THE SUBMARINE REVIEW

APRIL, 1983

A QUARTERLY PUBLICATION OF THE NAVAL SUBMARINE LEAGUE

THE SUBMARINE REVIEW IS A PUBLICATION
OF
THE NAVAL SUBMARINE LEAGUE

From The President

I hope that you share the excitement and desire for success that I felt as I read through a draft of this first issue of the SUBMARINE REVIEW. Your Board of Directors, in addition, feel that this publication is and will be the primary vehicle to foster a useful dialogue among the Submarine League's members. This Review is a convenient and periodic means to keep everyone informed of both the objectives of the League and those of the Submarine Service.

The League's annual symposium and business meeting, to be held at the Sheraton-National Hotel on 3 May, will serve as an opportunity to discuss the many items you may want to better understand with those who have the responsibility for charting the course of the Submarine Service. It is my desire that through the Review and the symposium you will become better informed Submarine Supporters. Then hopefully in some direct or indirect way you can influence others through your knowledge of submarine matters and your desire to promote the future of submariners.

The SUBMARINE REVIEW will be used for a wide variety of purposes. A more obvious one will be to inform its readers of the League's general business and its concerns. It will also provide an opportunity to publish one's ideas and recommendations on how to help the Submarine Service. Knowing many of you, I expect to see a lively response on many submarine subjects. And, by fostering mini-debates we can all profit from the wisdom that abounds among our members.

Al Kelln projected a membership goal of 500 by the time of the annual meeting. This number was reached on 15 March. Commander Jon Stein, USN, is welcomed as our 500th member. The goal of 1984 by the start of next year was an ambitious one but it is not unrealistic if each of us signs

up three additional people. Our mailing lists for new recruits are very incomplete and we need your help in filling the gaps through personal contacts with those who should be interested in joining the League. Please help. Remember that any U.S. citizen is eligible to join.

The offers to volunteer services has been overwhelming. As the League grows and our activities expand you will be asked to serve. I would like particularly to acknowledge the efforts of Brad Granum of Tracor and John Schilling of Rockwell for their significant assistance to the League and through whose help our League can function better and at reduced costs.

The "tax exempt" status of the Submarine League has been affirmed by the IRS so that dues as well as donations are "deductible." Lou Urbanczyk engineered this ruling -- a job of which I am very proud. It certainly widens the path for increasing our Benefactors Honor Roll.

Finally I wish to especially thank the SUBMARINE VETERANS of WW II for their support through joining the League and also for helping to get the word out about our League. Our Submarine Service is built on the heritage of our submarine veterans and we are indeed fortunate to have many of them on board.

Shannon

Editor's Notes

An attempt was made in this edition to demonstrate the wide and varied scope of submarine matters which can be published without concern for

their being classified. Submarine dialogue has been frequently constrained by the possibility that something secret might be voiced. Philosophical reflections rarely are, however, and J.S.L.'s very thoughtful article on the direction for future attack submarines demonstrates this. Establishing a threat base seemed necessary at the start of this forum and Commander Watson's article establishes it comprehensively. Submarine development, as Frank Andrews describes it through the history and work of the Dev Group, is another base to be appreciated. The Falklands War articles show the value of contemporary lessons which can be learned from today's submarine experiences. It was expected that at least article would reflect World War II experience and the lessons from which would apply to a submarine problem of today. Dick Laning's observations about submarine COs transitioning to war demonstrates this nicely. In the forum for discussion which the Submarine Review offers it is hoped that the problems of strategic warfare will be grappled with by military thinkers. Admiral George Miller does this with his options for basing the MX.

This first quarterly edition of the Submarine Review has shaped up well. The intent of the Submarine League to create a useful dialogue about submarines and submariners seems to be on the way. The articles contained herein should generate discussions in future quarterlies.

Much can be revealed about the status of today's submarines and the plans for their future from statements made to the Congress in their hearings on the military budgets. Most statements are far too lengthy however to be carried in their entirety in the Submarine Review. Thus, an attempt will be made to publish the more important points made. It is hoped that this selectivity will neither damage the

positions of those who make such statements or develop a bias which was not intended.

The Submarine Review is being produced with a minimum of staff. It behooves all contributors to this forum of discussions to make their submission in timely fashion so that the ideas presented can be gotten into print while they are still most convincing.

SUBMARINE DEVELOPMENT GROUP TWO

One of the brightest ideas the Submarine Force has ever had was the formation of a permanent special-mission team which employed operating submarines and was called the Submarine Development Group.

In 1945 when World War II ended, the U.S. Submarine Force could take credit for two-thirds of all Japanese merchant ships and one-quarter of all their warship tonnage either sunk or damaged. Yet, the Sub Force's 55,000 officers and men represented less than 1.5% of the entire U.S. Navy in WW II (a Navy of 4.2 million men). Nevertheless, following the War, the U.S. Submarine Force was said to no longer have a mission. The Soviet Navy at that time did not appear to be emphasizing surface ships. Instead it was expanding its already large Submarine Navy. But sinking submarines, then, was considered to be a job for maritime aircraft, aircraft off jeep carriers and destroyers. Radar and aircraft drove submarines down while active sonar was then used to search out and destroy them.

Submarine Development Group Two, or the DEVGROUP was formed in 1949 to "solve the problem of using submarines to detect and destroy enemy submarines." It was a necessary response if submarines were to continue to make a Navy contribution.

The central theme of this article is simple -- when a good thing gets going, encourage it!

To justify this declaration, the history of the DEVGROUP is recounted and its present direction is shown. Not only was my experience as a DEVGROUP Commander and skipper of a DEVGROUP boat, the K-1, drawn on, but former DEVGROUP Commanders and other senior submariners were interviewed on this subject. As Captain Frank Lynch, a PCO Instructor in the early fifties, told the author, "One's memory is apt to be self serving." So, for the many alumni of the DEVGROUP (at least 10,000) who might read this, I ask your tolerance if your perceptions are not presented accurately and properly.

Pre-War/Post-War Preliminaries

Before WW II, submariners were working on the bearings-only sonar approach for use below periscope depth. Target motion analysis was undeveloped, forcing many a CO to periscope depth for a "quick peek" before firing an exercise fish. Frank Lynch said that as early as 1940, he and others were playing with the use of time-bearing rate as a means for finding a correct firing solution. At the start of WW II, showing a periscope for 10-12 seconds was quite feasible without the enemy tending to see it. The bearings-only approach was thus quickly forgotten because it was not needed. The periscope with its stadimeter was the major source of input for tracking a target.

In 1946 it was evident that there would be no budget bucks for submarines unless they could be put to a meaningful use. Roy Benson, later ComSubPac, remembers some of the submarine officers who were involved in the first Submarine Conferences to determine the future of U.S.

submarines. "Gin Styer, the Assistant to Op 03, presided over the Conferences. Vice Admiral Lockwood, ComSubPac for most of WW II, attended. Other members included Admiral Jimmy Fife, John Scott, Carl Hensel, Dave White, Joe Grenfell, Swede Momsen Sr., and Dan Daspit." Daspit, the Director of the Submarine Warfare Branch of Op 31, was one of the main forces in creating the ASW mission for submarines. Important ideas presented and debated in those early years included small, mass-produced killer subs, a new acoustic homing torpedo, the conversion of Fleet boats to the streamlined structures of the German Type XXI boats with bigger batteries for this conversion (the GUPPY) and, finally, the atomic-powered submarine. The snorkel and array sonar found on the Type XXI boats were also earmarked for inclusion into the design of the small SSK killer sub and GUPPY.

A significant event derived from the Conferences was the establishment of a CNO project called "KAYO." The Chief of Naval Operations in 1949 directed that the Fleet Commanders assign one division in each fleet to this sole task: "Their mission shall be to solve the problem of using submarines to detect and destroy enemy submarines. All other operations of any nature, even type training, ASW services or fleet tactics shall be subordinated to this mission."

Project KAYO was designed to solve the Submarine versus Submarine problem. Division 72, at Pearl Harbor, received the Pacific assignment while a brand new Division, SUBDEVGROUP Two, was established in the Atlantic. The former, without special consideration devolved back to its status of a regular operating Division. The latter expanded to its present status, becoming DEVELOPMENT SQUADRON TWELVE.

Early Days

Roy Benson was the first DEVGROUP Commander. The group consisted of two Fleet-boats and two GUPPIES. It was commissioned in Key West, Florida, in May 1949. In July 1949, it left on its first SS vs. SS exercise in the Norwegian and Barents Sea. Examining the playing area of a potential Soviet-U.S. engagement and U.S. interaction with the Brits were the key objects of the exercise. One of the DEVGROUP boats, the USS COCHINO, was lost on the trip home from a battery explosion fire. Experimental underwater telephones on the four boats in the exercise were instrumental in allowing the submerged COCHINO to pass an early alert of trouble to the other DEVGROUP boats. HALFBEAK was later added to the DEVGROUP as a replacement for COCHINO, and the group was assigned a permanent home in New London.

Captain Chester Bruton, a New London based Squadron Commander, gave Benson his first headquarters -- a spare waterfront office not otherwise being used by Bruton's own staff. Bruton also advised Benson to ask the Underwater Sound Lab, down the river, to check out the JT sonars on all DEVGROUP boats. As a result, two topside arrays were found to be grounded out and two others had missing baffles. An appreciation of the dual hardware-tactics approach to the SSK problem was also fully underway.

Benson was highly successful in establishing a feeling of welcome for University and Government scientists who were interested in the DEVGROUP mission. This interaction with the scientific community has continued to the present. Early devotees to a study of the SS vs. SS problem were Allen Vine and Bill Shavill of Woods Hole Oceanographic Institute; Joe Worzel from Columbia University's Lamont Geological Laboratory; Fred Spiess from Scripps Oceanographic Institute; Walt

Clearwaters, Harold Nash and J.W. Horton from the Underwater Sound Laboratory; and Aubrey Pryce and Marvin Lasky from the Office of Naval Research. Lasky, in particular, received two top SecDef awards for his work in bringing about towed arrays.

The assumed threat in the early days of the DEVGROUP was a cavitating, snorkelling 8-knot submarine which was transiting with occasional zigs. Sounds easy? But detection ranges in those days by JT sonar (a topside line transducer) were like 4000 to 7000 yards on a good day. The real problem at that time was to get a tracking solution and a good shot off, before the target got by.

The short detection ranges were mostly a direct result of very high sonar self-noise. The rattling of top-side rigging, (typical of Fleet-boat design), the turbulance from hundreds of protuberances; and the noisy auxiliary machines all combined to blank out a signal. The technical community quickly recommended hovering and shutting down every last piece of machinery not absolutely needed. This included ventilation blowers, AC-DC motor-generators, and especially air conditioning compressors and fresh water stills. It was a submariner's badge of honor to be unwashed and unkept, but one also had to be quiet -- no loud talk or wrench-dropping. "Ultra-quiet" was the name given to a complete machinery shut-down. At ultra-quiet, a Fleet boat could detect the 8-knot snorkeller at the magnificant range of 12,000 yards. It was a grand beginning, but still too many targets got by!

Barney Sieglaff, a former COMSUBPAC, was the next DEVGROUP Commodore. Barney taught the sonar equation to those in the Submarine Force who were ready to listen. One had to be "ready to listen" because decibels were not exactly things that senior naval officers were comfortable with in

those days. Barney took a travelling team, including Charlie Bishop (later CO of NOSC), on a tour of the entire Submarine Force to generate interest, enthusiasm, and support for the Submarine ASW mission.

The competition at that moment was twofold: first, there was a simple ignorance of what was possible with array sonar, noise quieting, time-bearing plots and acoustic torpedoes; and second, there was over-attention to peacetime considerations like upkeep and services to the surface ASW community. The enormous overseas commitment had not yet started. However, the proto-type killer boat K-1 was under construction at Electric Boat in Groton, as was the Tang/Trigger class. And although the battle for nuclear power was still going on in Washington, the new BQR-4 array sonar was about to arrive in the Fleet.

On Barney Sieglaff's tour and later on that of Earl Hydeman (of Hydeman's Hell Cats fame - Sea of Japan 1945), the amazing performance of the BQR-4 was clearly proven at sea in Fleet exercises. USS K-1, off Bermuda in 1952, picked up a snorkelling exercise submarine at 30 miles, a range previously unknown to me, its CO, and my Fire Control party. The K-1 stayed at battle stations for five hours expecting every minute, after the first 15 minutes of tracking, for the bearing-rate to break and the target to go by. Can you imagine it? JT ranges 4000 to 10,000 yards until 1952; and then in one Fleet exercise period, BQR-4 ranges out to 30 miles. The word, "convergence zone," moreover, didn't exist in any one's vocabulary at that time!

Over the next several years, VP/SSK tactics gained immense popularity. The SSK made detections with its big ears and the VP aircraft provided the mobile attack unit. A VECTAC,

passed via mast-antenna from the sub, sent the VP out on a bearing to surprise and attack a snorkelling target. As late as the Cuban Missile Crisis in 1962, SUBLANT's war plans called for a barrier of diesel SSKs and LANTFLT maritime aircraft off Argentia, New Foundland, to stop Soviet submarines enroute to East Coast operating areas.

By the late sixties, however, nuclear power and the decrease in numbers of diesel submarines changed this thinking significantly.

What's Unchanged? What's New?

Since 1964 many hundreds of military and civilians have contributed significantly to the DEVGROUP's mission, providing the virtue of continuity and single purposeness. The proof of this lies in today's competency of nuclear attack boats to use the BQQ-5 sonar, the MK 117 Fire Control, the MK 48 torpedo, and passive ranging to detect, track and sink other submarines. The proof is in the submarine operator's knowledge of propagation loss and sea noise; the proof is in the NAVSEA/NSRDC machinery sound isolation and flow-noise reduction programs; the proof is in the NWP 70 series publications which document the Sub vs. Sub knowledge.

