. Intuition made me reverse course to parallel his and conduct a further sonar search of the area. So I eased over for a closer look and found a duplicate of the first trawler and on the same course. Closer observation of the second seemed to show that the two were towing between them a net about 5 MILES LONG in which SEAWOLF had almost been caught.

I've often wondered how many SSN's have been netted over the last 30 years.

Though at the time I recommended that a handbook on the fishing industry be prepared for SSN CO's, I didn't insist on a study and don't know whether anyone else has felt that such information is necessary.

Instead of thinking about how an SSN's CO can avoid being caught in fishing nets, let's think about how to use nets to catch and even possibly destroy SSNs. First, each nation of our alliance has hundreds of surface craft and expert crews to haul nets through the sea -- both high seas and inshore. In most areas, there are fish traps which are essentially fixed unmanned nets. The great human effort which has been expended in netting fish has produced a great variety of nets There should be general theories of and tows. netting -- interrelating such variables 88 materials, mesh-size, strength, density, hydraulic resistance, length, depth control, cost, efficiency, speed of tow, vibration effects and recovery.

It seems logical that as a start toward developing this technique for ASW, a group of officers, analysts and engineers should cover the above and then proceed into the following areas:

- fixed vs mobile nets
- surface towed vs submarine towed nets
- submarine covertly moored fixed nets
- air dropped moored and fixed nets
- double net-towing vessels
- inshore vs deep sea netting
- using meshes large enough to pass whales but not SSNs
- RPV towed nets
- communicating detections to A/C, satellites, other SSNs
- how to prevent an SSN backout or other escape measure
- how to engulf SSN and engage its screws
- how to drag a high speed SSN down to crush depth

Once such studies have been done there should be information on which a strategic plan could be developed toward which research and development programs can be mounted and funding acquired.

It seems to me that the NAVY and possibly DARPA should now proceed briskly on this concept. The U.S. Navy Submarine Force should keep close track of developments and think of how to cope with similar approaches on the potential enemy's side.

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

VOICE LANGUAGE-CODE TRANSLATOR COMPUTER

The various strategies now being propounded for nuclear attack submarines will push them forward as far as they can go to achieve ASW and other objectives. The further they go the more likely they will run into enemy coordinated operations against them by not only submarines but surface and air units as well.

These coordinated enemy operations will require communications among their coordinating units. The simplest of such communications are by plain language voice in languages few Americans would understand. To intercept such foreign talk could be vitally important to our submariners in battle; but only if such communications are at least partially understood. The "talk" could be in any of the many languages used in the Soviet empire and Warsaw Pact Nations. And it is unlikely that we will have human translators aboard. Enemy communications could be by underwater sound channels or by various radio frequencies. Or it could be by digital code of some sort.

There are now computer programs capable of receiving digitalized spoken words and translating them into written words. There are computers which can translate from one language to another. And this can include coded language. Such computers are dropping in price at an amazing rate. Soon optical and solid-state discs can contain billions of bites of information storage which is rapidly available on request.

It is recommended that each tactical commander be equipped with a computer which can receive any intercepted voice communication or code and translate it to English on a screen and on a printer. A date time group and bearing of the transmission and other pertinent information could be permanently stored for further tactical or crypto analysis. The language used in translation should be selectable, even if only by trial and error.

The terminal readout should be immediately available to the CO even if some parts are screened by expert communicators. Also, these translations of enemy voice communications should be made available to all tactical commanders, not just SSN CO's.

Possibly, the computer envisioned here would be of such power that it could also satisfy the growing awareness of the need for computer-stored tactical doctrine.

Many of our potential enemies speak our language but few of us speak theirs. This system would thus partially remove this disadvantage. It might also prevent the enemy from using the most advantageous kind of real-time tactical communication -- voice, in his native tongue.

One feels very stupid and mystified when listening in on foreign language communications CAPT R. B. Laning, USN(Ret.)

SUBMARINE AUTOMATION

A very stimulating and excellent dialogue has been initiated in THE SUBMARINE REVIEW on the topic of submarine automation. The first article by John S. Leonard appeared in the April 1987 issue. Mr. Leonard felt that automation in submarines was long overdue and well behind the power In the October 1987 issue, LT Mark curve. rebutted Mr. Leonard's position. This Gorenflo was followed by a series of open-ended questions by VADM Jon Boyes who seemed to lean towards the need for more automation and referenced his earlier article on "Flying the ALBACORE" in the Without further summary, my April 1987 issue. intention is to continue the dialogue with my experience with an automated submarine control system.

In the late Spring of 1977, USS LOS ANGELES (SSN 688) deployed to the Mediterranean with an automated ship control system. To my knowledge, specific system testing, evaluation and training had been minimal. However, through the efforts of our Ops/Nav Officer, the system was studied and put to use. The automated control system allowed for the input and adjustment of course, depth, turningrate limits, depth-rate (change in depth) limits and a band width for these parameters. For example, for periscope depth, an appropriate depth would be set with a narrow band like +/- 1 foot and a relatively high depth-rate would be allowed. When the OOD gave the order to proceed to periscope depth, the execution button put the order into action. The ship responded with precision, didn't broach and didn't hang up below the surface. Once at periscope depth, the 1 foot band was meticulously maintained.

The basic conclusions I would draw relative to system performance are identical to those stated by VADM Boyes in "Flying the ALBACORE." The automated system outperformed the human counterparts in every area at all times.

There were some lessons to be learned from our experience. After operating in fully automatic control for a period of time, it was found that the helmsmen and planesmen had lost the skills necessary to control the ship, even though these watches had been continuously manned during automatic control. While it only took a short period for them to regain their proficiency, this loss of skill remained an unsatisfactory byproduct. We next tried operating the system in an aided mode. The aided mode simply showed the operators where the system would put the control surfaces if functioning. The operators had to position them normally. The aided mode quickly became an exercise in following the computer. Again proficiency fell off. Finally, we began operating without the system. If, during the first 5 hours of a watch the helmsman and planesmen proficiency was good, then the last hour of the watch was in automatic control. Now there was incentive for the ship control party to maintain and demonstrate proficiency on every

watch.

