THE SUBMARINE REVIEW

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EDITOR'S COMMENTS

Two important messages are delivered to the Submarine Community, from representatives of the Executive and Legislative branches of our government, in the lead articles of this issue of **THE SUBMARINE REVIEW.** The first is from the Secretary of the Navy in the form of his speech to the annual Clam Bake at New London in September. His message is positive about the need for submarines in "all aspects of maritime warfare" and emphatic about the necessity of meeting the requirements of the post-Cold War era with strict regard to the affordability and cost-effectiveness of the next new-construction attack submarine program.

The second message directly from a member of the country's national security policy level comes from Capitol Hill, and relates to some specific submarine employment options which are suggested because "...the strategy and tactics developed by the Department of Defense contribute greatly to the emphasis Congress places on ...certain branches of service." Congressman Dornan's credentials for making such suggestions include membership on the House Armed Services Committee and the Permanent Select Committee on Intelligence.

The mix of Articles, Discussion pieces and Reflections in this issue is aimed at the broad base of submarine interest perhaps a bit more than in some of the recent issues. There is some big picture future thought with Dr. Thompson's piece, some delightful history about a Civil War submarine, a pair of articles about the hazards of submarine transits with, perhaps, a lesson to learn about deconfliction, and some interesting insights into Russian thought from both an eminent U.S. analyst and the Russian press. A variation in the 'Silent Service' theme is offered by a middle-grade officer to his colleagues, and that opportunity is taken to outline some of what has been done over the past few years to get out the submarine word.

Of particular interest is the review of Rear Admiral Fluckey's new book, Thunder Below! by Commander Bruce Engelhardt who recently completed an outstanding command tour in USS DRUM. This is a book which is of interest, and perhaps of even more importance, to the currently serving submariners as well as to those who were at sea in submarines from 1941 to 1945.

A special feature is introduced with the first installment of

a Submarine Bibliography. It is our plan to present listings of magazine articles and books published abroad in later issues; however, one of the main intents is to stimulate response and additions from the readers -- so we can make the community list a real recommendation from the people who have been down to the sea, have gone in harm's way and have produced sophisticated hardware for their country. So send in your nominations for inclusion, no matter what the source of publication.

Jim Hay

FROM THE PRESIDENT

In recognition of the need to update the Cold War-vintage *Maritime Strategy*, the Secretary of the Navy, the Chief of Naval Operations, and the Commandant of the Marine Corps have released a *White Paper* entitled ...From the Sea. The paper defines the new strategic direction for the Navy-Marine Corps Team as a "naval expeditionary force, shaped for joint operations, operating forward from the sea, tailored for national needs". Although the emphasis is on littoral warfare and maneuver from the sea, right up front, there is a strong commitment to a robust strategic deterrent force, at sea in SSBNs, as critical to national security.

Four key operational capabilities are called out as required for successful execution of the new direction: Command, Control, and Surveillance; Battlespace Dominance; Power Projection; and Force Sustainment. Even without explicit citing (attack submarines appear only in reference to cruise missile strikes under Power Projection), it is not difficult to visualize SSNs playing in each of the other areas, e.g., "...the ability to collect intelligence through covert surveillance early in crisis", "...deny access to a regional adversary, interdict the adversary's movement of supplies by sea, and control of the local sea...", and "...(maintain) open sea lanes of communications so that passage of shipping is not impeded by an adversary." Integration of attack submarines into the "expeditionary force" is the immediate challenge. In the intensely competitive battle for limited resources, the planners must be convinced that the unique and cost-effective warfighting capabilities of attack submarines are essential elements of our national security strategy, from conventional deterrence to littoral campaigns.

The future size and composition of the submarine force depends on the successful execution of that task.

Under the category, *"I always knew that but it sure is nice to hear it from an independent official source"*, a recently released General Accounting Office assessment of proposed strategic modernization programs, commissioned by the House Foreign Affairs Committee, found that, **"...on balance, the sea leg of the TRIAD emerges as the most cost effective..."**. Further, ..."**Test and operational patrol data show that the speed and reliability of day-to-day communications to submerged, deployed SSBNs were far better than widely believed**, and about the equal of speed and reliability of communications to ICBM silos. Contrary to conventional wisdom, SSBNs are in essentially constant communications with National Command Authorities and, depending on the scenario, SLBMs from SSBNs would be almost as prompt as ICBMs in hitting enemy targets."