Of great significance to the submarine force was the introduction of nuclear power which provided a submarine with speed and endurance that allowed it to undertake new ASW roles not permitted the diesel submarine. From the late 1960's onward, the DEVGROUP was in the forefront of the development of new submarine ASW concepts -- such as SOSUS-aided intercepts of submarines in direct support of the CVBG. Other highly classified ASW techniques were developed through a combination of innovative thinking, objective analysis, and carefully managed exercises.

The DEVGROUP's history of 34 years can be divided into three eras. The first from 1949 to 1959 was the exploitation of the battery driven submarine. The next, from 1960 to 1974, covered the Tactical Analysis Group (TAG), full arrival of nuclear submarines, the towed array, and the MK 48. The last, from 1974 to the present, comprises the NWP 70 series, transition to SSN 688 boats, and renewed emphasis on normal squadron responsibilities. Throughout these eras, the paper (and later computer) analysis of tactics, the conduct and reconstruction of SS vs. SS at-sea exercises to obtain real data, and the promulgation of lessons learned, have held top priority.

In the second era, a formal Tactical Analysis Group (TAG) was established within the DEVGROUP. This led to the assignment of civilian analysts to the staff. In 1965, there were three civilians assigned; by 1976 this number had grown to 13, and today there are 32 civilians (out of a total of 73 staff). In second era, the Big Daddy series of exercises were initiated by Mike Moore, with Bill Pugh and Charlie Woods accelerating the work. Data for use by OPNAV in selling nuclear submarines was a driving feature of Big Daddy. Proof of the SSN 594's capability to sink Russian nuclear submarines was the even greater motive.

Milt McFarland, later CO of NUSC, was head of the TAG in 1967. Mac says "Big Daddy" got its name from big Don Whitmire, an-all American tackle for Navy in 1943/44, and head of the TAG when the Big Daddy exercises were organized. During the second era, the SECNAV awarded two meritorious unit commendations to the staff of the DEVGROUP for contributions to Submarine ASW.

The third era, still underway, has the DEVGROUP re-emphasizing normal squadron responsibilities. The Group has always been

considered a major command, going back to the first era. Then, it was responsible for both the administration and operational readiness of its boats. In the third era, the Commodores have felt the increasing pressure, both self-imposed as well as from the outside, to give more of their personal attention to these normal squadron concerns. Yet the DEVGROUP continues to retain a heavy workload associated with its original Sub vs. Sub mission. Promulgation of "lessons learned" has grown into a massive program of writing, editing, and producing the entire Naval Warfare Publication 70 series on Submarine Warfare. Bob Austin, now Rear Admiral and head of Naval Technical Training, initiated this.

The curent organization of DEVRON 12's staff reflects a balanced approach. Under a Director of Tactical Analysis, the SSN 688 class Tactical Development and Assessment Program is being executed. Submarine ASW exercises (SUBASWEX) are conducted in a free-play ocean environment. Range Exercises (RANGEX) are conducted at-sea but under more controlled conditions to optimize long-range localization and tracking capabilities. A variety of other projects are also conducted -- associated with automatic data-recording and reconstruction, BQQ-5 active and passive sonar tactics, and search theory. Under a director of Tactical Systems, development of operational procedures and tactics for all the latest individual submarine combat systems takes place. This includes weapons like the MK 48-4, MK 48 ADCAP, HARPOON and TOMAHAWK missiles; sonar system developments of the BQQ-5 and BQR-22A; changes in the MK 117 affected by the addition of cruise missiles; and electromagnetic systems in support of over-the-horizon targeting. This work includes a significant interaction with industry's technical community, and the Naval Laboratory organization. Under the Coordinator of Tactical Documentation, the vast library of NWP 70 series publications are produced.

During the third era, DEVGROUP Two became DEVRON 12. The confusion between SUBMARINE GROUP TWO (two squadrons of submarines) and Submarine Development Group Two drove this decision, as did the desire to reemphasize the squadron-responsibilities of the Group.

The relationship between hardware and tactics in the DEVGROUP's history deserves special emphasis. Operational problems are solved by technical and tactical solutions. Both have been emphasized throughout the DEVGROUP, with sometimes one receiving more attention than the other. Nevertheless, a multitude of significant submarine hardware concepts have gone to sea early in their development. Examples include the UQC underwater telephone; the BQR-4 and the BQR-2 arrays; a vertically steerable array sponsored by USN/USL which lead to the BQS-6 spherical dome; digital multi-beam steering (DIMUS) which first appeared on HARDHEAD in 1960; passive ranging in the form of PUFFS; acoustic communications called SESCO and SPUME; the Spectral Dynamics Inc. analysis equipment for use with both hull and towed arrays; and of course the first towed arrays themselves.

The first era appeared to be oriented more towards hardware. Array sonars had to be made fully operational in this period. The second era initially swung to a scientific approach to tactical development. The Tactical Analysis Group (TAG) was the result. When Jack Fagan arrived at the DEVGROUP as Commodore, the SSN had been sold as a major member of the Navy's ASW team. It was then time to get back to specific combat system problems. Fagan restored the balance which appears to be maintained into the present era. Guy Shaffer, who relieved Fagan, put this important balance into perspective as follows: "Should the DEVGROUP go out of business, it is likely that tactical development

will continue through individual squadron interest. However, without a DEVGROUP, the necessary technical development that supports tactical development suffers. No average submarine squadron can match the special technical capabilities that have been amassed in the DEVRON/DEVGROUP over many years."

So What?

The DEVGROUP has had its share of critics as well as admirers. In 1959, there was a move to absorb the DEVGROUP into the Operational Development Force (presently OPTEVFOR). OPTEVFOR had the job of evaluating new fleet hardware (including documentation of tactics); VX-1 was its VP-air arm, SURASDEVDET was its surface arm, and SUBDEVGROUP Two was its submarine arm. Ray Dubois, Commodore at the time, fought off the enemy by pointing out the continuing need for total submarine system tactical evaluation and development.

The Submarine Force itself has not always had a love affair with its DEVGROUP. The SSBN role held the major attention of senior submariners. This led some to consider all other roles as secondary. That the Soviets have used their submarines as defensive tools in their own home waters led others to believe (in 1962) that a "Battle-of-the-Atlantic" involving Soviet submarines would never re-occur. Submarine ASW was therefore hardly to be taken seriously. Always, with increased overseas submarine commitments, there seemed to be cause for de-commissioning the DEVGROUP. The 1977 conversion to a full operating squadron is a reaction in part to these pressures. Those in favor of eliminating the DEVGROUP suggested a force-wide responsibility to develop submarine ASW tactics. Unfortunately, when everyone is supposed to do something, frequently no ones does it well!

As in all organizations there are periods of intense innovation followed by equally important periods of consolidation and preparation for the next sprint forward. The DEVGROUP/DEVRON is now poised for the next big push. The TOMAHAWK Land Attack Missile, SSN 688, SUBACS, and the next generation SSN require a DEVRON ready with innovative personnel and top level support to realize the full potential of this hardware.

The "So-What?" for the DEVGROUP is: when a good thing gets going -- encourage it!

Frank Andrews

Figure 1. A List Of DEVGROUP COMMANDERS

ERA I - Start-up and Exploitation of Battery Boats

R.S. Benson, USN	May 1949 - August 1950
W.B. Sieglaff	August 1950 - June 1951
E.T. Hydeman	June 1951 - July 1953
A.R. Gallaher	July 1953 - August 1955
F.D. Walker	August 1955 - July 1957
R.B. Lynch	July 1957 - July 1958
R.F. DuBois	July 1958 - July 1960

ERA II - TAG, Full Arrival of Nuclear Boats, Towed Array and MK 48

C.J. Zurcher	July 1960 - July 1962
F.A. Andrews	July 1962 - May 1964
M.U. Moore	May 1964 - July 1967
W.M. Pugh	July 1967 - October 1968
G.T. Smith	October 1968 - November 1968
C.E. Woods	November 1968 - September 1970
J.F. Fagan, Jr.	September 1970 - September 1972

G.H.B. Shaffer	September 1972 - May 1974

ERA III - NWP 70 Series, Transition to SSN 688, Re-emphasis of Normal Squadron Responsibilities

R.C. Austin	May 1974 - July 1976
R.R. Fountain	July 1976 -1978
B. Demars	June 1978 - May 1979
S.L. Ward, III	May 1979 - October 1981
D.R. Sackett, Jr.	October 1981 - Present

Figure 2. A Listing of DEVGROUP Boats and Names of Commanding Officers

ERA (1949-1960)

Cochino (Benitez), TORO (Schwab, Nicodemus), CORSAIR (March, Pitts, McCants), TUSK (Gugliotta, Worthington, Warner), HALFBEAK (Eckerto, Osler), SSK-1 (Andrews, Jerbert), BARRACUDA (Gaskin, Snyder, Braly), GROUPER (Webster, Hake, Gustafson, Hankins, Ramatowski), CAVALLA (Banks, Delaney, Hayes, Fitch, Kaufman) CROAKER (Edwards), NAUTILUS (Wilkinson), ALBACORE (Gummerson, Thompson, Rae), BLENNY (Jacques, Grace, Fagan, Reese), HARDHEAD (Bellah, Viele).

ERA (1960-1974)

HARDHEAD (Olson, Cordray, McPadden), ALBACORE (Green, St. Lawrence, Springer, Organ), CAVALLA (Kraus, Williams, Smith), THRESHER (Axene), SKATE (Phoenix) STURGEON (Bohannon), PARGO (White, Hinkle), TINOSA (Brumsted, Alexich, Victor), DACE (Walsh, Cowhill, McKee), BERGALL (Tally, Wyatt), TULLIBEE (Jortberg, Hale, Syndhorst, Fitzgerald, Wigley), TREPANG (Sackett, Perkins), NARWHAL (Matson, Kellogg), BILLFISH (Hughes, Butterworth), LAPON (Green), BATES (Arthur), LIPSCOMB (Caldwell), RUSSELL (Brons), ARCHERFISH (Bird, Ward).

ERA III (1975-1982)

BATES (Houley), LIPSCOMB (Caldwell, Wilkinson, Robertson), CAVALLA (King, Rohm), GROTON (Vogel, Emery), RUSSELL (Brons, Campbell, Farmer), BERGALL (Wyatt, Smith), ARCHERFISH (Ward, Plummer, Almon), WHALE (Morse, Morrow), DALLAS (Ferrier, Rawson), PHILADELPHIA (Osborne, Little, Parry), BOSTON (Adair).

THE SOVIET SUBMARINE THREAT

Since Admiral Sergei Gorshkov's appointment as Commander-in-Chief of the Soviet Navy in 1956, the development of the Soviet submarine fleet has enjoyed the highest priority among the Soviet naval programs. Today, the USSR has an impressive fleet of nuclear and diesel-powered ballistic missile, as well as nuclear and diesel attack submarines.

The purpose of this article is to examine Gorshkov's views on the submarine, to relate the chief events in submarine construction, and to note those major submarine operations that regularly occur on the high seas. The article concludes with a discussion of this fleet's implications to the West. It is hoped that this will provide a base for further discussion concerning the Soviet submarine threat in subsequent issues of this journal.

GORSHKOV's VIEWS

Gorshkov's writings are a clearing house for Soviet naval views and positions. Since they embody naval perceptions concerning the need for

a strong Soviet Navy, they are an indispensible part of a total understanding of Soviet submarine development.

Gorshkov's views are most completely developed in his eleven-part series of articles entitled "Navies in War and Peace," and in his book, Sea Power of The State.[1] In them, he maintains that the navy fulfills two missions: fighting naval engagements, and participating in anti-shore operations. He views naval engagements or "ship against ship" as the least important, saying that these rarely were of strategic value in history. Concerning operations against the shore, Gorshkov says that these date back hundreds of years in naval history. Due to technological advances, these became more important in the twentieth century, and included amphibious operations, shore bombardment, and then carrier strike operations against land targets. However, Gorshkov believes that a crucial turning point was reached when nuclear technology was applied to naval missiles and propulsion. The result was the nuclear powered ballistic missile-equipped submarine (SSBN), which projected the navy into the preeminent position among the several branches of the Soviet Armed Forces. Vastly increasing the strike capability of the navy, this technology has made anti-shore operations the primary mission of the service.[2]

Gorshkov goes even further. He asserts that the navy possesses weapons with such long ranges that it is now capable of conducting operations that can have devastating impact on the operations in the land theater and the development of Soviet strategic submarines has the highest priority in naval thinking.

Gorshkov's preoccupation is not limited to ballistic missile submarines, however, but includes attack submarines as well. His observations of German submarine operations in World Wars I and II confirm this. He says that German submarine operations against Great Britain had a great effect on the courses of these wars, that Allied naval losses required great expenditures on new ship construction and antisubmarine warfare forces and that German submarine warfare finally failed because the submarines were not adequately supported and protected by surface combatants. In spite of this failure he recognizes that submarine warfare inflicted impressive casualties on allied shipping. Secondly, Gorshkov notes that, given the vast expenditures that the Allies made on ASW and the great numbers of men and amounts of equipment that the Allies devoted to ASW, their results were meager. He concludes that, in World War II, "of all of Germany's naval arms, the U-boat fleet alone continued to pose a threat of serious dimensions, and the 'underseas war' ended only after German territory was occupied by the Allied armies."[3]

Thus in Gorshkov's writings, no weapon system receives as much praise as the submarine, the so-called "main striking arm" of today's navy.

SUBMARINE CONSTRUCTION

In naval construction, the submarine has received paramount emphasis. Since the submarine is integrally tied to the strategic defense of the USSR, it has dominated Soviet naval construction. This emphasis has been so great that it appears that decisions on whether to begin classes of air capable ships, surface

combatants and amphibious ships has rested on whether ongoing submarine construction was sufficient to meet national defense requirements. The following brief summary of Soviet submarine construction since 1956 reflects this emphasis.