A significant advantage of the automated system, one that VADM Boyes mentioned briefly, pertains to its effect on sound quieting. Particularly at high speeds, control surface motion can generate noise and cavitation. The use of an automated control system, however, keeps motion to a minimum, particularly when a wide control band is permitted. This translates to a lower hydraulic fluid usage and less noise from the hydraulic power plant.

Any submariner could list many examples when employment of an automated system would be useful, if not essential. The error-free transition to periscope depth is one example. Consider another situation. A minor case of food poisoning leaves half the crew sick and in bed for a few days. A skeleton watch section is used to cover the duty on a port and starboard basis -- to pull the submarine through. An automated system manned by a single operator would be ideally suited for that situation.

After the Mediterranean deployment, USS LOS ANGELES went into PSA and the system was disconnected, although it remained onboard. T currently do not know to what extent later 688-Class hulls or TRIDENTs have an automated system -- but if not, it is long overdue. While I disagree with the revolutionary manning scheme proposed by Mr. Leonard, an automated control system has a place on the submarines of today. In fact, if we are not providing the submarine commanding officer with this valuable tool, we are unnecessarily limiting his ability for precise ship control, particularly when the ability to fight his ship may depend on it.

Ken Hart

LASER COMMUNICATIONS WITH SUBMARINES

[Ed. Note: The development of laser communications with submarines is getting increased emphasis as submarines realize their capability for joint operations with surface and air units. The requirement for real-time communications involving large volumes of information, places a premuim on this means of communications -- if successfully made operational. The information on lasers included here is taken from a paper developed by Dr. David Friewald of the General Dynamics Laser Systems Laboratory, San Diego.]

The right color for satellite or aircraft laser communications through seawater to a submarine, depends upon the laser beam's penetration of seawater and having a very narrow band filter/receiver on the submarine so as to have a high signal to noise ratio.

The transmitter, according to Figure 1, should best transmit a blue light with an approximate wave length of 4590 Angstroms. This sort of beam, as shown, is least absorbed by seawater and should arrive at a deep submarine with sufficient intensity to convey to the submarine's receiver a considerable amount of information in a very short period of time.

The two main transmitters which produce about 4600 A^O light beams are the Xe/CI Raman gas laser which produces a blue beam of 4593 A^O, and the Nd:YAG doubled solid state laser which produces a blue-green beam at 5320 A^O.

The receivers on submarines are either the CsARF (Cesium atomic resonance filter) which accepts only a narrow band (10 milli A^O) of blue, centered at 4593 A^O, or the tuned quartz filter/receiver for the 5320 A^O beam which accepts a beam about 1 A^O wide -- about 100 times wider than the Cesium filter/receiver. However, such factors as atmospheric scattering, variations in seawater, etc., make the blue Raman gas-laser at least 30 times better than the solid-state blue green laser and about 100 times better on the average.

The present satellite laser communication program is consequently baselined for the Raman gas laser transmitter and the Cesium filter for the submarine receiver. This allows for transmission of a blue laser beam at the general area where a submarine might be and the sub can pick up the transmitted communications in real time.

It is desirable to have different colors for the up and down links, and significantly, only one kind of laser beam receiver is needed per submarine.



A BLUE-LIGHT (4590A°) LASER SYSTEM IS BEST FOR TALKING THROUGH SEAWATER



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SPACE/AIR-TO-SUBMARINE LASER DOWN-LINK COMMUNICATIONS

- The transmitter laser beam propagates most of the way before hitting clouds.
- The beam is partly scattered and reflected by clouds, and partly transmitted thru clouds to the ocean's surface.
- Some "bloosing" then occurs in the seewater with_scattering close to the receivar.
- o Sunlight has a similar experience.
- The submarine's receiver sees about a 50% signal, and 50% sunlight (noise).
- o with a narrow band filter on receiver, the signal-to-noise ratio is high.
- o The down-link can be continuous from high orbit estellites and in real time, giving an unscheduled communications capability.



SUBMARINE-TO-SPACE/AIR LASER UP-LINK COMMUNICATIONS

- The transmitted signal beam is scattered by seawater before even entering the atmosphere. The deeper the sub the more blooming.
- The signal is additionally scattered and partly reflected by clouds. Thus only a small part of the signal reaches the receiver.
- o In addition, reflected sunlight also reaches the receiver. The receiver sees about 90% sunlight and 10% signal. Hence the signal-to-noise ratio is low compared to the down-link.
- o The up-link laser beam fights unattenuated sunlight, while the receiver in the aircraft must be pointed at the sub to work at all. Thus all up-links must be scheduled and the sub must be shallow. Use of the up-link poses a threat to the submarine's security.



A BIT OF HISTORY

Joe Pursel writes: "With 18,000 ton, 425 foot TRIDENTs poking holes in the ocean, I often recall COMSUBLANT Freddy Warder's memorandum when I still hear these submarines referred to as "boats."

MEMORANDUM FOR ALL COMMANDING OFFICERS, SUBLANT

6 September 1958

Do you drive a "Tin Lizzie?" Whether you own the latest, smartest, most "ultra" car on the road, or an older, "practical and dependable" one, you would probably bear a bit of resentment against anyone calling your "pride and joy" a "Tin Lizzie." The term was at one time in rather common usage when referring to Henry Ford's early \$295 models.

As you have guessed, there is a parallel here. I have been carrying on a campaign to stop people from calling our submarines "boats." I have been in this outfit long enough to realize that I could put out directives until I am blue in the face and still not stop people from saying "boat." It is almost like legislating against someone talking with a southern drawl or a midwest twang. We talk this way through years of habit. We say "boat" also from years of habit. As you know the term is derived from the name of our early submarines, "torpedo boats." These were elementary small craft that were incapable of sustained operations at sea. It was a feat to surface them after diving. They could be hoisted from the water by cranes on the dock or aboard other ships, thereby meeting the definition of "boat." These early torpedo boats are a far cry from the fine submarines you operate today. It is my personal feeling that the submarine is the most feared and respected combatant in the world.