The study also found that the accuracy of the D-5 is about equal to Peacekeeper, as is its reliability, and its warhead has about 50 percent higher yield, making hard target kill capability a draw. Further, unlike easily located silos, operational test results show that SSBNs are even less detectable than generally understood, and that there are no current or long-term technologies that would change this. In addition, the life-cycle cost per warhead of the D-5/OHIO system is almost identical to land-based systems, but with the significant advantage of being based on submerged, essentially invulnerable submarines. So, what's new?

I recently received a copy of Volume I, Number 1 of the SEAWOLF NEWS, the newsletter of the Seawolf Commissioning Committee. Stepping forward in October, 1989, the city of Akron, Ohio, with strong support from the Akron-Canton Council of the Navy League, petitioned the Secretary of the Navy for consideration as the sponsor city, and was so named in December of that year. Based on the enthusiasm evident in the newsletter and the outpouring of support for the Committee, it is clear that the crew of SEAWOLF is in good hands.

Bud Kauderer

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RIGGED FOR DIVE

by Honorable Sean O'Keefe
Acting Secretary of the Navy

[Ed. note: Acting SECNAV O'Keefe delivered this address at Naval Submarine Base, New London, CT to The National Security Industrial Association on 16 September 1992]

Thank you very much distinguished guests, leaders of industry, current and retired flag officers, and, above all, **fleet submariners.** Thank you for inviting me to speak with you at this important event.

It is a **great** pleasure to be back in Southeastern Connecticut. I have a nostalgic affection for this area, having graduated from Wheeler High School in North Stonington where I met my wife, Laura who grew up here. While I only lived here a short time--my dad was still in the Navy serving as SupShip Groton--I thoroughly enjoy the neighborhood and always look forward to the opportunity to visit. So I'm very happy to be with you today for the seminar and Laura and I are certainly looking forward to the Clambake tonight. I'm hopeful my experience as a Navy 'O' Club busboy isn't tapped after it's over.

This year's seminar topic is Future Submarine Roles and Concepts, and I think that is a great choice; although in the current budget climate some folks may feel the Navy program should be called *Rigged for Dive*. Looking at the schedule of presentations you've seen today, as well as those coming up later this afternoon, I can see that I'm amidst a group of truly distinguished submariners. In fact, I'm probably the only person in the room who got a C in high school physics; so my plan is to take a broad philosophical perspective in the hopes that I'm not out of my league in this area as well.

In any endeavor to talk about the future of submarines, it's instructive to retrace historical roots. One of the early pioneers of submarine technology, a voice from turn of the century America is, of course, John Philip Holland, an Irishman. And with a name like Sean O'Keefe I can't resist stories about Irishmen. He emigrated to America in 1873 and essentially invented the modern submarine. You all know about John Holland, of course, but perhaps you don't know that the funds for Holland's first boat were donated by Irish separatist

revolutionaries and that the strategic target was Britain. Imagine the historical change had the plan been fully successful!

As you can imagine, Holland was hardly working in a benign or well-planned environment. The leading naval powers of the time didn't have a grand vision of how to use submarines. In fact, England's thinking about submarines was summed up at the time by Admiral of the Fleet Sir Arthur Wilson, nicknamed *Old Hard Heart*, who was the comptroller of the British Navy. You can see why I've heard of him, but please don't draw any conclusions. He suggested that, "in wartime, the crews of all submarines captured should be treated as pirates and hanged." In the United States the thinking was not much better developed. The American Navy was said not to like submarines "because there was no deck for the officers to strut on."

Fortunately for the future of submarines, there were visionaries on both sides of the Atlantic, most notably Admiral Jackie Fisher of the Royal Navy and John Holland in the United States. Perhaps more than anything, John Holland's controversial 1886 article, Can New York be Bombarded?, talking about the earliest land attack role for submarines, awoke the public to the capabilities of the submarine. **He looked at roles and concepts**, and a great deal of his thinking is still valid today. Holland talked about offensive uses of submarines against enemy shipping, carrying divers to conduct special operations, mine laying and mine clearance, and strategic deterrence, as well as what we consider antisurface warfare today. The point is that people have been wrestling with these questions about roles and concepts for submarines since the first boat went down the ways, and I know the kind of dialogue you are engaging in today is very, very helpful to this important process.