Ballistic Missile-equipped Submarines

Soviet ballistic missile submarine development began with the ZULU class diesel powered ballistic missile submarine (SSB). Six ZULU hulls were completed as or converted to SSBs, but all but one have reverted to attack submarine status.[4] The ZULU V was armed with two SS-N-4 SARK missiles, making them the first submarines in the world to carry ballistic missiles. The limited 350 nautical mile missile range and the fact that the ZULU had to surface to fire its missiles, reduced the strategic threat that ZULU posed. The GOLF-class SSB and HOTEL-class SSBN which succeeded ZULU provided operational improvements. The early units of both classes carried the SS-N-4 SARK, which had to be fired on the surface. However, several GOLFs and HOTELs were modified to carry the SS-N-5 SERB, which could be launched while the submarine was submerged. These made the GOLF and HOTEL less detectable, thereby enhancing the threats that they posed.

The appearance of YANKEE in 1968 was a dramatic improvement in the Soviet SSBN fleet. YANKEE was initially equipped with sixteen SS-N-6 missiles, which had a range of 1300 nautical miles (nm). Subsequent missile variants increased this range to 1600 nm. YANKEE patrols began in the Atlantic off the U.S. east coast in 1969, and off the U.S. Pacific coast in 1971. These patrols significantly increased the Soviet SSBN threat against the United States.

The DELTA-class SSBN, which appeared in 1971, further enhanced the SSBN threat. Armed with twelve SS-N-8 ballistic missiles with a range of 4300 nm, the DELTA I could launch missiles against the U.S. east coast while remaining in Northern Fleet waters. From the Pacific, the DELTA needed to voyage only a few hundred miles eastward from its home base at Petropavlovsk to be in range of the U.S. west coast. Such range vastly enhanced the invulnerability of DELTA, with a concomitant increase in the threat it posed. DELTA II, which carries sixteen SS-N-8s, and DELTA III, which carries the MIRV capable SS-N-18, represent further enhancements.

Finally, the latest class of SSBN is the TYPHOON, which was launched in 1980. This new 25,000 ton submarine carries twenty SS-X-20s, a MIRV-capable missile with a range of 5000 nm.

This dramatic progression in Soviet SSBN development has insured the strategic defense of the USSR and has established Soviet strategic parity with Western SSBN develoments. Ongoing controversies center on several issues. One pertains to submarine positioning and employment ... whether the Soviet SSBNs would be used in a Soviet first strike or whether they would be held in reserve to be used in a third strike. A second controversy considers the Soviet MIRV capability and characteristics, strengths and vulnerabilities of DELTA and TYPHOON to determine if and how much of a superiority the Soviets have in the SSBN field. One thing is certain. The Soviet SSBN program has been hallmarked by remarkable progress which has negated the traditional U.S. superiority in this area.

Cruise Missile-equipped Submarines

Developments in the cruise missile (SSG/SSGN) program have been equally impressive. The first

units were the ECHO SSGN and the JULIETT SSG. Sixteen JULIETTs were built in the early 1960s, each were equipped with three SS-N-3 SHADDOCK surface launched missiles. The five ECHO Is were also armed with the SS-N-3, each unit carrying six missiles. The necessity of surfacing in order to fire increased their vulnerability, with a resultant decrease in the threat that they posed. The ECHO II was an improvement. Each was armed with eight SS-N-3s and, for years, was considered the primary anticarrier threat.

The CHARLIE-class SSGN was a significant improvement. The CHARLIE I, which became operational in 1968, carries eight SS-N-7 missiles that can be fired while CHARLIE is submerged. The improved CHARLIE II may carry the SS-N-9, with a 60 nm range, double that of the SS-N-7. CHARLIE's capability of firing missiles while submerged, drastically increased the Soviet ACW threat, and CHARLIE is still one the the greatest threats to US carrier operations. A succeeding class, the PAPA SSGN, never went into series production.

The most recent addition to the Soviet SSGN inventory is the OSCAR. The initial unit was launched in 1980. At 12-14,000 tons, OSCAR is the largest general purpose submarine in the world. With an armament that includes 24 SS-N-19 missiles (having an estimated range of 250 nm), and torpedoes, it poses a formidable threat. A controversy exists as to OSCAR's mission, but the best estimate comes from Captain William Ruhe, U.S. Navy (Retired), who sees OSCAR as an anticarrier weapon system. Over twice the size of CHARLIE, OSCAR probably relegates CHARLIE to anti-convoy operations.[5]

In summary, the Soviet SSBN fleet has been complimented with an impressive fleet of SSGNs. Today, these SSGNs pose a potent threat against

U.S. attack aircraft carriers and convoy operations. As such, they are an important factor in the US-Soviet balance of power equation.

Attack Submarines

Captain Ruhe is correct in his observation that the term "SSGN" is a misnomer, since today's attack submarines also have impressive missile arsenals.[6] In the context of this blurred distinction, the Soviets have made impressive progress in their attack submarine construction program. This began with several diesel powered classes, the most notable being WHISKEY, ZULU and FOXTROT. WHISKEY relied heavily on German design concepts, and 235 of these units were built. 26 ZULUs were built from 1952 to 1955. ZULU had a longer range and more torpedo tubes than WHISKEY, and therefore was capable of more significant operations. However, a very significant advance was made in FOXTROT. Introduced in the late 1950s, FOXTROT was a very popular fleet attack submarine. For years, FOXTROT has been the mainstay of the Mediterranean Fleet submarine force, and has also been deployed to the Indian Ocean and the Caribbean Sea.

Whereas some FOXTROTs continue to deploy regularly to the open seas, WHISKEYs and ZULUs are now used less frequently for naval missions other than training. (Some exceptions immediately come to mind, the most notable being the WHISKEY which ran aground in Swedish waters in 1981, creating an international incident and severely damaging an ongoing Soviet peace initiative in Europe). Continued Soviet interest in diesel powered attack submarines was evident when TANGO became operational in 1973. Several units have been constructed. TANGOs deploy regularly to the Mediterranean Sea, and a TANGO was included in the latest combatant deployment to the Caribbean, which began in November 1982.

Turning to nuclear powered attack submarines (SSNs), the Soviets have five classes: ECHO, VICTOR, NOVEMBER, ALFA and YANKEE. ECHO is a conversion from the ECHO I SSGN and deploys periodically for operations on the high seas. (An ECHO SSN had an internal accident off Okinawa in August 1980, in which several of the crew were killed or injured). Similarly, the YANKEE SSN is a conversion of the YANKEE SSBN, converted because the continued construction of DELTAs required YANKEE conversions in order to conform to the provisions of SALT I.

The NOVEMBER SSN, the first Soviet nuclear powered submarine, became operational in 1959. The most famous is the NOVEMBER which sank in the eastern Atlantic in April 1970. The VICTOR SSN appeared in 1967. Armed with torpedos and possibly ASW missiles, VICTOR was a significant improvement over NOVEMBER. Follow-ons, including VICTOR II, established VICTOR as the mainstay of the SSN fleet in the 1970s.

The appearance of ALFA, the latest in Soviet SSN design, has had great significance. With a non-magnetic titanium alloy hull which makes it difficult to detect, and a maximum speed of over 40 knots which makes it difficult to destroy, ALFA is a very critical threat. Controversy exists concerning ALFA's purpose, but protection of Soviet SSBNs appears to be the most plausible.

In summary, Soviet naval construction has conformed to the pro-submarine emphasis found in Gorshkov's writings. To be sure, Soviet submarines are not without their liabilities. Crew habitability, for example, is low. Nonetheless, one marvels at Soviet progress. Since 1956, they have neutralized the US strategic advantage by building an opposing SSBN

force of about 70 units and have constructed attack submarine fleets which pose serious threats to US aircraft carrier and shipping operations. It remains to explain how these submarines have been used.

SUBMARINE OPERATIONS

The Soviet Navy's use of its submarine fleet has been innovative and efficient. The result has been a continually increasing submarine threat to U.S. operations in most of the world's major ocean areas.[7]

Ballistic Missile Submarine Operations

With the appearance of YANKEE, the Soviets posed a critical SSBN threat against the US and NATO. Patrols along the US east coast began in 1969, and eventually reached a level of three submarines constantly on station. West coast patrols began in 1971, and a two submarine patrol was eventually established. Both the Atlantic and Pacific patrols insured missile coverage of US bases in Alaska and Hawaii and coverage of almost all of the continental United States. This threat was enhanced with DELTA, which can launch its missiles from local Soviet Northern Fleet and Pacific Fleet waters and hit its US targets. The fact that inch for inch, the Northern Fleet is in perhaps the most heavily defended area on the earth today, makes locating and destroying DELTAs in wartime potentially a very costly endeavor. The benefits of all this to Soviet security are obvious.

This strategic threat is supplemented by Soviet submarine operations in the Atlantic, Pacific and Indian Oceans, and the Caribbean and Mediterranean Seas.

Atlantic Ocean Operations

Excluding SSBN operations, Soviet submarines spent 2600 ship days in the Atlantic Ocean in 1982, for an average daily presence of ten submarines. These figures reflect a critical threat to Allied supply lines across the North Atlantic. We can be sure that these submarines will be governed by a sound naval strategy. The references to the Gorshkov theory presented earlier in this article demonstrate the Admiral's impressive analysis of German submarine warfare in World Wars I and II. (Interestingly, this point is supported by Sir John Hackett in his book The Third World War: August 1985. Rumor has it that the Hackett team's assessment was that the Allies would lose World War III. Hackett's publisher informed him that his conclusion would be psychologically and commercially disastrous. The team then attempted to determine the most likely mistake that the Soviets would make if they were to lose the war. They concluded that this error would probably be a failure to follow Gorshkov's strategy. Thus, in Hackett's scenario, Gorshkov has died, his strategy has been ignored, Soviet submarines have not been properly protected, U.S. forces reach Europe, the NATO front is reinforced, the Soviet advance is halted, and the Soviet bloc collapses. Barring such an unlikely spot of good luck, NATO should expect a major disruption of U.S. supply lines should a war occur in Europe.)

West Africa

In 1982, Soviet attack submarines spent approximately 300 ship days off West Africa, for an average daily presence of almost one submarine. These units augment the surface combatant sea

power in the area. In crisis periods similar to the Angolan Civil War, this submarine level would probably increase as the Soviets increase their naval force level.

Caribbean Sea

In 1982, a TANGO attack submarine participated in the twenty-second deployment of combatants to Cuba. This is the latest incident in a Soviet attempt to deploy the widest variety of submarines to the Caribbean. In the past, they have sent NOVEMBERs, ECHOs, FOXTROTs, a TANGO and a GOLF II SSB, a ballistic missile platform which took part in two deployments, in 1972 and 1974.

In conjunction with these operations, the Soviets have demonstrated an interest in Cienfuegos, Cuba, possibly for use as a submarine base. They have assisted in upgrading the facilities, which are now used to support Cuban FOXTROTs. As Soviet interest increases concerning insurgency in Central America, the USSR may decide to establish continuing presence in the region.

The Mediterranean Sea

The Soviets first standing submarine force on the high seas was established in the Mediterranean in 1958. Staging from Valona, Albania, the force of approximately twelve submarines operated in the region until 1961, when denial of the Albanian facilities forced an end to this activity.

However, operations recommenced in 1964 and continue through today. From 1967 until April 1976, the Soviets used Alexandria to support their Mediterranean Fleet and used El Gabbiri shipyard for submarine repair. Similar repair activity has occurred in Tivat, Yugoslavia since

1975, and in Menzel-Bourguiba, Tunisia since 1978. Syrian ports have also been used since 1967.

In 1982, Soviet submarines spent 2600 days in the Mediterranean, for an average daily presence of seven units. Most of these submarines are FOXTROT and TANGO diesel powered boats, but at least one cruise missile submarine (usually a CHARLIE) and often a VICTOR SSN are deployed. This force poses a potent threat to the U.S. Sixth Fleet, since it exercises regularly in anticarrier warfare and is quite proficient. In crisis periods, such as the October 1973 War, the force will be bolstered, and as the oldest standing Soviet submarine force on the high seas, it is extremely relevant politically. It stands ready to challenge NATO and Israel and to support Soviet policy in the Middle East, and as the events of October 1973 demonstrated, we cannot afford to ignore this threat to our military and political initiatives in the region.

The Pacific Ocean

In addition to the Pacific Fleet's SSBN force, that fleet has an impressive number of attack submarines. The total force of 127 boats is second in size to the 188-boat Northern Fleet, based on 1981 figures. The Pacific Fleet submarine force is proficient in defense of the homeland operations and exercises regularly. It has the ability to disrupt the sea lanes leading to Japan, Korea, and the People's Republic of China.

As a result of their support to Vietnam in the Sino-Vietnamese War of 1979, the USSR acquired access to Vietnamese ports. Operating out of Cam Ranh Bay and Da Nang, the Soviets have a standing submarine force in Southeast Asia. Most of the 2200 ship days that Soviet attack and cruise missile submarines spent on the high seas in the

Pacific in 1982 were spent in or near these Vietnamese ports. This amounts to an average daily presence of over five submarines, including an average of two cruise missile submarines. This amounts to a major threat to the balance of power in the region, since it means the introduction of significant naval power in an area where the United States has enjoyed naval superiority. It also means that the Soviets can now react much more rapidly to crises in the Indian Ocean, since they can now sortie from Vietnam, whereas before 1979, all reacting naval forces sortied from Vladivostok, which seriously delayed their responses. In light of these factors, it is reasonable to conclude that this Soviet force is a major political and military factor in Southeast Asian affairs and will play an even more significant role in coming decades.

The Indian Ocean

In 1982, an average of two attack submarines were deployed daily in the Indian Ocean. This is a moderate presence, which augments the surface forces deployed to the region. Access to the facilities at Kahlak Island is adequate to support a larger force, should the Soviets choose to bolster their naval presence.