I certainly realize that most of our men use "boat" without any inference term of the degradation or belittling. But unfortunately people outside our service do not understand that we call our submarines "boats" more as a nickname than with genuine pride. Most people know that a boat is something less than a submarine. It is therefore inferred that since we operate a fleet of boats we are small potatoes and not deserving the designation of being on the first team. I know that this feeling many times colors the thinking of highly-placed persons -- sometimes possibly to the disadvantage of the submarine force.

I request that you, your officers and crew, refer to our submarines as "submarines" but not as "boats." If we set the example by spoken and written word, I believe that we will in time educate the rest of the Navy and the civilian populace.

F. B. Warder

SUBMARINE RAD PROGRAMS

I have read, with great interest and dismay, the Editor's comments in the January 1988 SUBMARINE REVIEW concerning the Navy's submarine R&D programs and I take exception to his attack on the developmental decision to build the next generation of submarines with a single hull.

We know just how difficult it has been to get the SEAWOLF project moving. In the current austere budget environment holding on to that project will be extraordinarily difficult. Every swipe at that plan will aid those opponents of the submarine force in achieving a delay in the delivery of the SEAWOLF.

Drawing from my command experience I can confirm the current sustained capability of the 688 class submarine well into the 1990's. However, the SEAWOLF must come on line as scheduled. Any motion put in place to re-think or re-justify the SEAWOLF construction will significantly hazard the delivery of a well planned and supremely capable warship.

I have read THE SUBMARINE REVIEW from its inception. I was under the impression that one of the goals of the Submarine League has been to work with and support the Submarine Force within the limits of the charter. In that context I do not understand the Editor's stand in support of those on the "Hill" who have a "better idea." I only hope that this editorial does not give any of those congressional staffers food for thought in that they might aggressively re-attack the SSN-21 design.

J have a better idea! I submit that the Submarine League must provide 100% support backing the decision to build SEAWOLF now, as designed. CDR R. E. FRICK, USN

[President's comment -- The NSL Directors, speaking for the great majority of NSL members, whole heartedly support the SEAWOLF concept design and construction program. However, in so doing, the SUBMARINE REVIEW must remain as a forum for ideas and discussion to help focus submarine issues. The following letter from Admiral Long to Congressman Hunter firmly states the NSL position on SEAWOLF.]

14 April, 1988

The Honorable Duncan Hunter United States House of Representatives Washington, DC 20515

Dear Representative Hunter

The Naval Submarine League is an organization principally comprised of U.S. Navy active duty and retired submarine officers and individuals of the civilian and business communities interested in the submarine service.

The Naval Submarine League was formed to accomplish the following:

a. Encourage mutual understanding and a close working relationship between American Society and those United States Government segments responsible for the acquisition and employment of submarines.

b. To promote greater liaison and communications among the military, academic and business communities on issues concerning United States submarines, and,

c. To provide a forum wherein the views and perceptions of the membership can be focused and examined.

The NSL publishes a quarterly professional magazine to provide information in support of the above objectives. The articles in THE SUBMARINE REVIEW necessarily express the various views and perceptions of the individual authors and are published in an effort to encourage an open dialogue of submarine matters. This dialogue is felt to be a constructive element in the overall effort to help maintain the superiority of the U.S. Navy Submarine Service.

The NSL is not chartered as a lobbying organization and therefore refrains from expressing views unless specifically asked and a degree of expertise can be established to make our views creditable.

Notwithstanding the above, the NSL Directors and I firmly believe the NSL membership desire to state their strong support for the SSN-21 design and for the production of the SSN-21 submarine itself. These views have been discussed and reinforced at various meetings and symposia of the League. Many of our members are quite knowlegeable of the threat, others are experts in various facets of design and production. The integration process pursued by the Navy which resulted in the SSN-21 design has been professional in approach and realistic in product. I believe the SSN-21, 88 presented to the Congress, is necessary, achievable, demonstrable, and more important, is responsive to the emerging improvements observed in the Soviet submarine force.

In summary, the NSL Directors and Members are pleased to endorse and recommend the SSN-21 submarine program as presented to you. This letter is written in response to a question you asked during a Congressional hearing which asked the position of the NSL vis-a-vis the SSN-21 submarine program.

Sincerely

/s/ R. L. J. Long Admiral, USN(Ret.) Chairman of the Board, NSL

Copy to: Chairman C. E. Bennett Sea Power Subcommittee, HASC

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JANUARY'S EDITORIAL

Just read the January issue of THE SUBMARINE REVIEW, and have congratulations for another fine job. The editorial is a lucid exposition of the situation and a cultivated way of illuminating the need to help.

John Leonard's letter on Frank Lynch was welcome --- and a fitting complement to the editorial. No tunnel vision in Frank's thinking.

Henry Payne's paper on hydrodynamics is an excellent tutorial for all submariners. More to come?

The REVIEW has a creative and thinking source of authors in the submarine community, and is doing a great job in turning them on!

Charlie Bishop

NEW IDEAS?

It has been my hope in writing for the REVIEW to seed the community with ideas of possible use and to incite more contributions from younger people closer to the real action. I think there has been a fine increase in such contributions and hope the trend will continue. As I use up my ideas of relevance I hope to be replaced thoroughly.

There is much remaining for the LEAGUE to cover and to do. Much credit is due you people at the top for what you have accomplished.

Dick Laning

THE MK 18 TORPEDO

I was doing some research in Westinghouse torpedo history since this is our 50th year in Defense work, and found a couple of things of interest.

Westinghouse started on MK 18s in early '42 and delivered the first copies of the MK 18 in July. Production quantities came off the line in early '43 going to 400/month by December 1944, along with 50 or more MK 28's/month.