So with that historical perspective, I'll try to look ahead toward the horizon and give you a sense of where we see the submarine force going from **both a strategic and a resource standpoint.** And if we can't come to closure on every point this afternoon, I'm sure after a couple of dozen steamers and a two pound lobster tonight we'll at least have a relaxed discussion.

Let me begin by telling you the simplest and most straightforward thing I know about future submarine roles and concepts: **Submarines will be used in all aspects of maritime warfare.** To be sure, antisubmarine warfare is no longer our

highest warfighting priority. The greatest challenge we faced, that fully justified the need for advanced submarine systems, gave up just last year. Even so, future scenarios call for submarine use in **every** aspect of what our joint forces do at sea. And to keep submarines in the fleet, we need the kind of teamwork exemplified by this audience; industry and the service, working together in a fair and straightforward relationship.

Let me tell you about four key operational capabilities I see for submarines in the evolving international security environment.

The first is **battlespace dominance**. Our most important and enduring naval mission is, and will remain, sea control. Fortunately, in this post Cold War era, America really does *rule the waves* in the absence of a significant blue-water opponent. So we can allocate fewer resources to pure sea control. But in the near-land areas of the world, we will be called upon to execute complete battlespace dominance in a given crisis arena. This is both a sea control and a sea denial mission. Submarines, fully integrated with Naval Expeditionary Forces and Joint Task Forces, are well configured to play a key role in dominating the **undersea** portion of the regional battlespace, as well as critically influencing the surface portion; and, with their cruise missiles, the land portion of the battle.

A second critical role for the submarine will be in **Command, Control and Surveillance**. In order to effectively dominate the battlespace, we will need to gather a significant amount of intelligence, often discretely. This will be particularly important in the dangerous **early** days of a crisis, when our objective is to contain the problem before it escalates. Submarines, with their inherent stealth and sophisticated sensors, are ideal for many intelligence gathering missions. They are likewise well suited to provide command of the undersea environment in the crisis arena, where we can expect to encounter hostile submarines, mines and enemy sensor suites; all of which must be neutralized before further operations can occur.

Power Projection is the third vital role in which submarines have a distinct role to play as part of Naval Expeditionary Forces. We generally have 14 submarines deployed on any given day, carrying well over 100 Tomahawk missiles. Their reach is 650 miles inland, covering 75 percent of the world's surface. With this kind of capability we can avoid putting sailors at risk

in the *Line of Death* type scenarios we confronted with Libya, for example. In the future, the Khadafis of the world may not know where a strike came from. With a nominal force forward deployed, we can bring precision strike capability to bear virtually anywhere in the world within 48 hours.

Submarine power projection is **virtually risk-free** from a political perspective. There are no friendly aircraft being shot down while conducting strikes, no Prisoners of War appearing on CNN, no surface ships hitting mines or being attacked by enemy aircraft. The submarine, because of its endurance and stealth, can remain off an adversary's shores for extended periods of time while other means are employed to solve the crisis. And that is a very important attribute.

Among these future missions, the most important **enduring mission** for the submarine force will be **strategic deterrence.** Our nation's ballistic missile submarines, working directly for Strategic Command, will continue to provide over 50 percent of America's nuclear deterrent power for only about 25 percent of the cost. The Trident fleet is indisputably the most reliable leg of the triad. And as long as other nations possess the ability to attack the United States with nuclear forces, our best defence for the near term remains the retaliatory capability to strike back; that capability constitutes the strongest part of the argument that the SLBM fleet can deter an aggressive strategic action.

I think we can all agree that we are not going to have a problem finding important missions for our submarine force for the foreseeable future. So now let me talk about resources and budget questions surrounding the submarine force.

Despite the many attributes of submarines, with the collapse of the Soviet Union, we simply will not need the Cold War level of submarine force, either in terms of pure numbers **or** in terms of capability. As impressive as SEAWOLF is, it far exceeds the capability needed to respond to likely future scenarios. But as I've just finished telling you, we have many important missions remaining. So how do we synthesize these two concepts?

The first answer is the tremendous investment we already have in a superb, high-quality submarine force and the industrial base that builds and supports these superb warships. Especially with the decline of the former Soviet Union's military capability, our submarines are a dominant undersea force today and will be

for decades. Many of you in this room should take justifiable pride in that state of affairs, because you planned those boats, you built those boats, and you sailed, and continue to sail, in those boats.