IMPLICATIONS FOR THE WEST

Defense of the Soviet Union is a consistent theme of Gorshkov's writings. The Admiral comments repeatedly on U.S. naval power and views NATO as a maritime alliance in which the U.S. Navy is the key force. He is certainly correct in this assessment. The United States is a first rate maritime power, which has used its naval strength repeatedly for defense and foreign policy purposes. Furthermore, if the USSR hoped

insure its stategic defense and actively support so-called "progressive forces" in the Third World, then it had to find a means of reducing the U.S. naval advantage. It found this means in its submarine program, which has provided both strategic security and a certain tactical advantage.

From the above discussion, it is reasonable to conclude that, guided by the strategy of Sergei Gorshkov, the Soviets have built a potent fleet of ballistic missile, cruise missile and attack submarines. This fleet operates constantly on the high seas and provides the USSR with several advantages.

Concerning strategic security, although the Soviets have not been successful in blunting the U.S. SSBN threat through their antisubmarine warfare program, they have built an impressive SSBN fleet which neutralizes this U.S. advantage. This effort has been so successful that we can no longer employ strategic escalation, as we did in October 1973, to achieve our foreign policy goals. We must realize that maintaining this parity is the highest Soviet naval construction priority. It will therefore be very costly and difficult, if not impossible, to regain our previous advantage in the SSBN field. Thus, containing and countering the Soviet SSBN force is a far more realizable goal than attempting to achieve a decisive U.S. superiority in SSBNs.

Cruise missile submarines are a critical threat to U.S. attack aircraft carrier operations. This is most true in the Mediterranean where Soviet SSGNs are targeted against the U.S. Sixth Fleet. Countering this Soviet capability is a continuing problem for the U.S. Navy.

Finally, the Soviet attack submarine is a critical threat to U.S. surface combatants and merchant ships. Whether the Soviets can interdict U.S. convoys to Europe in wartime is hotly disputed and is contingent upon the type of scenario, the length of the war, and other factors. One thing is certain: the Soviet submarine threat is such that the United States is not certain that it can insure SLOC security through the North Atlantic in wartime. The political effect of this predicament on NATO is obvious.

Inversely, while this fleet is impressive, it suffers from some significant weaknesses. Of these, systemic liabilities, geography, and susceptibility to U.S. capabilities are the most noteworthy.

Concerning systemic design problems, the Soviets have some serious deficiencies. Noise control has been a chronic problem and Soviet efforts to reduce the noise levels in their submarines have often been unsatisfactory. The result, noisy submarines which are more easily detectable, is a significant weakness. Other design problems include insufficient radiation shielding on some units and reliability. Concerning reliability, the Soviets have a tradition of building systems that are less complex than U.S. naval systems, but systems that are highly reliable. Nonetheless, the Soviets have experienced many submarine mishaps on the high seas, and these must have caused some misgivings concerning system reliability. Among the effects of this possible loss of confidence may be the perceived requirement for submarine access to overseas bases.

Geography is also a significant problem. The exits from the Northern and Baltic Fleet areas are restricted, making submarine detection a problem. To make matters worse, the Montreux Convention prohibits staging submarines from the Black Sea, so there is no staging area between the Baltic Sea and the Pacific Fleet bases. The Soviets have alleviated this problem by acquiring access to several foreign ports to support their submarine operations. But this has not been an ideal solution, since they have been expelled from several ports, including Valona, Albania in 1961, Egyptian ports in 1976, and Somali ports in 1977. Most of these expulsions have disrupted Soviet submarine operations, and similar hardships will result if the Soviets are expelled from other ports in the future.

Finally, U.S. ASW systems pose a great problem for the Soviets. SOSUS and other systems afford an impressive detection capability. Moreover, the U.S. Navy is proficient in ASW, which threatens Soviet submarine operations on the high seas in wartime. In short, while the Soviet submarine force is a serious threat, the U.S. Navy has an impressive ASW capability which will combat Soviet submarine warfare operations should war occur. The Soviets, therefore, cannot count on easy success in war either now or in the near future, and this deters more assertive Soviet submarine operations.

Considering both the strengths and liabilities of the Soviet submarine force has been a major preoccupation of the Department of Defense since 1956. While there has been significant success in defining the threat that the Soviets pose, much less attention has been paid to its implications for the West. There is an erroneous distinction

which pictures the Soviet submarine as far less politically useful than the Soviet surface combatant. The Soviet submarine, however, should be viewed as a very important political weapon and one that must be employed in a different way than the surface combatant in order to exert political influence. For example, it is used far less often than the surface combatant in the showy official port visit. Inversely, its patrols and its level of submarine activity in an area have great political content. Who can argue that Soviet submarine operations in the Mediterranean Sea in October 1973 did not threaten U.S. policy objectives through the threat it posed against our Sixth Fleet? Likewise, during the Carter administration, the Soviets dramatically increased the number of submarines deployed to the Atlantic on several occasions when President Carter was critical of Soviet human rights abuses. These escalations were so consistent that they had to have been political messages, particularly in light of Carter's Naval Academy education and his submarine background.

Other examples abound...Vietnam, West Africa, the Norwegian Sea and the Baltic Sea to name a few. They amount to assertive political operations whose political content is too seldom analyzed. Their political results thus include contributing to the dissolution of NATO and a weakening of the far more assertive foreign policy which we pursued twenty years ago. In the future, Soviet submarines might have greater influence on our relationships with Israel, the nations of South Asia, Japan, Korea, the Peoples' Republic of China, and many other countries.

It is hoped that this article has directed attention to both the military and the political value of the Soviet submarine force and that it

will prompt discussion on this subject in future issues of this journal.

Bruce W. Watson
Commander, U.S. Navy
Director of Research
Defense Intelligence College

Footnotes

1. Sergei G. Gorshkov's "Navies in War and Peace" series was originally published in the Soviet journal Morskoy Sbornik and subsequently appeared in January-November 1974 issues of the U.S. Naval Institute Proceedings. They were then republished as Red Star Rising at Sea (Annapolis, Maryland: U.S. Naval Institute, 1974).

2. Sergei G. Gorshkov, Morskaya moshch' gosudarstva (Moscow: Voennoe izdatel'stvo, Ministerstva Oborony SSSR, 1976), pp. 105-7, 200, 348-9, 351-61.

3. Red Star Rising at Sea, p. 45.

4. All statistics on Soviet submarine construction have been quoted from Office of the Chief of Naval Operations, Understanding Soviet Naval Developments, 4th ed. (Washington, D.C.: U.S. Government Printing Office, 1981), pp. 86-99.

5. William Ruhe, "The Effect of Emerging Soviet Submarine Technologies on U.S. Naval Warfighting Strategies." Unpublished paper delivered at the U.S. Naval War College, Newport Rhode Island on January 31, 1983, p. 6.

6. Ibid.

7. All information on Soviet submarine operations has been taken from Bruce W. Watson, Red Navy at Sea (Boulder, Colorado: Westview Press, 1982).

SUBMARINE LESSONS FROM THE FALKLANDS WAR

In the Falklands War, submarines were engaged in wartime action for the first time since World War II. Although submarines were involved in only a few incidents, we can draw some important lessons from this experience. The best way to reveal the influence of submarines in the overall actions would be a chronological examination of submarine participation in the Falklands War, which is the approach of this analysis.

The sequence of submarine events begins with the landing on 19 March 1982 of a so-called party of Argentinian scrap metal workers on South Georgia Island, 900 miles to the east of the Falklands.

On the 26th of March the Argentines, in response to British insistence that these illegal workers be removed from the island, seemingly evacuated these people but clandestinely left a shore party behind, it then became evident that the Argentine Government was very much behind the incident. By the 29th, when a diplomatic solution to this occupation seemed stalled, the Commander in Chief Fleet of the British Navy, Admiral Sir John Fieldhouse, ordered the nuclear submarine H.M.S. Spartan to leave the exercise in which she was engaged, embark stores and weapons at Gibraltar and deploy to the South Atlantic. On 30 March the nuclear submarine Splendid was ordered to deploy from Faslane in the U.K. and Conqueror was sailed a few days later. Instructions to covertly prepare a Task Force for South Atlantic operations were then

received on 31 March. When the Argentines invaded the Falklands on 2 April, further preparations were openly conducted.

What is particularly significant about this sequence of prewar events is the recognition that nuclear submarines were deployed rapidly and covertly toward a distant area of tension, with no effect on ongoing diplomatic negotiations. With their impressive, sustained high speed, and freedom from the impact of weather and sea conditions nuclear submarines were in place well ahead of any surface forces, which were deployed at about the same time. And, if the political problem had been resolved satisfactorily prior to an outbreak of the conflict there was likely to be no evidence of pressure attributable to the on-station threat of several nuclear submarines.

On 12 April, the British imposed a maritime exclusion zone of 200 miles around the Falklands against Argentine naval ships, and on 23 April the British further warned that any threatening approach by Argentine forces which might interfere with the British mission in the South Atlantic would be dealt with appropriately. Well before this time, the British had revealed the presence of three nuclear subs in the war area. This threat thus posed by these British subs had effectively stopped Argentinian reinforcement of the Islands by sea since 12 April.

However it was revealed that one Argentinian resuppply ship had arrived during this period without being detected by any of the nuclear submarines -- despite the total blockade being maintained. This set the stage for the Argentine use of the conventional submarine Santa Fe to haul relief supplies to the shore party on South Georgia. The British nuclear submarine Conqueror had been ordered to patrol off the island to prevent any sea lifted Argentinian reinforcements,

while a group of Commando Royal Marines was covertly landed by helicopter on the 23rd. Thus, on 25 April with the weather having cleared, a British helicopter spotted the Santa Fe approaching the main port of Grytviken on the surface. It would appear that the Santa Fe, which did not know about British operations in the vicinity, had pierced the Conqueror's blockade and was about to deliver its supplies when she was attacked by British helos using AS12 missiles and depth charges. An AS12 wire-guided, 6km range missile with a 63# warhead, fired by a Lynx helicopter, hit the Santa Fe's conning tower, inflicting serious damage, while helo launched depth charges which exploded nearby apparently destroyed the submarine's watertight integrity. The badly damaged Santa Fe then limped to Grytviken and was beached nearby.

The role of the submarine for emergency resupply of beleaguered forces and its capability to penetrate a blockade of a port area was much the same as in World War II. Similarly, the great toughness of the conventional submarine in remaining afloat long enough to be beached despite damage from very close depth charges exploding at proper depth, was demonstrated. The efficiency of the nuclear submarine in the context of a total blockade role appears questionable, particularly in the environment of high sea noise, produced by heavy weather.

On 2 May the most interesting and significant submarine incident of the Falklands War took place. The Argentinian cruiser, the General Belgrano, escorted by two destroyers, was located by the British nuclear sub Conqueror south of the Falklands and beyond the 200-mile exclusion zone. The British felt that this small force which was armed with Exocet missiles, posed a clear threat to the British task force. At the same time other Argentine ships north of the zone were apparently conducting the same sort of probing

action. Since the threat could not be ignored, Conqueror was ordered to attack the General Belgrano with torpedoes.

With her high submerged mobility, the Conqueror in a periscope attack, gained an ideal attack position and with a short torpedo run put two MK VIII torpedoes into the cruiser -- which sank in a couple of hours. The MK VIIIs were pre-World War II, straight running, 45-knot, 5000-yard steam torpedoes. They were used, either in preference to or because of a distrust of the very modern, wire-guided, terminal homing Tigerfish torpedoes which were also reported to be aboard the Conqueror. Apparently in the load-out of Conqueror at the beginning of the War there weren't enough Tigerfish torpedoes readily available, so some of the obsolete MK VIIIs were loaded on board. Although the two destroyers dropped numerous depth charges after Conqueror's attack there was no evidence of their actually having contact on Conqueror.

The decision of Conqueror's skipper to use these old torpedoes attests to his appreciation of how a nuclear submarine's covert mobility relates to the weapons carried. The skipper recognized the proven reliability of the MK VIII based on almost 4000 of these torpedoes having been used in World War II. Its shortcomings were well ironed out by the end of that war. In addition, the MK VIIIs had 750-pound torpex warheads approximating the destructive effects of the lighter Tigerfish torpedo warheads with its more efficient explosive. Although the MK VIII produces a good wake as opposed to the wakelessness of the electric driven Tigerfish torpedo, the skipper also evidently knew that he could approach undetected to close range and hit with the MK VIIIs. And, the torpedo run would be so short that the cruiser would be unable to satisfactorily evade the torpedoes even if the wakes were promptly sighted.

The lesson illustrated with this selection of torpedoes seems to be that the high mobility of the nuclear submarine allows the use of simple, very low cost torpedoes in the anti-ship role -- and even against warships under many circumstances. A second lesson would be that the nuclear submarine's mobility allows it to make covert approaches on targets which would be considered well escorted in the traditional sense but which can't begin to handle this new type of submarine threat.

After the sinking of the General Belgrano, Argentine naval surface forces stayed within 12 miles of the Argentine coast for the remainder of the War. The sinking of the cruiser was such a clear demonstration of nuclear submarine capability that no further attempt was made to risk any major Argentine warship outside of coastal waters. But at the same time British nuclear submarines patrolled the coast of mainland Argentine to provide intelligence on aircraft sorties from Argentina which might generate massed air attacks on British forces.

An examination of the waters in which the British nuclear subs operated shows depths of 20 fathoms in spots and usually less than 50 fathoms where they could effectively use their periscopes for detecting aircraft.

The British Fleet's lack of an air-early-warning (AEW) capability was thus being remedied in part by stationing her nuclear submarines close to the Argentine coastal airfields to provide early warning of large aircraft raids directed at the British forces in the Falklands' area. But this was apparently a far from efficient operation, since a large-scale air raid at San Carlos caught the British with little

warning, resulting in the loss of their two landing ships which were in the process of being offloaded.

Another lesson from these forward operations is the need to ensure that today's submarines are efficient in shallow water operations and particularly at periscope depth. With waters under 100 fathoms all the way out to the Falklands from the Argentine coast, even the blockade against Argentine shipping had to be carried out in "shallow" waters.