A single torpedo was paid for by check to the U.S. Treasury in the amount of \$6,3301

The letter from the Chief of the Bureau of Ordnance is but one of many which he sent to "exhort the troops." I found two MK 18's I had fired in one of his letters of 1945.

"To: The Men and Women of the Westinghouse Electric & Manufacturing Company

Westinghouse torpedoes have scored again. In recent action in the Pacific, Mark 18 torpedoes Nos. 54036, 54199 and 54188 hit and sank a 5,700 ton Jap freighter; torpedo No. 53557 sank a 1,000 ton cargo vessel; torpedoes Nos. 52282 and 54108 hit and set afire a 5,000 ton freighter; and Nos. 53950 and 53959 hit and damaged a 5,500 ton freighter.

Thus do Mark 18's continue to play their important part in the all-out effort to destroy Japanese shipping in the Pacific... RADM G. F. Hussey, Jr., USN." M. D. Rindskopf

A HEALTHY EXCHANGE OF VIEWS

As a naval historian in Vietnam, I too often observed the stretching of history, the dressing up of what happened, in order to enhance one's own personal record or, parochially, one's service.

We were losing the war in subtle ways. In 1970 and 1971 you wouldn't know it from the sitreps. The dream war floated on those dispatches. Reality was elsewhere.

My conclusion is that critical analysis --that may appear negative in suggesting ways things are less than perfect -- is necessary to win. Service enhancement may not be the only "good;" defending one's country may be a "better."

The style of the SUBMARINE REVIEW is a case in point; a healthy exchange of views is stimulating, hence readable, especially in controversy, and creates the kinds of reconsiderations necessary to keep the questions open. Readiness before some big war has got to be a higher priority than skin burns accrued in a heated debate. Let's argue it out, but do it in the REVIEW. The case is easily made for relevant dialogue -- in the open for all.

In an age when we don't hold all the cards against the "enemy," open discussion has got to continue to be one of our long suits. Let's not disarm ourselves by dousing the fires of controversy.

Keep writing the hot-headed letters to the Editor. That is a most patriotic way to help submarines and your country.

Ironweed

IN THE NEWS

o The Navy Times of 9 May, 1988, reports on the battery explosion sustained by the BONEFISH on 24 April, 160 miles off Cape Canaveral. Three of the crew died as fire raged in the battery compartment and smoke filled the 29-year-old diesel submarine. BONEFISH, like the ALBACORE, is one of the four remaining conventional submarines in the Submarine Force. The stricken sub was towed back to her home port of Charleston, S.C. "Sailors from the BONEFISH", according to the Charleston News Courier, "attributed the explosion and fire to a leaky valve that let sea water run into the submarine and seep into the battery compartment." The survivors were transferred from the main deck of the BONEFISH to the aircraft carrier KENNEDY by helo, and to the frigate CARR by motor whaleboat.

o VADM Lawson (Red) Ramage, as the oldest qualified submariner, cut the birthday cake at Washington's Submarine Birthday Ball on April 12th. He was then specially honored by VADM Bruce DeMars for his exploits leading to his award of the Congressional Medal of Honor. His citation noted that as CO of PARCHE in an attack on a Japanese convoy July 31, 1944, "he penetrated the screen of a heavily escorted convoy -- delivered a orippling stern shot into a freighter -- then with bow and stern torpedoes he sank the leading tanker and damaged the second one. With shellfire passing overhead, he struck again, sinking a transport. He then calmly ordered his men below. Avoiding a ram by a fast transport, he launched three torpedoes in down-the-throat shots at a transport dead ahead, scoring a killing hit as a climax to 46 minutes of violent action with the PARCHE."

o In the <u>PROCEEDINGS/Naval Review 1988</u>, Norman Friedman discussed three new small submarine propulsion systems -- fuel cells, closed cycle engines and a small nuclear-reactor SSn to relieve "the loitering load on the battery." Friedman says of the latter, "Canada might find the SSn attractive because a submarine so equipped could cruise (albeit at very low speed) under the ice for a protracted period." For the second alternative, relative to the Stirling engine being pushed by Kockums of Sweden, he says, "Earlier closed cycle engines were intended to provide dash power, so they were relatively large and used large volumes of fuel and oxidant. Kockum's system is the opposite -- a small engine allows the submarine to loiter without exhausting its battery or giving away its position by snorkeling."

o Relative to the first alternative listed above, <u>SUBNOTES</u>, April 1988 says that a West German test submarine, the U-1 of 450 tons has been "converted to accommodate a fuel cell power system." Sea trials on this submarine propulsion system will commence soon. "With the fuel cell providing direct current from the oxygen-hydrogen chemical reactor, submarines will be able to approach the endurance of nuclear submarines but at a much reduced cost when the concept is fully developed."

SUBNOTES, April 1988 also notes that the 0 Soviet CHARLIE-class missile-carrying SSN leased to India, will be for training only. This is evidently in preparation for the sale of four SIERRA-class submarines to India, starting in 1991. An update in SUBNOTES of U.S. Submarine Force "items" lists: "Today's U.S. Navy submarine forces account for 38% of the Navy's combatant ships, 20% of the budget and 10% of its personnel. There are 98 SSNs in service. About 75% are highly quiet 688 and 637 submarines. Twenty-one submarines are currently equipped with TOMAHAWKS. About 75% will be certified for this weapon system by 1991. The SEA LANCE ASW standoff Mk 50 torpedo, missile-carried weapon is scheduled for first test flight in July 1989."