Our current submarine inventory will meet our needs for the foreseeable future. Eventually though, we **will** need replacements. **The answer is to build an affordable attack boat that meets the needs of this new post Cold War era.** We have been calling this boat the Centurion, although we may end up with a different name for what we are currently calling the NSSN or simply New SSN. On this issue, it is essential that we speak very bluntly.

We **must** be prepared to build a cost-effective boat. We can't go to Congress and defend a boat that costs as much as the SEAWOLF. We need a boat that offers the ability to perform in the regional war scenario with capabilities in covert strike, covert surveillance, intelligence collection, special warfare, and can still conduct standard submarine missions of antisubmarine warfare and antisurface warfare. And it had better end up costing a good deal less than the SEAWOLF. In the alternative, I think we will coast along and work with what we have. With the impressive fleet of 688s in the inventory, there simply is no imperative to press on at all cost, and at a time when we're resizing the Navy. We will not be able to convince anyone that we need a $2 billion solution.

If we do go forward, of course, industry needs a sense of what to build. So let me give you a few more details of what this boat ought to be able to do, in very general terms.

I'm not going to belabor the obvious qualities; endurance, stealth, and speed are the attributes that **must** be part of the New SSN's make up.

But we need more than that. We need creativity and imagination in submarine design, and let me give you three areas to focus your efforts on.

The first is **offensive power.** We must find ways to make the new submarine capable of carrying enough torpedoes and Tomahawks to really make a difference in regional warfighting scenarios. In order to avoid prohibitive expense, we must come up with some truly innovative technology. So that will be a key challenge.

The second area is **mission flexibility.** Our submarines will

have to do it all: mining, strike, special operations, intelligence and warning; and, oh by the way, **still** do antisubmarine warfare and antisurface warfare well enough to dominate the regional battlespace. Again, a tough problem.

Finally, think about **interoperability**, with Naval Expeditionary Forces, Joint Task Forces, with everything from four ship surface action groups to integrated strike forces that include Navy carrier battle groups, amphibious readiness groups with embarked Marines, and Air Force composite wings operating from expeditionary airfields. **The battlespace of the future is complicated and it is joint.**

So there are three areas to focus on: offensive power, mission flexibility, and interoperability. And the paramount challenge--build an affordable boat.

I know there is a lot of justifiable hand-wringing about the industrial base as it applies to submarines. All of you in this audience are part of a national asset--the capability to support advanced nuclear submarines. The future holds many uncertainties, but I know we can all agree on the need for the U.S. to remain capable of designing, constructing, and overhauling our undersea force. Earlier, I told you a story about the nuclear submariner looking at the guillotine and trying to make it work. I think the lesson is that we need a common sense approach in maintaining our industrial base, and one that won't kill us in the process. Unfortunately, the current debate on Capitol Hill has the potential of doing just that. We can't endorse solutions which yield excess inventory. In the alternative, we must make the tough decisions and reconcile our excess public and private industrial capability. **If we try to keep it all, we run the very real risk of losing much more.** The historical precedent is that we preserve more equipment at the expense of the people we're asking to operate the systems. **We will not do that again.**

Right at the start, I jokingly referred to this year's budget climate as one in which we ought to be *Rigged for Dive*. But I'd like to close by suggesting that taking that phrase as a theme might be pretty sensible. After all, when a submarine is rigged for dive, the boat is tight and properly trimmed, with every valve checked and double-checked, all hands on station and alert, and the entire organization poised and ready to move forward into

the great adventure ahead. That is the feeling I hope we can capture in the maritime defense establishment today: professionally prepared, set for anything, and above all, heading forward into the sea, underway and ready for action.

Thank you for sharing your time with me today.

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THIS IS IT. FINAL DEADLINE
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The response from the previous deadline has been outstanding. With nearly 600 biographies of Naval Submarine League Members received and research and compilation going full speed ahead, the publisher has agreed to allow a final deadline of MARCH 31, 1993, to receive more personal biographies, photos and special stories of NSL members before designing the book.

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ROLES AND MISSIONS FOR A POST-COLD WAR U.S. SUBMARINE FORCE

by Congressman Robert K. Dornan R-CA
House Armed Services Committee

The end of the Cold War will greatly change the future role of the military, perhaps affecting no branch of service more than the U.S. submarine force. The recent decline of the Soviet underwater threat has raised new questions about the future roles and missions of this force, especially attack submarines. Additionally, new submarine procurement must now compete against other programs in an era of declining defense budgets. Facing such uncertainty, what should we expect from our post-cold war Submarine Force in the future?