Throughout the Falklands War, questions were being continuously asked about Argentine conventional submarines. What were they doing? Argentina started the war with four diesel-electric boats. Two were U.S. Fleet submarines transferred to the Argentine Navy, the Santa Fe (ex-USS Catfish) and the Santiago del Estero (ex-USS Chivo), and two were German-built 209 type submarines. The Santa Fe was rapidly put out of action and virtually destroyed. The Santiago del Estero was laid up at a naval base and never saw action. But the two 209s which were in some sort of refit status at the start of the War were buttoned up and quickly departed for sea operations. Little was reported about their operations except that they claimed to have shot at the British carrier Invincible and other targets but suffered torpedo trouble and failed in their attacks.

These two 10-year old subs have non-magnetic hulls (a special feature of German submarines). They are of 1285 submerged tons and have eight torpedo tubes with a reload of eight more torpedoes. They have a submerged speed of 22 knots and a small complement of only 32 men. They carry the German 21" SST 4 antiship torpedo which has a 260 kilogram warhead, is battery

driven with a speed of about 35 knots, and is wire-guided with both active and passive terminal homing. Interestingly, this torpedo has a 3-dimension sonar for homing -- which is particularly useful for submarine targets but is a needless complication against surface ships.

What these two conventional submarines accomplished is summed up in Sir John Fieldhouse's Dispatch to the Minister of Defence.

> "Attacks on the Task Force by enemy submarines (the 209s) were a significant threat, which was recognized by the inclusion of anti-submarine Sea King helicopters in the air order of battle. A number of torpedo attacks were carried out by these aircraft against underwater contacts classified as possible submarines. Results of the actions are not known, but the high intensity flying rates of this helicopter force throughout the operations were an essential part of Fleet antisubmarine warfare defences."

Admiral Gorshkov, head of the Soviet Navy, in his articles on Navies in War and Peace observed that in World War II there were 25 Allied ships and 100 aircraft involved in ASW operations for each German submarine at sea. The same disparate use of ASW forces to handle the threat of only two small conventional enemy submarines seems to have taken place off the Falklands Islands. The "appalling weather" which created much surface noise, plus the high density of biologics in the waters off the Falklands combined to make ASW operations extemely difficult with a high incidence of false contacts. The tiny shrimp-like krill which breed in the cold Antarctic waters are found in huge tightly packed schools which return convincing echos from active sonars

-- and they reportedly make a lot of noise with their massed tiny squeals. That the British warships expended large amounts of ASW ordnance on false contacts in this environment is highly likely. The magnetic anomaly detection (MAD) gear on British ASW aircraft was apparently of little use for classifying the non-magnetic hulled 209s. The detectable magnetic signatures of these susbmarines were probably too weak to make a determination of sub or non-sub in an environment where other masses of biologics could produce low magnetic signatures.

The experience of the Argentine submarines, their 209s, suggests that a highly complex antiship torpedo which requires a large number of electrical settings and a complex fire control system is difficult to use in war -- particularly if there has been little or no opportunity to test out a torpedo's fire control system before going into war operations. Such torpedoes are also almost impossible to use manually if there is a failure in the electrical input-firing sequence. The Conqueror's skipper's use of a torpedo, whether through preference or necessity, which lends itself well to manual firing, may also be an indication of this hazard in the employment of today's sophisticated weapons.

That the 209 skippers were not certain whether the Invincible had been fired at would indicate the firing of their SST 4s on sound bearings only (i.e., no periscope looks were involved which would have made the nature of their target certain).

It is not clear why it would be advantageous to shoot on sound bearings from below periscope depth. The high seas experienced during the fall months in the Falklands area should have caused much water mixing with isothermal conditions down

to considerable depths. Hence, the 209s would tend to be as susceptible to active echo ranging while operating deep as they would be up at periscope depth.

At any rate, conventional submarines on both sides -- the British had one in action in addition to the five nuclears which eventually were on-scene -- accomplished little except for their nuisance value.

On the other hand, as summarized in the Secretary of State for Defence white paper:

> "Our nuclear-powered submarines (SSN) played a crucial role. After the sinking of the General Belgrano the Argentine surface fleet effectively took no further part in the Campaign. The SSNs were flexible and powerful instruments throughout the crisis, posing a ubiquitous threat which the Argentines could neither measure nor oppose. Their speed and independence of support meant that they were the first assets to arrive in the South Atlantic, enabling us to declare the maritime exclusion zone early. They also provided valuable intelligence to our forces in the total exclusion zone."

In summary: nuclear submarines had a totally dominating effect on the at-sea operations of enemy surface ships. Conventional submarines, although ineffective, tied up a considerable number of ASW units and caused a heavy expenditure of ASW Ordnance. In another war this might be an important way to dilute enemy ASW efforts against one's nuclear submarines.

Phoenix

WARNINGS FROM THE SOUTH ATLANTIC

Editor's Note: An article on the Falklands War by Vice Admiral George P. Steele, USN (Ret.) adds some thoughts relevant to submarines which should also be regarded, along with "The Submarine Lessons of the Falklands War" earlier in this volume. Some of George Steele's pertinent thoughts from his article, "Warnings from the South Atlantic," follow:

"The Royal Navy used nuclear-powered killer submarines to render the Argentine Navy powerless and to cut sea communications to the Falklands...Not only did this submarine shield allow the Royal Navy to operate without fear of surface attack, it also prevented adequate resupply or reinforcement of Argentine forces on the islands ...

"If the British had been thrown back into the sea, their sea power eventually could have brought all Argentine maritime commerce to a halt. Argentine ports could have been mined, and military bases could have been attacked to bring the Argentine air force to its knees and facilitate the blockade. British sea power could have completed the destruction of the Argentine economy that its own generals had begun. Without doubt, a new Argentine government would have sued for peace and evacuated the Falklands.

"In many ways the Falklands Islands mini-war of 1982 resembles small conflicts of earlier times in which the distant exercise of sea power settled political disputes. Military and political disputes. Military and political lessons dating from ancient times were relearned. The big surprises can be attributed to the short memories, defective educations, or poor judgments of British and Argentine political leaders. British

leadership failed to maintain military credibility when the Falklands were threatened by a volatile and ignorant military dictatorship. The deployment of a single nuclear-powered killer submarine to the area as well as a small garrison with surface-to-air missiles to hold the Port Stanley airfield would most likely have deterred the aggression. Another year of conventional-force reductions in the British armed forces, as planned, and the British seaborne invasion would have been out of the question.

"We must try at least to understand the power of the nuclear killer submarine with its long-range cruise missiles and its guided torpedoes. There is no antidote in sight to the nuclear submarine except another nuclear submarine, and we should build a superior force of such ships. Above all, neither the nation's leaders nor the public may safely indulge any longer in wishful boasting about the military power of the United States. To cry that we are the greatest will do us no more good than it did the poor Argentines.

"The Falklands episode should serve as a providential reminder of the importance of a superior navy. It is high time to rebuild our sea forces.

"For many years the United States' civilian and Navy leadership has been in the hands of those who have put the projection of power ashore above all else. Now, in light of the tremendous sea force possessed by the USSR, that policy is clearly bankrupt. As Alfred Thayer Mahan put it, "the proper main objective of the Navy is the enemy's navy."

Reprinted from Orbis, Fall 1982, with permission of the Foreign Policy Research Institute, Philadelphia, Pennsylvania.

THE SUBMARINE FORCE MUSEUM AND LIBRARY

For years, the Submarine Base at Groton has shown an area (presently a parking lot), just to the south of the Base alongside Goss Cove and fronting on the Thames River, as a location for a "museum." With the establishment of this area as a site for the Nautilus in accordance with a Bill signed by the President in 1980, an opportunity to have a submarine museum-library just inboard of the Nautilus pier, was presented. Submariners in the New London area rapidly responded to this opportunity.

The Submarine Force Library and Museum Association which was incorporated in 1972 by Admiral James Fife, Vice Admiral Vernon L. (Rebel) Lowrance, and Bob Chappell, has taken over the job of raising the money for construction of a museum-library on the Nautilus site -- to be ready when the Nautilus returns to Connecticut in 1985. Although the construction of this museum-library will be in the hands of the Navy, working with the Connecticut Nautilus Committee (chaired by former governor Dempsey), the Library and Museum Association will act as advisors as to its design and content. The Association, a group of dedicated submariners who have volunteered their services to perpetuate the history, tradition and means of the "Silent Service," see the museum-libary as an indispensable way to promote and disseminate a knowledge about submarines and the men involved with them in peace and war.

The content of the museum-library stems from an early collection of submarine models, drawings and related papers which Electric Boat gave to the Submarine Base in 1964. A Sub Base museum was then established at the Sub School. This museum has had a steady buildup of items, from torpedoes, fire control consoles, and submarine models to

personal items such as submarine insignia and cigarette lighters. At the same time a research library connected with the museum obtained a file of World War II patrol reports, the Columbia University series of oral histories from senior officers who conducted submarine operations during WW II, RADM Tommy Dykers "Silent Service " TV series, as well as many books and manuscripts on submarine history, design and construction along with books of fiction related to submarining.

Now, the Submarine Force Library and Museum Association plans to move this reservoir of submarine material to the Nautilus site and greatly expand the content of a museum-library which will be located there. While relatively few visitors annually have visited the Sub School's submarine museum because of Base restrictions, the locating outside of the Base of the Nautilus with its accompanying museum should cause up to half a million tourists and students of submarining to visit this memorial site -- which will be free to the public.

Connecticut's Nautilus committee is aware of the value of enhancing the knowledge of visitors to the Nautilus through the background information they can gain in the contiguous museum-library. The visitor's appreciation of where Nautilus fits into the evolution of modern submarines should be heightened. In addition, the museum-library will provide visitors with shelter, comfort facilities, crowd overflow space, a store for souvenirs, etc.

To aid the public funding of this historical submarine memorial the Submarine Force Library and Museum Association has established a "Building Fund" to assist with the fitting out

and equipping of this building. Submariners, whether active or retired, as well as veterans and civilians with a high interest in submarines are thus given an opportunity to participate in making this museum-library a truly outstanding national asset. Strong monetary support of this effort should insure the Association's influence with the Navy and Connecticut Nautilus Committee in determining the character of this new museum-library. Donations, which are tax deductible, should be sent to "The Submarine Force Library and Museum Association," Box 501, Submarine Base, Groton, Conn. 06349. Checks written to "The Submarine Force Library and Museum Association" should also have in the lower left hand corner the designation of Building Fund.

The museum-specialist at the present Sub Base museum, Dave Bishop, who is helping the Association, has "big plans" for this new museum. He also hopes to have the small subs near Dealey Center on the Base moved to the new site. John Stebbins, the architect for the museum, has additional ideas. "The preliminary design plans call for visitors to enter the museum through a room intended to give a sense of going underwater." He adds, "We may have an audio tape of sonar pinging, the sound of whales communicating and shrimp clicking their feet." (How about carpenter fish hammering away?) Stebbins sees the first exhibit as related to the physiological restraints man faces in going underwater. Another display would deal with the development of the submarine from the Turtle through the Trident and on into the future. Other displays would deal with a submarine's armament, its fire control, the sort of life a submariner has on a submarine, etc.. The realization of these ideas is, to a great extent, up to those who will contribute to the Building Fund.

Rear Admiral Dave Bell, USN (Ret.) is spearheading this effort and can be contacted at (203) 447-9857.

SUBMARINE COMMAND IN TRANSITION TO WAR

The start of WWII was a step into uncertainty for submarine commanding officers. For some, war was an environment to which they failed to adapt and consequently they proved a disappointment to the submarine service. Can lessons be learned from this past experience for those who will command our more modern boats at the start of a next conflict?

I was in carriers until after the Battle of Midway and hence had no first hand experience regarding the transition to war of submarine COs. But I have subsequently examined this problem through questioning of submariners and through an extensive reading of submarine patrol reports. My own later commands in submarines brought this problem into focus and has caused me to attempt to examine it more seriously.

Prior to WWII, submarine COs were a very carefully selected elite. Most in the initial part of WWII performed heroically with imagination, daring and dogged persistence in spite of poor intelligence and poor torpedo performance. Yet there were some who didn't, and proved expensive to the war effort. Why COs failed or succeeded needs to be illuminated. The observations made in this article are not only mine but those of many other submariners who have proved equally interested in this problem. Hopefully, the judgements derived on the basis of

the past history of COs transitioning to war may serve to alert present submarine commands to ways and means for minimizing this problem for a next big naval war.

Looking at several types of peacetime COs who proved inadequate in war, there is first the officer who appeared to be, in virtually every sense, first rate -- hyperactive, charming, articulate and an outstanding administrative officer, he was nevertheless too "high strung" to stand the stresses of war. In the low budget years prior to WW II, submarine operations were insufficiently extensive to test this characteristic in this type of man. Today's intensive nuclear submarine operations, however, should more readily disclose this type of weakness.

A second type of CO who proved inadequate was a product of the slow rates of promotion which prevailed prior to WW II. This resulted in many COs being over 40 years of age at the start of the war. Thus, some were likely to need early relief due to physical exhaustion, lack of sleep, discomfort due to poor submarine habitability, lack of exercise, etc. Today, the ages of nuclear submarine COs are climbing and war would pose this problem for some of them. However, their greater operating experience and better shipboard living environment should make age a less important factor in adapting to wartime conditions.

A third type of inadequate CO was again the result of low budgets. The variety of operations and functions carried out by peacetime pre-war skippers was low. Competition between COs was based largely on appearance of self, crew and boat. Hence a tendency was fostered to have a

submarine present a best appearance in any of the rare operations conducted -- meaning that the CO tended to always put the most experienced officer, himself, in charge of every function. The result was that when war came, such officers proved readily overworked and exhausted from war action. Today's far more extensive operations, improved submarines and greatly improved methods of training and delegation of jobs should make patrol exhaustion less of a factor in a war. Additionally, the rapid force expansion experienced in WW II submarines, with Reserves, and the greatly increased training load they inflicted on submarine COs is not so likely in a nuclear powered force which is far less susceptible to rapid expansion.