Jane's Defense Weekly of 22 January, 0 shows a photograph of the anechoic tiles attached to the hulls of British SWIFTSURE-class SSNs. "The SWIFTSURE class are already noted as being among the quietest SSNs in the world and therefore the newly fitted tiles can only enhance their "Sources" indicate that effectiveness. HMS SUPERB "was pitted against two U.S. Navy STURGEONclass SSNs in what is described as a simulated attack under the polar seas. According to the sources, SUPERB was not detected once throughout the exercise, even when the Americans went on active sonar." In the same edition of Jane's Defense Weekly, Admiral of the Fleet, N. I. Smirnov, it is noted, says that "although 375,000 (3-year) conscripts in the Soviet Navy should have mastered Russian by the time they leave school, this is not so in practice."

o Jane's Defense Weekly of 13 February notes that Taiwan commissioned the SEA DRAGON --its first submarine in 15 years. And that a second, the SEA TIGER will commission later this year. These submarines are based on the Royal Netherlands Navy's SWARDVIS-class, "but Taiwanese boats have four high frequency sonar-intercept arrays mounted on the bow-casing as the prominent distinguishing feature."

o <u>NAVY-NEWS & Undersea Technology</u> of 28 March says that the Defense Advanced Research Project Agency (DARPA) "will receive \$114 million in FY 1989 to continue the advanced research program established by Congress last year." The language in the defense authorization bill "stipulated that the \$114 million can be used only for basic research, exploratory development and advanced technology development of hull, mechanical and electrical systems for submarines.

o <u>NAVY NEWS & Undersea Technology</u> of 28 March, reports that the House Armed Services research and development subcommittee, believing

that the small Mk50 torpedo "does not pack enough punch to sink Soviet submarines", is directing DARPA to spend \$10 million in FY '89 "for a program to develop an advanced lightweight torpedo." The new torpedo should: "use the latest technology in high-speed, high-density integrated circuits; be able to penetrate and deliver worthwhile impact payload; be silent enough to not give away the ship or aircraft that launched it: use innovative guidance, power and control technologies which will result in a large payloadto-weight ratio; incorporate revolutionary technologies; and be capable of integration with existing programs, looking at advanced warhead concepts and new homing techniques."

o In the April 11 issue of <u>NAVY NEWS &</u> <u>Undersea Technology</u>, RADM Richard Macke, Commander of the Naval Space Command, said that using stateof-the-art technology, submarines could launch anti-satellite weapons as large as TOMAHAWK from their vertical launch tubes -- and "take out enemy ocean surveillance satellites that can target U.S. Navy ships at sea." Macke sees Navy sea-based anti-satellite weapons as usable from three-fifths of the Earth's surface -- the oceans of the world -- and a good "adjunct to a national ASAT capability."

o An article by Senator Dan Quayle in the Journal of Defense & Diplomacy, discusses, in part, the role of submarines using conventional land-attack cruise missiles -- SLCMs. Using these missiles: "Some land attack missions, in fact, may not absolutely require a carrier. In the case of Libya, if we had had enough conventionally-armed land-attack cruise missiles of the right range, with the right targeting information, we might not have needed as many manned aircraft -- and conceivably none at all. Submarines will be critical to enable us to get safely within range of targets such as Backfire bomber bases and key air defense complexes." The latter thought, Senator Quayle feels, is because "it may be necessary for the Navy to consider attacking Soviet naval bases, simply to maintain an adequate level of air defense for our fleet."

The Washington Post of 3 March had an 0 article by George Wilson telling of the Navy's SEAL force having 15 mini-submarines "for sneaking in and out of unfriendly places." There are twoand six-man versions of the minisub -- with speeds up to 6 knots. The two-man sub is a wet version with its crew wearing scuba gear. The six-man sub is dry inside. These minisubs "are carried in compartments atop large nuclear-powered submarines," like the converted SSBN, JOHN MARSHALL. General James J. Lindsay, commander of the U.S. Special Operations Command says these minisubs "can plant a magnetic bomb on the bottom of an unsuspecting ship in a harbor and sneak SEALS, or other commandos, onto hostile beaches for counter terrorist missions."

o NAVY-NEWS & Undersea Technology of 2 May, describes the amendment to the FY '89 defense authorization bill, introduced by Representative Robert Torricelli, which would initiate a program "to encourage U.S. shipyards to construct combatant vessels including diesel submarines for nations allied to, or friendly with, the United States." Torricelli notes that his amendment is "Specifically aimed at promoting diesel submarine construction because the Navy has intimidated U.S. shipyards into not building these ships." (Israel and Egypt have been forced to use U.S. military assistance funds to build subs in Holland and Germany). Torricelli notes that although his district has no shipyards, as a member of the Foreign Affairs Committee he is "troubled by our voting military assistance funds to other countries" (which could be spent in the United States). Torricelli adds, "No one is going to propose that we go back to building diesel submarines for the United States Navy. That debate
was settled years ago. That is a senseless concern on the part of the Navy." But that, "the Navy is exhibiting its past paranoia and is fighting the amendment. The Navy should share our concern that we have been reduced to two shipyards that can construct submarines. I see this as a way to create a mobilization capability for a national emergency." Although the shipbuilding industry is aware of Torricelli's amendment, he notes that "Private companies do not want to express an interest in this for fear of retribution from the Navy."

o Admiral Carl Trost, the Chief of Naval Operations, in an article in the Wall Street Journal of 7 March, tells of Soviet leader Gorbachev's initiative to create northern "zones of peace" as part of "a peace offensive." Admiral Trost sees this proposal as a means to possibly undermine NATO's successful deterrent strategy for Northern Europe. He feels that the curtailing of military activity (eliminating naval and air presence) in the Baltic, North, Norwegian and Greenland Seas has widespread appeal in Western Europe. But European leaders have expressed concern that any such maritime accord would work to the advantage of the Soviets. "Acquiescence to the Soviet proposal," Admiral Trost notes, "would sacrifice one of the West's greatest competitive strengths. NATO absolutely requires use of the high seas and international air space for reinforcement and sustainment. The Soviets, deeply concerned about our effective forward strategy. seek to obviate it through negotiations." If Gorbachev's "zones of peace" initiative succeeds, "stability will be reduced and our ability to deter Soviet aggression in Europe will be degraded."

o <u>The Naval War College Review</u>, Spring 1988, describes the Soviet's Naval Spetsnaz forces. "Each of the four naval Spetsnaz brigades would field approximately 100 small, five to

twelve-man teams in wartime. They most likely would be infiltrated to their target locations prior to the initiation of hostilities. Minisubmarines (manned by Spetsnaz members) would be transported to their target area on conventional submarines or surface vessels. The priority naval Spetsnaz wartime mission is the destruction or neutralization of enemy seaborne nuclear delivery capabilities and support facilities. Their targets would be U.S., French and British SSBNs. sea-launched cruise missile platforms, our submarine bases, nuclear weapons storage facilities and associated command and control nodes. The personnel manning the Spetsnaz brigades are extremely reliable, well trained and highly motivated. They are divided into teams of assassins, combat swimmers, paratroops and mini submarine crews for operational employment. As the Soviet Navy continues to grow into a blue-ocean power, the potential military leverage provided by its naval special operations forces may substantially increase."

o <u>National Defense</u>, April 1988, notes that "Brazil has confirmed its plan to develop a nuclear submarine of indigenous design. The estimated price tag for development and construction of the lead vessel would be around ten times the funding spent so far on the program. South Africa has also begun to develop submarines of indigenous design -- but of the diesel-electric type."

o <u>The Daily Press</u>, 13 March, reports that according to RADM William Studeman, testifying before the House Armed Services seapower subcommittee, the Soviets have stopped sending YANKEE SSBNs to patrol off the Atlantic coast of the U.S. and are diverting them to European waters instead -- to compensate for the loss of land-based SS-20 nuclear, intermediate-range missiles targeted against Europe which will be eliminated under terms of the new arms control agreement between the U.S. and the Soviet Union.

o <u>NAVY NEWS & Undersea Technology</u> of 21 March, in an article by Frank Elliott, discusses the speed of the Soviet's new AKULA-class submarine. The AKULA appears to be a scaled-up ALFA which makes at least 42 knots, some analysts believe. They feel that "given the same technology that the ALFA demonstrated 20 years ago, it (the AKULA) is definitely a 40-knot submarine."

o Aviation Week & Space Technology/March 21, 1988, notes that the Soviets renewed their claim "last week" that they have a means to detect and will verify deployed nuclear-armed sealaunched cruise missiles on submarines and would demonstrate this capability to the U.S. -- without an on-vessel inspection. Secretary of Defense Frank Carlucci agreed to examine any Soviet verification proposals, "but voiced doubt that a one-time experiment could demonstrate foolproof reliability."

o <u>Navy Times</u> of 4 April reports that the House Armed Services Committee liked what they've seen about the TRIDENT II ballistic missile. "Of all the strategic weapons programs we have looked at," Representative Lee Aspin said, "I would give this one the highest marks." Aspin noted that "it is important to highlight weapon system success stories because the failures are so well publicized. If you don't report the successes, it gives the inaccurate impression that none of the stuff works." The first TRIDENT IIs are scheduled to be sent to the fleet in December 1989.

o Commander Joe McGrievy, USN(Ret.), past national president of the SubVets of World War II, reported on the ceremony rededicating a refurbished Memorial to the submarines and submariners lost in WW II, at the Pearl Harbor Submarine Base. Joe, as one of a 3-man ad hoc committee, put the Memorial back into first class condition, and ensured that the names on the plaques were at least "99.9\$" accurate. Over 300 attended the ceremony.

o A news release from <u>USD'88</u> announces that Captain Roger Venables, Royal Navy will be Keynote and Banquet Speaker at the Under Seas Defense '88 Exposition & Conference, to be held in San Diego 3-6 October 1988. CAPT Venables is presently Captain (S/M), First Submarine Squadron at HMS DOLPHIN, Gosport, UK. His command includes ten submarines and the Royal Navy Submarine School, which includes the "Perisher Course" for future submarine CO's. He has served in submarines since 1956, has held two commands, including CO, HMS RESOLUTION (SSBN). He also has been British Naval Attache in Bonn, West Germany. His keynote address will stress the importance of allied cooperation in meeting the ASW challenge.

This is the second annual Under Seas Defense expo and conference. For exhibits and attendance information, please contact USD'88 at P.O. Box 368, Spring Valley, CA 92077. Tel: (619) 465-2262. Tlx: 530111.

USS CLAMAGORE (SS-343) REUNION

USS CLAMAGORE Veteran's Association will be holding their 5th Reunion on October 28-30, 1988, in Charleston, SC, at Patriot Point Naval and Maritime Museum. For information, please contact:

Paul Wm. Orstad	or	Charles D. Bass
30 Surrey Lane		560 Cypress Lane
Norwich, CT 06460		St. Marys, GA 31558
(203) 889-4750		(912) 882-3589



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Newport News Shipbuilding

BOOK REVIEW

STRATEGIC ANTISUEMARINE WARFARE AND NAVAL STRATEGY by Tom Stefanick, Institute for Defense and Disarmament Studies, 1987, Lexington Books, D.C. Heath and Company, Lexington, MA.

This book by Tom Stefanick is probably the best thing to date on this subject and is a very valuable reference work for those who need to understand the value and risks of strategic ASW. including our political decision makers who should find this book of considerable value in making determinations on such concepts as "zones of sanctuaries, SSBN war termination. peace", stability of sea-based strategic systems, potentials for escalation to nuclear war -- even the relation of strategic ASW to the present INF Treaty.

It should be made clear, if any real doubt exists, that strategic ASW implies antisubmarine warfare against strategic submarines, i.e. those submarines which could be used to deliver weapons against homeland objectives of the enemy. Although Stefanick focusses on ballistic missile submarines -- SSBNs -- much of his rationale might apply to attack submarines using 1600-mile landattack cruise missiles against targets in an enemy's homeland.