Perhaps the CO most susceptible to failure was the one who worried too much about the unknown. The scarcity of information on the enemy at the start of WW II is hard to imagine in today's environment of a seemingly overwhelming amount of information about everything. The profile of the Japanese naval man was ill-defined and most derogatory. The characteristics were only too frequently badly exaggerated. Aircraft, for example, were felt to be far more of a threat than they actually proved. And the enemy waters where U.S. submarines fought were poorly described. Obsolete Dutch charts for the Borneo area, for example, were the only navigational charts available. Sonar was primitive and of little help to the CO in the assessment of a situation. Radar was very erratic or didn't exist. The bathythermograph arrived later in the war. Effective evasion tactics could only be guessed at. In fact, early detection of enemy threats was unlikely and hence a skipper's imagination could easily run riot if he concentrated too much on the possible dangers close around his submarine. At the same time,

the WW II CO in transition was stressed by an uncertainty about the performance of his submarine's power plant, the diesel engine, and a great uncertainty about his weapons, mainly the torpedo. The HOR engines were an example of the former material problem. Known as "the Kaisers revenge" these diesel engines with a high horsepower per pound ratio, rarely ran for five hours without failure of the myriad of oil lines needed for their functioning. Why such an abortion could be accepted by the Navy was evident when I checked the peacetime correspondence and logs on the engines of the submarines I served on. Although there was much evidence of trouble with the engines, the correspondence extolled the theoretical advantages of the compact design of the engines and made little attempt to condemn them. It seemed evident from the correspondence that most submariners didn't want to risk disfavor and promotion by criticizing their material. The torpedoes proved to be the same sort of political problem. Even when their faulty performance was observed and reported, correspondence indicated that the higher commands tended to credit poor performance to the operator's fire control failures, personnel errors or failures to properly maintain the torpedoes. The let-down suffered by a CO when the torpedoes he used in a highly dangerous approach on an enemy target failed to run true or explode on impact, may have been a major cause for the worries which incapacitated some of the COs at the start of the War.

What has been said so far can be brought into better focus by the observations of one of those COs who transitioned to WW II war operations -- Vice Admiral Robert Rice, USN (Ret). Although he was a highly effective wartime CO and not one who failed to adapt, he passed along a few thoughts to me which clarify some of the points just made:

I'm sure now as I look back, that my age, over 40, was too old for a good submarine skipper... There were some skippers in those days who overly centralized their boats to "look good" -- we all know of several, one of whom turned his submarine over to his exec and incarcerated himself... By and large, there's no doubt in my mind that the comparative lack of success of the early skippers stemmed from horrible torpedo performance (depth, magnetic exploders, etc.)... Remember we had no radar, except the very first model SD which turned out to be a most effective beacon to attract Jap planes while we charged batteries at night... My second ship, Paddle, was cursed, along with her class of boats, with the HOR engine which was uniformly a flop...

Another submariner who saw the transition to WW II, Captain Mike Sellers, summarized the characteristics of many pre-WW II peacetime COs. He describes them:

- "He was so cautious that everything had to be first doublechecked, and he took the time to do it. He wasn't about to take a chance of making an error;
- he blindly followed stereotyped training procedures year after year with few suggestions for improvement;
- he had to go by the book and do well in competition at all costs;
- he was either hesitant to, or was incompetent to, speak out on new ideas for improvements. He didn't 'rock the boat;'
- he would rarely if ever 'take a chance.' One didn't take chances in submarines because it was not worth the price of

failure, promotion or command;

- and he wasn't allowed to have the experience of seeing and hearing his warshot torpedoes hit and explode in a target, if only a dummy target."

If today's COs of submarines are like this, then expect the same sort of problems in transitioning to war.

Mike Sellers also gives his ideas of the characteristics for a good wartime CO:

- "The vigours of submarine war patrols demand a youthful man;
- the CO had to develop a certain "devil may care" attitude;
- the CO had to have confidence in himself and his crew and rely on his younger officers, both to train them fast for more senior jobs as well as to spread the load. This was a recognized risk that had to be taken;
- the WW II CO was accustomed to taking the 60:40 chance of success in most of his actions. (He knew that high risks led to big payoffs.) This sort of risk-taking was unheard of in peacetime;
- he generally emphasized training on a daily basis, i.e., underway to and from patrols, daily battle problems generated by dummy runs on the TDC, emergency drills, etc. as opposed to the once a week drills conducted prior to WW II;
- he normally encouraged questions and suggestions, including ones related to his actions and decisions -- no matter how frivolous. He in turn said what he thought and used facts to help train his officers in decision making;

- and he didn't let red tape or Bureau rules inhibit him. (When Bu C and R rules did not apply to wartime procedures, we disregarded them although that would have been a heinous crime in peacetime days.)"

To these thoughts of Sellars, I would add that the good wartime skipper, in my experience, didn't necessarily adhere to doctrine if innovative actions appeared to have greater payoff. For example, remaining at periscope depth during an entire day's submerged patrol was an innovation which created more target opportunities while taking a (greatly exaggerated) risk of being sighted by aircraft. The good CO knew that war was dangerous and couldn't be satisfactorily pursued if an attempt was made to reduce all risk in a situation. Moreover, the good CO acted promptly, even if there was a possibility of error from his actions. (Long study of the problem and excessive checking of alternatives invariably seemed to lead to missed opportunities.)

What seems to need consideration for those COs who might enter a World War III is that:

- in this age of specialization, great care must be taken to insure that COs will acquire the necessary command qualities and skills in addition to their technical specialities;
- risk taking by COs should receive special mention and credit whereas the tendency towards non-risk taking should be discouraged;
- an appreciation of history, and particularly of the shortcomings of COs in their transition to war in WW II, seems necessary. This would also lead

to a recognition of the probability of the unexpected and a developed mind-set to accept this factor as part of war;

- o the age factor must be taken seriously and younger men trained, to throw into CO positions at the start of a big war;
- o the torpedo fiasco of WW II may be replayed, or another part of a weapon system, the computer for example, may prove the Achilles heel, if an unexpected enemy technology or tactic is introduced which has not been programmed for or a computer outage exists without recognition;
- o the demands on a CO's intelligence are far greater today than in WW II and will increase with time. The use of that intelligence for innovating should be encouraged and rewarded. Today, recognition of this factor on a man's fitness report can be a great stimulus to a CO's warfighting effectiveness;
- o the CO must know his own weapons well, and their use, as well as the character of his potential enemies and how they are likely to fight. These are the first requirements of a warrior and their development needs encouragement. (The Air Force's Project Warrior recognizes this need in today's peactime environment.)

Such generalizations are easily, if not casually, developed by a retired submariner with World War II experience and some awareness of the CO problems in modern submarines. Perhaps their only value is in creating an awareness of some factors which were eventually recognized at great cost in WW II and need not be repeated for WW III.

Captain Richard B. Laning, USN (Ret.)

Statements to the House Seapower Subcommittee

A digest of the:
Statement by VAdm. Nils R. Thunman, USN, Deputy Chief of Naval Operations for Submarine Warfare to the Seapower Subcommittee of the House Armed Services Committee

You may have noted that two key elements run consistently through the current overall naval strategy as enunciated by both Admiral Watkins and Secretary of the Navy Lehman. These are an emphasis on deterrence and a commitment to a forward defensive posture. As I testified last year, submarines have key roles in both of these elements. Our strategic missile submarines make up a solid leg of the strategic triad and our attack submarines are uniquely capable of operating with great effect in the forward-most ocean areas of U.S. national interest. It is extremely important, therefore, that we equip our ships and train our people to capitalize on the unique characteristics of the modern nuclear submarine, and this is precisely the orientation of the Navy's submarine program.

As we strive to maintain maritime submarine superiority, we face a potential adversary who is intent on building both a first rate, highly capable submarine force with which to meet us, and also a competent anti-submarine warfare force to stymie our potential advances.

Even though they have been working hard over the past 20 years to develop an ASW capability with which to counter U.S. submarines, neither current intelligence nor our own development work in ASW indicates any dramatic advance or imminent breakthrough either by acoustic or any other

means of detection which would put our submarines at significant risk.

The sea is opaque, and the extraordinary capabilities of stealth, endurance and survivability which we build into our submarines enable them to function as a major deterrent to war, and a significant factor in victory should deterrence fail.

The goal of 100 multi-mission nuclear powered submarines is needed to:

- o Penetrate deeply into hostile seas to conduct sustained independent operations against enemy submarines and surface forces and, with the introduction of the cruise missile, to attack land targets.
- o Form choke-point barriers to intercept opposing submarines and surface ships and deny them access to the open seas.
- o Operate in direct support of carrier battle groups against both submarine and surface threats.
- o Conduct broad ocean search and sanitization to detect and destroy enemy submarines threatening sea lines of communications.
- o Conduct covert special missions such as mining, reconnaissance, and landing special warfare teams behind enemy lines.

In performing these missions, attack submarines must be effective in all ocean areas of the world: restricted waters, under the ice, in the tropics and in both deep and shallow oceans.

We are requesting authorization for twenty-one additional SSNs in our five year plan. The higher rate of construction planned for the latter years of our program is needed to replace the large numbers of existing submarines which

will reach nominal end of life in the 1990's. At the end of the current five year plan in 1988, projecting eighteen deliveries and eight retirements, we will have ninety-eight nuclear attack submarines.

ATTACK SUBMARINES

Acquiring the required number of attack submarines is expensive and we have continued to explore ways to achieve commensurate effectiveness for less capital investment; but, unfortunately, our efforts have not been successful. There simply is no effective alternative to the multi-mission SSN in today's arena. As I stated in my posture statement last year, the diesel submarine can not match the capability of the modern nuclear attack submarine in any major mission category.

Our most likely potential adversary, the Soviet Union, has a modern attack submarine force of which the majority of the deployable front line units are nuclear powered. The Soviets have more submarines and their submarines, sensors and weapons are modern. They have developed the largest, most capable submarine shipyards in the world, facilities in which up to twenty submarines in a year can be built. Recently some eight to twelve submarines have joined their fleet each year.

To match this fleet of modern submarines U.S. attack submarine strengths lie mainly in quiet operation, superior sonar and torpedo performance, and superb operational and survivability characteristics in high threat areas. In short, an acoustic advantage. We can hear his submarines before he can hear ours, but the Soviets are clearly improving in their ability to build quieter submarines. To maintain the competitive edge so necessary in light of

superior Soviet numbers, we need to continue to improve our 688 class submarines and to design a new SSN for deployment before the end of this century.

The attack submarine currently being built, the SSN 688 class, was designed in the late 1960's. They are particularly effective primarily because of their high speed, low radiated noise and superior sensor systems. In the face of ominous Soviet trends, we are placing high program priority on improving their warfighting capability. The design for follow-on new-construction 688 class submarines has been modified to include vertical launch tubes for cruise missiles, an advanced combat system (SUBACS) which will incorporate new sensor and computer processing capabilities and which, when coupled with new sonars such as the wide aperture array, provides a significantly expanded capability.

As we look to the future, it is clear that we are close to the point where additional advancements to further improve 688 class performance will not be feasible due to design, weight and space limitation.

We are now looking at conceptual designs to determine what characteristics a new SSN should have. This effort is timed so that it could lead to the development and authorization of a new class SSN in the late 1980's.

The three main submarine weapons are the heavyweight torpedo, the rocket boosted standoff weapon and the cruise missile. The MK 48 torpedo makes up the majority of our weapon armament and targets. We are progressing well in our program to upgrade all these torpedoes to a reliability-enhanced configuration and nearly half the fleet inventory has completed this process. The MK 48

advanced capability, or ADCAP program is developing a major performance enhancement modification to the torpedo.

The submarine ASW standoff weapon, which will replace the aging SUBROC rocket-propelled depth bomb, is in the demonstration and validation phase of development. It will carry a newly developed nuclear depth bomb payload, and the development program includes a funded follow-on conventional payload variant.

Harpoon cruise missiles are aboard our SSNs complementing the anti-ship capability of the MK48 torpedo. They have performed extremely well in fleet firings. Submarine Harpoon will be supplanted by the anti-ship Tomahawk beginning later this year. The nuclear-armed land attack Tomahawk will attain Initial Operating Capability (IOC) in mid-1984. The wide-ranging tactical strike capability of Tomahawk-carrying attack submarines will add an important new dimension to the conduct of naval warfare.

Our submarine force must also be able to operate extensively around and under the ice. We are expanding the arctic warfare capability of the 688 class submarine and the weapons we intend to employ under the ice.

STRATEGIC SUBMARINES

Deterrence of war has been the sole mission and the fundamental reason for the existence of the FBMs. Fleet Ballistic Missile submarines from USS George Washington in 1960 to USS Ohio in late 1982 have successfully completed two thousand one hundred and nineteen (2119) strategic deterrent patrols.

USS Ohio, the first ship of the Trident class, completed her first patrol in December 1982 and

is presently deployed on a second patrol in the Pacific. The second ship of the class, USS Michigan, is currently enroute to the Pacific. The third Ohio class ship, Florida, is at sea right now on sea trials and is scheduled for delivery in June. Work on the tenth submarine began late last year.

Current Navy planning calls for fifteen Trident submarines. Each Trident is far more capable than the Poseidon submarine it will replace, both in terms of number of missiles carried and destructive capability. It will make a quantum leap in capability over the Poseidon submarine when the new Trident II (D-5) missile enters the fleet in 1989. Presently there are thirty-one Poseidon submarines, of which twelve have been backfitted to carry the Trident I (C-4) missile. The increased range capability of the C-4 allows a far more exspansive operating area than if the Poseidon missile were carried. Greater missile ranges also considerably reduce dependence on foreign bases.

STRATEGIC MISSILE MODERNIZATION

The Trident II (D-5) program is in the advanced development phase and, although the design is not yet finalized, it is certain that the D-5 can deliver significantly more payload than the current C-4 with a major improvement in accuracy. Also, its full load range will be comparable to or greater than the C-4, and the option will exist to configure for greater ranges with fewer reentry vehicles. The D-5 capabilty could be placed aboard the new construction Trident hull (SSBN 734, the 1981 authorized ship).

STRATEGIC SUBMARINE BASES

In the Atlantic, fleet ballistic missile submarines are based at Holy Loch, Scotland,

Charleston, South Carolina, and Kings Bay, Georgia. In the Pacific the sole base is at Bangor, Washington.

Improvements in the logistical support system have reduced 30 day refits which were scheduled for Poseidon submarines to 25 days for the Ohio class ships.

USS Michigan will soon arrive and ultimately ten Ohio class ships will be homeported at Bangor. The Trident base at Kings Bay, Georgia is under construction and will have the same major facilities as the Bangor base.

The Kings Bay base currently supports our squadron of Poseidon submarines backfitted with the Trident I C-4 missile system.

SUBMARINE DISPOSAL

No decision has been made yet to dispose of inactivated units. The intent is to enable a deliberate and thorough study of alternative disposal methods. At present four defueled nuclear submarines are inactivated and in waterborne protective storage. Three more are in the inactivation process. An eighth, the Nautilus, has been prepared for permanent layup as a national monument.

SUBMARINE FORCE PERSONNEL STATUS

As Admiral Watkins has noted, the Navy's greatest resource is its people; and nowhere is that more true than in the submarine force.

I am very, very proud of our submarine force men and women. Officer or enlisted, submarine crew or support personnel, nuclear-trained or not, they comprise as fine a group of dedicated

professionals as exist in the armed services today.

The pay initiatives authorized by Congress, the increased submarine pay, improved nuclear officer incentive pay and selective reenlistment bonus changes, combined with Navy initiatives, have created distinctly positive trends in our recruitment and retention.

During the past year we have seen improvement in officer accessions into the submarine nuclear power program, and steady improvement in officer retention. The efforts to increase accessions have resulted in the highest number of officers brought into the nuclear training program in its history.

In fiscal year 1982 we projected that officer retention would be 37% but we actually retained a total of 123 officers, or 39% of the applicable year groups.

So far this year we have seen 14% fewer officer resignations than for the same period in the previous year - we continue to man our submarines fully by keeping 77% of our commanders and junior assigned to ships, a slight improvement over the 79% so assigned a year ago. The average submarine officer now expects to spend fourteen of his first twenty years of service in a submarine crew.

Enlisted retention has also continued to improve. Two years ago we had only 70% of the senior supervisory enlisted billets in submarines manned by petty officers of sufficient experience. Today we are filling 85% of these billets with the required seniority. Even though the petty officer is retained we must sacrifice shore rotation and keep him at sea to keep the submarines combat ready.

If we are to maintain our momentum in improving the submarine personnel situation, we must continue to insure that pay for these highly trained and technically skilled officers and enlisted personnel remains roughly competitive with what they could earn in the civilian sector. We must also continue to reward certain groups whose talents and knowledge are in short supply. Pay is not the total solution, but it is a large part of it.

SUMMARY

The potential adversary we must be prepared to face at sea is from all available evidence building and training to match us, and he obviously shares the opinion that a strong, modern submarine force is an absolute necessity to gain that parity or to upset the balance in his favor. Although currently out-numbered, our force is more professionally capable and outfitted with better equipment. The 1984 submarine program which you are about to consider will allow us to maintain the technical and professional advantage which we need.

A digest of the
Statement of Admiral Kinnard McKee (Director of the Naval Nuclear Propulsion Program) to the Seapower Subcommittee of the House Armed Services Committee on March 2, 1983

Last Saturday I returned from the initial sea trials of two new nuclear submarines: the FLORIDA -- our third TRIDENT submarine, bringing the TRIDENT submarine force to three, with seven more authorized -- and ALBUQUERQUE -- our 22nd

SSN 688 Class attack submarine. I will go out with another new SSN, NORFOLK, on Friday, bringing the 688 Class attack submarine force to 23, with 18 more authorized. The Navy's 1984 budget request will add one additional TRIDENT submarine and three attack submarines to that force.

Today, the 125 nuclear powered submarines represent over 40 percent of the Navy's first line combatants, yet our submarine officers and enlisted men comprise only about four percent of the Navy.

It is particularly important to recognize the contribution of our TRIDENT/POSEIDON force to our strategic deterrent posture. A substantial portion of the U.S. strategic nuclear warheads and the most invulnerable are based at sea. The true value of this major investment can only be measured in the fact that they have remained unused.

Our record of safe and effective operation continues to depend upon the technical integrity of a small group of dedicated headquarters and field personnel in my organization, and upon the operational skill and dedication of the men who operate these ships daily under difficult, demanding, and, at times, dangerous conditions.

The Naval Nuclear Propulsion Program makes extraordinary demands on these men -- long hours, endless training, qualification, and requalification. It is not enough that they must achieve a singular level of professional competence. They must also prove their competence over and over again; and all this they must do in the face of extended and frequent separations from their families.

To meet our national commitments, our attack submarines average about 50 percent of the time away from port, and our strategic deterrent submarines 65 percent.

Congressman Whitehurst Statement

This is a digest of a Statement made by Congressman Whilliam Whitehurst, a member of the Seapower Subcommittee, to that Subcommittee, for the record, 2 March 1983. (Ed. note: This is an unusual procedure and seems to indicate a strong continuing interest by some members of the Congress in keeping alive the argument that the U.S. Navy should pursue a diesel-electric submarine option.)

Mr. Chairman, I want to make it very clear at the outset that I do not advocate substituting diesel electric submarines for a single nuclear attack submarine that would otherwise be acquired. I accept the Navy's stated needs for far more attack submarines than we in the Congress have provided. My concern is the rate of submarine acquisitions and the dangerous trends that we have established. Of course I'm aware of the Navy's opposition to diesel electrics and the arguments they have presented; however, I'm convinced that Thucydides described the current situation some 2400 years ago, "...their judgment was based more on wishful thinking than on sound calculation of probabilities; for the usual thing among men is that when they want something they will, without any reflection, leave that to hope, while they will employ the full force of reason in rejecting what they find unpalatable."

The composition and the quantity of submarines we have is far too important to leave to hope.

In reality, funds have been appropriated for eight attack submarines during the past five years. This is an average of 1.6 per year. If this rate is continued it will eventually result in a force of less than 50 attack submarines. That prospect frightens me very much.

It wasn't planned this way though. The Navy's five-year plan of five years ago called for building far more, just as the five-year plan of today does. There always seems to be five per year in the fourth and fifth years. Based on the history of the past decade, I believe these rates represent a cruel and false hope.

A number of naval analysts have recommended that 1) nuclear submarines are not required for every mission (missions for diesels are listed as coastal defense and choke point barriers); 2) being outnumbered by the Soviets 3:1 is being far too heavily outnumered; and 3) as more and more nuclear submarines require expensive overhaul, funds will not be available to increase sufficiently the new construction rate of the past five years.

The Secretary of the Navy has told us that he is dependent on Allied diesel electrics. This strikes me as a mighty risky policy when we consider the track record of our allies in supporting us over the past 35 years.

The most alarming consideration is the weapons these submarines carry. They may well be adequate for the anti-surface and anti-amphibious roles they are assigned. However, there is serious doubt that these weapons can be relied on

to support the U.S. Navy against the full range of Soviet naval might. Testimony in support of the MK-48 ADCAP (Advanced Capability) torpedo improvement program and the ALWT (Advanced Lightweight Torpedo) clearly eliminates most NATO submarines from consideration when the full Soviet threat is considered.

Protagonists of diesel electrics see them as a force building tool that is affordable and urgently needed. Antagonists see diesel electrics as a threat to future nuclear building plans and therefore refuse to provide the option.

I propose that we pursue options (B) and (D). I believe that (option B) we should double the nuclear attack submarine building rate of the past five years. In addition, we should take the first step in developing option (D) by authorizing to be appropriated funds for construction of a lead ship diesel electric attack submarine for test and evaluation.

Remarks by VADM Thunman to the Subcommittee in answer to Congreeman Whitehurst's statement on Diesel Submarines.

I would like to discuss an issue of great importance which Congressman Whitehurst has already addressed ... whether the U.S. attack submarine force should consist of nuclear powered ships or a mix of SSNs and diesel-electric submarines.

In response to that direction we moved out along two paths to evaluate the potential role of the diesel-electric submarine in the U.S. Navy ... we initiated a diesel-electric design study

and, in parallel, conducted an evaluation of several foreign submarines. Underlying both of these efforts was a strong desire to ensure our submarine force of the future is as effective as possible given the realities of limited resources. This study was provided to the Congress in August 1982.

To determine the effectiveness of a conventionally powered submarine developed in this country, the Naval Sea Systems Command conducted a baseline feasibility design of a modern submarine using diesel-electric propulsion and U.S. Navy certified components. That design, which we called SS-X, incorporated extensive quieting features, a modern combat system and current U.S. submarine safety and production requirements. The lead ship cost was $612M with a follow-on ship cost of $310M.

We also surveyed existing and new foreign designs as a part of our study. These included French, Italian, Japanese, Dutch, and British submarines as well as the German TNSW TR-1700 and HDW T2000 designs. An evaluation team visited both German shipyards in early 1982 to evaluate their designs.

While several foreign designs appeared well suited to the needs of the particular countries for which they were being constructed none were judged to satisfy U.S. requirements without extensive modifications. Even if the German designs were modified to meet U.S. Navy standards and if quieting similar to the U.S. design were provided, the U.S. and German designs would be similar with an advantage to the U.S. submarine due to the more capable combat system. The conclusion reached was that it would be necessary to transfer an extraordinary amount of engineer-

ing technology to upgrade a foreign design to a submarine similar to the SS-X. Therefore, the study concluded that foreign designs should be eliminated from further consideration.

Subsequently a military capability assessment of the SS-X design compared the effectiveness of the SS-X with an improved 688 class nuclear submarine. The conclusion over all mission areas was:

o Employment of the diesel-electric submarine would be restricted to areas free of ice cover and where friendly forces control the air space.

o Even in the mission for which SS-X is best suited -- the continuous fixed barrier mission with forward basing -- a mixed force of diesel-electric and nuclear submarines provides no more effectiveness for the same cost as a force comprised entirely of nuclear submarines.

o The mixed force provides substantially less capability in all other missions for the same cost and, in addition, would limit the flexibility of the tactical commander in assigning submarines in response to changing needs.

Mr. Chairman, no one could agree more with Congressman Whitehurst than I that we must strengthen our submarine force. In my view, the construction rate of attack submarines has not been sufficient over the past five years. I am particularly concerned because of the growth of the Soviet submarine force and the qualitative improvements in their nuclear submarines. It is exactly because of this concern that I feel it is imperative we invest our available resources where they can most effectively promote our maritime strategy. We must have the mobility,

stamina and combat potential to respond on short notice to crisis or conflict virtually around the globe. Having considered this and having carefully examined the relevant factors, we have concluded that procurement of diesel-electric submarines would not be cost effective in adding to or maintaining the overall capabilities of the U.S. submarine force.

DISCUSSIONS

Sea Deployment For MX?

The major military threat to the United States is that of Soviet nuclear weapons aimed at missile and bomber bases inside the United States. From the Soviet point of view, the major military threat to the Soviet Union is that of US-based missiles aimed at Soviet missile and bomber bases inside the Soviet Union. These naturally generate surprise-attack thinking on the part of U.S. and Soviet military men.

Even though U.S. and Soviet leaders say they do not intend to launch a surprise attack, how can the other be sure? "Instant retaliation" or "launch under attack" would come too late to preserve and defend America. In evaluating the latest land-based MX proposal, Congress needs to know the complete and systematic cost to America of a surprise nuclear attack on US-based nuclear weapons with collateral damage on transportation, industries and population.

At this moment, the United States has within its own borders intercontinental missiles and bombers targeted around the clock on the Soviet Union. We continue to tell ourselves, "It can't happen here because we have deterrence."

The Pentagon claim that the U.S. can deliberately deploy nuclear weapons in a way that exposes the United States itself to surprise attack and then say we have "deterrence" simply hands to the opponent the freedom of action we should above all retain for ourselves.

Congress should review the shock and paralysis that gripped the American high command in the wake of other surprise attacks, such as the Pearl Harbor surprise in 1941, the North Korean surprise attack on South Korea in 1950, and Chinese surprise attack on U.S. forces in North Korea a few months later. Is Pentagon insistence on US-based nuclear missiles and bombers risking another surprise attack incalculably more devastating than Pearl Harbor?

Additions to the present U.S. nuclear posture must serve to reduce, rather than increase, vulnerability of the United States to any attack, including surprise. This means removing all nuclear missiles and bombers, and their command and control, from the United States itself and deploying them in ships and submarines at sea. It means compensating for the Soviet 2.5-to-1 superiority in land area and taking advantage of the more favorable U.S. access to the open oceans. Sea-based deployment would remove America from the line of fire of early strikes on strategic forces.

In 1967, the Defense Department STRAT-X Study found the surface ship-based missile system to be the most cost-effective deployment mode, virtually impossible to destroy by surprise attack. The submarine system was second most cost-effective, with the hard silo and land

mobile systems third and fourth, at over twice the cost of the sea-based systems. Land-based bombers were eliminated early in the study because of vulnerability of the air bases. The foregoing calculations did not include the cost to America of a nuclear attack on each of the basing modes, in terms of blast, heat, fallout and radiation destruction of U.S. land, water, cities, industries, transportation and population. The study group agreed that with guidance technologies available then, missile accuracy in each of the four basing modes would be about the same.

Deployment of MX in submarines and ships at sea would be the least costly of all strategic forces basing modes, secure from surprise attack and protected by the U.S. Navy and Air Force.