The first half of the book is devoted to generalizations about strategic ASW and where it leads. The reader may, at times, see big question marks relative to the technology supporting these generalities made by Stefanick. But the second half of the book -- eight appendices -- are available to resolve the major technological questions.

Stefanick's bibliography for his technological explanations appears to be well chosen and carefully sifted. His references for his philosophical conclusions are also impressive, so nuch so that his book should be a primary reference book for those who would want to understand and write about submarine ASW matters.

There are areas of Strategic ASW technology which are not well covered such as: the survivability of SSBNs from various types of weapon attack; the character of weapons likely to be used; the impact of the SSN's land attack, nuclear-warhead cruise missile on the strategic ASW problem; the use of nuclear warhead torpedoes; countermeasuring of ASW weapons; and the effect of drag reduction on submarine characteristics.

Stefanick's strategic ASW subject, however, is so well researched and thougt out that the few unresolved questions arising from a few underdeveloped areas should not seriously affect the conclusions which Stefanick has derived.

He sees strategic ASW as a practical strategy for the U.S. -- to tie down a considerable portion of the Soviet's sea assets, for damage limiting if war eventually went to strategic nuclear 8 exchange, to free ASW forces from the constraints of having to clearly identify SSBNs from other submarines, to deter strategic war and to provide a form of leverage by making the Soviets go defensive. But he feels that: the U.S. should place little reliance on strategic ASW as a means for war termination; that strategic ASW during a conventional war does not make Soviet use of nuclear weapons more likely; that treating Soviet SSBN patrol areas as sanctuaries would not decrease the risk of escalation; that there are very large uncertainties in predicting the results of undersea combat between submarine fleets; and that the cost of strategic ASW is greater than the cost of countermeasures.

At the beginning of his book Stefanick makes it clear that the strategic ASW for the U.S. and

the Soviets is not a "mirror image." The U.S. assumes that our very quiet SSBNs can best be operated independently in the vast reaches of the oceans, wherever, and their main protection is their covertness and considerable mobility to avoid enemy ASW threats -- and lately to have a weapons capability to counter the enemy if attacked. On the other hand, the Soviets are believed to accept the likely detectability of their SSBNs by enemy ASW forces, particularly SSNs, and hence use a "bastion" concept for employment of their SSBNs in limited havens, close to their homeland -- even bastions which are under the Arctic ice. Additionally, it is recognized that the Soviet SSBNs will require the protection of other ASW units -- submarines, mines, surface ships, aircraft, even satellites -- to ensure their survival in war. This is felt to give certain advantages to the U.S. from their strategic ASW efforts in that Soviet SSNs would be tied down in the SSBN protection role along with other assets thus reducing the threat to U.S. aircraft carriers and the Allies' sea lines of communications. Also, the Soviet SSBNs would be confined to small areas which could be swept rapidly -- while Soviet SSBN mobility would be of little value in avoiding SSNs. But at the same time, the Soviet's paramount emphasis on SSBN protection, Stefanick feels, makes the U.S. interest in strategic ASW perhaps of more risk to U.S. submarines than what might be gained by a deliberate offensive against Soviet SSBNs in their bastions. He sees their SSBNs escorted to their bastions by warships using active sonar. Then he sees a use of diesel-electric submarines, mines, non-acoustic as well as acoustic sensors, and other active acoustic platforms as forming a formidable barrier against U.S. SSNs penetrating into the bastions. Once inside, he feels, our SSNs wold be subject to counteractions which might even result in mutual destruction -- i.e. the target or escorts going active when a torpedo was fired; a different submarine than the target

firing a countering torpedo; nuclear-warhead torpedoes used to counter our SSNs; etc. The latter's possibility Stefanick sees as good. He notes that there are strong tactical arguments for the Soviets using tactical nuclear weapons against U.S. SSNs in Soviet waters.

Stefanick's appendices abound with facts which, for the submarine buff who is not involved in day-to-day submarine operations, give one a feeling of uncovering important clues to a better understanding of the submarine's problems:

- a submarine should stay below 100 meters to avoid tell-tale bioluminescence in the oceans, triggered by the submarine's passage;
- magnetic detection/signal strength decreases with the cube of the range; a hundredfold increase in sensitivity provides less than a fivefold increase in range and current ranges are in the order of a few thousand feet;
- using the capacity of modern storage batteries on German submarines, a calculation can be made which indicates that the Soviet's TANGO class submarine is likely to have 2.7x10⁷ watt-hours stored in its batteries, giving it 160 hours at 5 knots or about 800 nautical miles of fully submerged travel;
- a wide aperture array sonar performs best with broadband noise, thus accepting a lower signal-to-noise ratio than for narrow-band noise and hence has a lower detection range but more rapid localization rate;
- Seasat A with a synthetic aperture radar for ocean surveillance, flies 432 nm above the earth, orbits the earth in 100 minutes, has a search-width of 54 miles and moves 25° of longitude further along on each successive pass;
- etc. (the above are merely to whet your appetite for this book).

Stefanick reaches many reasonable conclusions from his examination of the technology, poiicy and strategy inherent to strategic ASW. For examples:

- the U.S. advantage in passive acoustic detection of Soviet submarines is eroding because of: Soviet quieting measures; the spatial and temporal variability in the ocean which impose fundamental limits on signal processing and array gain; and the decreasing difference between signals and ambient noise;
- attacks on Soviet SSBNs are not likely to cause a Soviet launching of strategic missiles against the U.S.;
- Soviet nuclear attacks against U.S. carriers as a response to a loss of their SSBNs also appears to be unlikely;
- a U.S. commitment to treating Soviet SSBN patrol areas as sanctuaries would yield tactical advantages to the Soviet Navy;
- in the absence of a U.S. strategic threat, the Soviet's SSN force would have greater flexibility in how they might be used in a conflict; etc.

In effect, this book by Stefanick should be considered a first-line submarine textbook and be made available to all submarine wardroom officers as well as those outside of the submarine service who are highly interested in submarine matters.