George H. Miller, Rear Admiral, USN (Ret)

Torpedo Boat or Missile Boat, The Weapon System Makes The Difference

Twice since the HOLLAND IV was launched the United States submarine community has pursued new weapon systems which have proven successful. These innovations were introduced during the early post-World War II period. The first was a weapon system that set the stage for the anti-submarine submarine; the second led to the fleet ballistic missile submarine. These steps, taken between 1947 and 1957, account for the shape and success of today's submarine service.

Continued success in naval system development requires a partnership between weapon and ship systems. A healthy partnership requires accommodation toward an effective working relationship. This relationship may be stressed when two or more different weapon systems fail to find satisfactory accommodation within a single ship. The submarine development community is presently hog-tied in precisely this situation. The operational community, by tradition, accommodates the torpedo with its finesse tactics of target motion analysis, closing, and attack. Meanwhile a whole array of standoff systems are presently being force-fit within a ship framework whose combat system is designed around the torpedo. As a result, the overall gain in submarine system capabilities is marginal.

The new family of submarine standoff weapon systems can enhance the submarine's capacity to handle existing tasks and open up additional tasks as well. The anti-ship HARPOON and TOMAHAWK missiles would permit the submarine to launch effective attacks against heavily defended surface groups from well outside the defended perimeter. In addition, the conventionally armed, land-attack TOMAHAWK missile adds a capability to launch surprise strikes from water contiguous to the opponent's homeland. The nuclear armed, land-attack TOMAHAWK could complement the fleet ballistic missile system by assuming theater nuclear force and/or strategic reserve force roles. In short, the military market opened by the new generation of standoff weapons could radically alter the demand for submarine services. The meeting of this demand is dependent upon flexibility in the partnership between the submarine weapon and ship system community.

The new generation standoff weapons provide the foundation for a naval system whose style of combat would differ substantially from older systems. The difference in style should be reflected in differences in ships. Classically, standoff weapons and their tactics are those of naval CRUISERS. Attacks are launched as soon as practical after detection and the ship is maneuvered in such a fasion as to retain a weapon range advantage. Today's general purpose nuclear submarines have the mobility, displacement, and names of CRUISER types, but retain the weapon system installation logic of submarine torpedo boats. A CRUISER weapon system must concentrate on target localization at maximum range. The option of firing large salvos of standoff weapons will be important in order to assure defense saturation. Weapon inventories of over fifty and approaching one hundred per ship can be justified based on the number, type, and mix of targets to be addressed.

The tactics and needs of a close-in ATTACK type system differ substantially from a CRUISER type. After target detection, ATTACK systems will close the target to a point which maximizes the effectiveness of their weapons. The battleship, as an ATTACK type system, employed armor and compartmentation to enhance survivability as the probability of counter-attack increased during closing. ATTACK type submarines substitute stealth for armor and compartmentation. Their weapon has been the torpedo, the effectiveness of which is enhanced with decreasing firing range. An ATTACK type normally addresses individual targets in sequence, thus the importance of salvo size is diminished. Because the ATTACK type will use individual weapons more efficiently, and has a more restricted target mix, weapon inventories of less than fifty may be justified.

It is time for the naval system development community to begin considering two, not one, new generation submarines; a CRUISER type, and an ATTACK type. The ship characteristics of the SSN 688 family offer an excellent foundation for a CRUISER type. Emphasis is required to adapt the ship to CRUISER style warfare, which exploits standoff weapons. When we move on to consider the desirable characteristics of a dedicated submarine torpedo boat, we are opening up what might appear to be a new naval system question. Yet, the ATTACK submarine was the original option. It truly must be capable of going into harm's way; penetrating into enemy-held waters and closings targets to effective torpedo range. The resulting system should be capable of handling any target which is a legitimate torpedo target. As a starting point, why not consider a ship with twice the number of torpedo tubes and one-half of the displacement of the SSN 688?

If we fail to develop a better working partnership between the weapon and the ship system engineer, the submarine may meet the same fate as the ARMORED CRUISER. Simply stated, this means that the style of the weapon system is not matched to the qualities of the ship, and vice versa. The potential of the U.S. submarine force should not be limited by this possible trap. We need a torpedo boat and missile boat!

J.B.L.

Personnel Matters

The follwing major command assignments have been announced:

- ComSubRon 14 -Capt. George DAVIS
- ComSubRon 16 -Capt. Raymond JONES

- ComSubRon 18 -Capt. Arlington CAMPBELL
- CO USS McKEE -Capt. John ROBERTSON
- ComSubDevGru 1 -Capt. Dave GORHAM
- COSUBASENLON -Capt. J. RANSOM
- ComSubRon 3 -Capt. Harry CHILES
- ComSubGru 7 -Capt. Dave OLIVER
- ComSubDevRon 12 -Capt. Virgal HILL
- CO USS HOLLAND -Capt. Donald BROADFIELD
- CO USS SIMON LAKE -Capt. Gerald EGAN
- CO USS L.Y. SPEAR -Capt. John WHELAN
- CO USS E.S. LAND -Capt. Robert PARTLOW
- CO USS CABLE -Capt. James GRISE
- ComOceanSysPac -Capt. Robert FITCH
- CO USS CLEVELAND -Capt. Barton BACON III
- ComSubRon 10 -Capt Douglas VOLGENAU
- Co SUBASESDGO -Capt Kirk WALTERS
- CO SUBASE BANGOR -Capt. Robert ALDINGER
- CO SUBSCOLNLON -Capt. William HOULEY
- CO NAVSTACHASN -Capt. Stanley SKORUPSKI
- CO USS ST. LOUIS -Capt. William GAINES

The FY 84 Active Line Captain selection Board reported out on 1 March 1983. Vice Admiral Thunman was President of the Board, with Rear Admirals Burkhart and Carter the other submarine members. 67 submariners were in the zone; 45 were selected, for a 67% selection opportunity. One above-zone and 3 below-zone submarine officers were selected.

The following submariners were selected for Commodore by the FY 84 Board:

Roger Bacon
Guy Reynolds
Chauncey Hoffman
Dean Sackett
Guy Curtis
Malcolm MacKinnon (EDO)

Current Submarine Events

USS OHIO (SSBN 726), the first TRIDENT submarine, has completed her second patrol and USS MICHIGAN (SSBN 727) has arrived on the West Coast for an availability at the Puget Sound Naval Shipyard before beginning her patrol cycle. MICHIGAN transited the Panama Canal on 1 March 83. USS FLORIDA (SSBN 728) has started her sea trials from Electric Boat.

SECNAV announced that a nuclear attack submarine, SSN 709, will be named USS HYMAN G. RICKOVER in honor of retired Admiral Rickover, who is frequently referred to as the "Father of the Nuclear Navy." SECNAV stated, "It is most fitting that a nuclear-powered submarine representative of Admiral Rickover's professional and material excellence carry his name." Mrs. Rickover will be asked to be the ship's sponsor. The SSN 709 is scheduled to be launched in August 1983.

USS NATHANAEL GREENE (SSBN 636) recently completed her 50th strategic deterrent patrol with her return to the Holy Loch on 16 February 83. VADM S.A. White, USN, COMSUBLANT congratulated the crew on their return to port.

Book Review

War Under the Pacific by Keith Wheeler and the Editors of Time-Life Books on World War II, Alexandria, VA 1980.

Submarine veterans of World War II are not the only folks who will be delighted to discover this latest book on their often frustrating and tense but ultimately brillant, daring and successful

saga against the Navy of Imperial Japan. Well written in easy non-technical prose, beautifully illustrated, it will find avid readers in all age groups. The veteran submariner will be disappointed only in not finding more of everything.

War Under the Pacific opens with the familiar story of a submarine force unready for combat -- handicapped strategically, doctrinally and operationally. The crippling of the surface fleet at Pearl Harbor wiped out the expected scouting mission with the battle fleet. Author Wheeler finds many flaws with the submarine's actual role in commerce raiding. It was a product of quick improvisation that certainly merited a broader grasp of the task at hand. Wheeler is much less critical of early leadership problems, however, than Clay Blair in his monumental Silent Victory.

Historically the submarine was never a favorite of the great maritime nations. It has been more the weapon of a continental power, isolated from the sea, who uses this weapon system of stealth not to control the seas but to deny enemy control. Britain and America, dependant on the sea for survival, could hardly be expected to foster development of a warship that could destroy their fleets. Proposals for abolition of the submarine and humanitarian pleas against unrestricted submarine war marked the interwar years. The development of sea based air power and new techniques of underwater detection, moreover, convinced many that the submarine could not survive in a war. The fleet role for the low speed submarine was in itself somewhat contrived. Nor did the submarine force ever produce a fanatic like General Billy Mitchell to carry the torch for the submarine as he did for the equally unproven and untested system of strategic air power. One can only speculate on the role of the

submarine had the fleet not been sunk at Pearl Harbor.

Japanese submarines operated with the fleet generally in accord with American prewar doctrine and they were generally unsuccessful. Since the improvised role for U.S. submarines eventually became the decisive factor in the Japanese collapse, Pearl Harbor -- whatever its tactical success -- proved more of a strategic disaster for Japan than generally believed. And last but not least, the wretched torpedo performance in the early months of the war would have defeated even the best laid plans for conducting a war.

It was mid-1943 before a good torpedo was finally in service. Superb new radar and other equipment also gave subs a marked advantage, which scores of daring skippers developed devastatingly, particularly in night surface attacks. Submarines concentrated on focal points of shipping with targeting priorities focused on tankers and troop ships. The slaughter was on. Thanks to skillful development of operational intelligence gleaned from code breaking, the tally began to mount. As Wheeler notes, the numbers of submarines in the Pacific rose from 56 as of 7 December 1941 to 100 by January 1944 and 156 a year later. Japanese merchantmen sent to the bottom eventually rose to almost five million tons (1113 ships) -- twice the number of U.S. merchant flag vessels today, to give a measure of comparison. Japanese Navy losses to U.S. submarines were also crippling: 201 warships of 540,192 tons, including 1 battleship, 4 large carriers, 4 small carriers, 3 heavy cruisers, 8 light cruisers, 43 destroyers and 23 large submarines. U.S. subs sank 55% of all Japanese ships lost in the war in all theaters. This was more than the surface navy, its carrier planes and the Army Air Forces combined.

If the adventure of sinking ships was not enough, the submarines performed an almost unbelievable number of special missions - hauling ammunition and gold, hit and run tasks ashore with secret agents and guerrilla leaders, serving as lifeguards and saving over 500 Navy and Army Air Force aviators who had been shot down, photo reconnaissance missions for Marine amphibious operations, mine-laying and hair-raising cruises through known Japanese minefields to pinpoint mines for destruction prior to amphibious landings. Intensely dramatic and challenging the finest skills in ships and men that America perhaps has ever produced, the saga is heroic. The price paid -- small in view of the accomplishments -- was far from insignificant. Of those who went to sea, 52 submarines and 3505 men never returned from their last patrol -- 18% of the officers and 13% of the enlisted -- the highest casualty rate in the Navy.

War Under the Pacific is an engrossing account of those days and if the printed word cannot convey the entire story, another dimension is added by the superb illustrations, from the swaddling days of primitive submersibles to fine combat art. For all its virtues, however, some small errors crept in that should not have escaped the technical advisor. Submarines making deep approaches on sonar did not use active pinging, which would have given away their location immediately to an antisubmarine vessel. They occasionally used a "single ping" just before firing to check the range. The difficulty with the sonar attack was that when using passive listening, although the direction of the target could be determined, the range was largely guesswork -- unless the "single ping" could be risked.

The SJ radar did not supplant the SD. One was a surface search radar, the other an air search

one. The air search SD happened to be on a frequency which was highly susceptible to Japanese airborne radar intercept receivers and hence acted like a magnet, drawing antisubmarine air patrols to the source of the emissions. The discussion of the bathythermograph, that simple mechanism to record sea water temperature with changing depths of the submarine, shows only a vague understanding of its tactical value in evasion.

What was missed most in this heroic saga is recognition for some of the unsung heroes. My own selections would include Captain Andy McKee, whose submarine construction genius gave unlimited confidence in our submarines regardless of the excessive demands so often made. It would also suggest retired Captain Jasper Holmes -- called back to duty during the war despite crippling arthritis -- whose mathematical wizardry and shrewd operational knowledge of the enemy guided the code-breaking team at Pearl Harbor, upon which the subs so heavily depended. The inspirational Lieutenant Commander Reggie Raymond when killed on patrol in a daring gun battle with an armed trawler early in the war was possibly the greatest potential leadership loss suffered by the submarine force. Fred Oyhus, a reserve officer, physically disqualified for sea duty by an accident at birth, saw extensive combat while exerting his wizardry at electronics --including three major alterations to the radars, all unauthorized, but later adopted by the Bureau of Ships.

Then there were the Joe Garlands, typical of many outstanding former enlisted men who served so capably as temporary officers; Joe Manganello in his galley-bake shop, and Wheeler Lipes, the pharmacist's mate became family physician, surgeon, and general practitioner responsible for

his crew's health. Each of these men made his vital contribution to morale. But above all stands the ordinary submarine enlisted man who often knew not whence he came nor where he was headed, except in harm's way, yet whose courage, technical mastery and unfailing good humor under all circumstances firmed the backbone of the undersea force, no matter what. These are the heroes who never made the record in War Under the Pacific, except perhaps as one of the 3505 who never returned.

In sum, if you want to make a gift to somebody who cares, here you can't possibly go wrong.

P.R. Schratz

The Submarine Review is a quarterly publication of the Submarine League. It is a forum for discussion of submarine matters. Not only are the ideas of its members to be reflected in the Review, but those of others as well, who are interested in submarines and submarining.

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

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

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

The success of this magazine is up to those persons who have such a dedicated interest in submarines that they want to keep alive the submarine past, help with present submarine problems and be influential in guiding the future of submarines in the U.S. Navy.

NAVAL SUBMARINE LEAGUE
Box 1146
Annandale, Virginia 22003

NON-PROFIT ORG.
U.S. POSTAGE
PAID
PERMIT No.124
ANNANDALE, VA