W. J. Rube

OBITUARIES Retired Navy Captain Jason P. Law, 62, Dies

Jason P. Law, 62, a retired Navy captain who served in the Korean and Vietnam wars, died of cancer April 20 at his home in Chevy Chase.

Capt. Law was born in Savanna, Ill. He graduated from the U.S. Naval Academy at Annapolis in 1948. His Navy service included six sea commands. He retired in 1978 after serving as deputy director of naval history in Washington. He had been a permanent resident of the Washington area since the early 1960s.

His military decorations included the Bronze Star.

While serving in the Navy, Capt. Law received a master's degree in international relations from George Washington University. He received a master's degree in accounting from American University after he retired and became a certified public accountant.

For about the past five years he had been internal controller of Jubilee Housing in Adams-Morgan, an organization that provides housing for low income families.

Capt. Law was treasurer of the Naval Submarine League.

Survivors include his wife of 37 years, Sue Farquharson Law of Chevy Chase; tirree sons, Robert I. Law of Milwaukee, Jason R. Law of Macon, Ga., and Ives A. Law of Washington; one brother, retired Navy Capt. Richard R. Law of San Diego, and five grandchildren.



THE WASHINGTON POST

TLESDAY, APHIL 26, 1988

[Reprinted with the permission of the Washington Post Company. Copywright Washington Post.] . ٠ Dear Sue . . I wish to take this opportunity to share . a few thoughts with you, concerning my dear ٠ As you recall, friend Jason. Jason and I . first met and served together in Norfolk . when we were a part of Submarine Squadron ٠ SIX. I was impressed then and have remained . so, when I recall Jason's most striking . attribute of being a gentleman at all times . in all situations. Happily, as good fortune would have it. . we became reunited in the early formative . days of the Naval Submarine League. Jason's attribute of helping others was evidenced by . his efforts to establish the League on a ٠ firm and sound financial base. His long ٠ ٠ hours of research into the ambiguities of non-profit organizations, many summaries and ٠ • treatise he produced for consideration bv the Directors and his insistance on account-٠ ability are virtues only a few of us have • seen, but which have benefitted us all. As ٠ League members, we owe him a large debt of ٠ gratitude for becoming active and helping when the need was great and the reward ٠ We shall not forget Jason, but will small. ٠ remember him with admiration and gratitude. ٠ ٠ Our sympathy and love are with you in ٠ this hour of sorrow. We look forward to . seeing you at future League functions, which ٠ in part are possible through the legacy that ٠ Jason gave us. ٠ On behalf of the NSL, our sincere best wishes and love. Al Kelln

DOLPHIN SCHOLARSHIP

The Dolphin Scholarship continues to grow and support increasing numbers of deserving dependents of submariners. This year the amount of our grants <u>and</u> the number of students was raised due to the outstanding support of the contributors. During the school year 1988-89 Dolphin Scholarships of \$1,750 will be awarded to 90 students.

This success was made possible by the hard work and generosity of the various area submarine officers wives clubs, plus the corporate donors such as Rockwell International, Vector Research and General Dynamics as well as specific memorials and annual calendar sales.

Students should be advised that if they were not selected for their freshman year, they can reapply each subsequent year. Many recipients are not chosen until their second, third or fourth years. It is important to note also that even if the sponsor has been separated from the Navy for many years, his or her dependents continue to be eligible <u>if</u> the sponsor has served five years or more as a qualified submariner or has been attached to a support facility for six or more years.

This year the Dolphin Scholarship Foundation selected 25 new recipients and since 1961 has awarded grants to 367 individual students.

The Dolphin Scholarship Foundation ladies sold merchandise at the Naval Submarine League Symposium on 8-9 June. Over \$5,000 of sales were recorded.

For further information, write to: Dolphin Scholarship Foundation 405 Dillingham Blvd. Norfolk Naval Station Norfolk, VA 23511

NAUTILUS PAINTINGS

The Naval Submarine League has obtained autographed copies of the original NAUTILUS painting by the late Fred Freeman which appeared on the cover of the December 1952 Colliers magazine. Copies are available for \$5.00 each plus \$2.00 postage. Mr. Fred Freeman is noted for his original art work and illustrations in the USNI book "Submarine Operations in WW II."

NSL jacket patches are also available at \$5.00 each, and NSL Twister ball point pens at \$1.00 each. Call Pat Lewis for more information. (703) 256-0891.

	MEMBERS	HTP STATUS	
	2000/02/00		
	Current -	Last REVIEW	- Year ago
Active Duty	924	914	861
Others	2761	2643	2469
Life	153	134	125
Student	28	25	19
Foreign	38	34	31
Honorary	11	11	0
Total	3915	3761	3505
HAVE YOU	BOTTEN 2 N	EN MEMBERS FO	R 19887

HAVAL SUBMARINE LEAGUE Belance Bhest At 31 March 1948

Assets:				
Cash	8173,450.44			
Furniture, squipsent and software	20,236.62			
Prepaid expenses	3,700.67			
Total Assats	8197,397.73			
Liabilities and Fund Balance:				
Accounts payable Beferred seabership dues and	8902.84			
Contributions Deferred advertising income	36,178.97 16,760.00			
Long Term Lishilities:				
contributione	31,605.91			
Total Liabilities				
	101.141.12			
Fund Balance:	110,050.01			
Bevenues:				
Contributions	\$172.515.85			
Dues	22,287.44			
Bysposium	70,328.00			
Advertisements	8,240.00			
Other	2,844.50			
Total revenues	\$283,379.06			
Expenses:				
Awards and grants	\$1,907.60			
Operations	120,312.42			
Publishing	31,479.30			
Corporate benefactor's secting	6,875.88			
Chaster subburt	1,304,50			
Total aspenses	233,659.68			
Excess of revenues over expenses	48,718.37			
Fund balance, beginning of year	\$0,330.54			
Fund balance, and of year	\$110,050.01			

NAVAL SUBMARINE LEAGUE HONOR ROLL

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