While Congress is and should be more involved in weapons procurement than in developing roles and missions, the strategy and tactics developed by the Department of Defense contribute greatly to the emphasis Congress places on certain systems and, in turn, certain branches of service. In order to maintain a preeminent role in future U.S. military force structure, I offer the following suggestions for the Navy to contemplate in developing roles and missions for our Submarine Force in the future.

Deterrence

Strategic Nuclear Deterrence: The ballistic missile submarine has emerged from the nuclear TRIAD of the sixties as the preeminent arm of the U.S. nuclear force. This is a direct result of advances in precision guided weapons technology, namely the deployment of the Trident D-5 missile, which gives our submarine fleet the accuracy of land-based ICBMs. This accuracy, coupled with a submarine's inherent survivability as a mobile, stealthy undersea missile platform, makes our Trident fleet the primary U.S. offensive force today and well into the next century. Modernization of this fleet is nearly complete, with funding already approved for eighteen total Trident boats. However, with the prospect of further arms control reductions with the republics of the former Soviet Union, opposition against further production of the D-5 missile is growing. In order to maintain public confidence in the stability and flexibility of submarines in the U.S. TRIAD, the Navy should immedi-

ately examine the following options regarding future Trident and other submarine force structure and operations:

1) Present Congress and the President with detailed options for downloading Trident SLBMs to single warhead missiles. Although most U.S. warheads are based on subs, the majority of post-Soviet warheads are still based on MIRVed ICBMs. A comprehensive plan outlining how the U.S. could download SLBMs to single warhead missiles would give our government a strong bargaining chip in negotiations for further strategic arms reductions. Additionally, such a plan would demonstrate the inherent flexibility of the Trident system, which can be used not only as a platform for single warhead SLBMs but also as a platform for re-MIRVed SLBMs in case of rapid geopolitical change. Our offensive nuclear force will definitely grow smaller; single warhead ballistic missiles appear to be the weapon of choice for future nuclear arsenals. In order to size the initiative, the Navy should develop its own single warhead SLBM plan.

2) Examine the feasibility of rearming the Trident fleet with anti-ballistic missiles. While the threat of a massive nuclear exchange between the U.S. and Soviet Union has declined, a new nuclear threat has emerged in the form of ballistic missile proliferation throughout the Third World. Unlike superpower threats, Third World threats may not be so easily deterred through massive retaliation. A strategic missile defense against such an attack may be the best answer to counter this new threat. Most emphasis in this area has been on Air Force strategic space systems and Army theater ground systems. Recently, however, there have been new discussions regarding a naval role in SDI. Recent language from SDIO (The Strategic Defense Initiative Office) has directed that the new Theater High Altitude Area defense system (THAAD) be evaluated not only for Army, but also for Navy use. This would include studies regarding the utilization of THAAD interceptors with vertical launch systems on board Navy Aegis cruisers and destroyers. The submarine community should also investigate the possibility of deploying THAAD or other interceptors on board undersea vessels including the Trident. Not only do submarines posses the same range and station time as surface ships, but they also can be deployed without detection to trouble spots, providing U.S. forces and allies with ballistic

missile defense coverage. Such undetected coverage could help deter potential adversaries from using or even acquiring ballistic missiles.

Strategic Convention Deterrence: Whether it is a naval quarantine of Cuba during the 1962 missile crisis or a naval blockade of Iraq in 1990 as part of economic sanctions, U.S. naval forces, including submarines, have been extremely effective in providing conventional deterrence against aggressors. Because of their conventional strike capability with cruise missiles, submarines can also threaten to actually engage enemy targets in order to deter a specific action. To capitalize most effectively on these conventional capabilities, the following actions should be taken:

1) The Navy should increase the use of submarines in naval blockade/quarantine missions, especially in tracking potential adversaries and directing surface combatants towards interception of these ships. Even actual interception and boarding of vessels should be examined. An American submarine surfacing out of nowhere to intercept and board a ship attempting to run a blockade would leave great question with the enemy regarding where and how such blockades could be broken. Unlike surface ships which could be easily detected by these *blockade runners*, submarines could cover a much larger area with far fewer ships. Submarines can also be used to lay mines and/or monitor previously deployed mines. Again, the ability to slip undetected into enemy waters would prove quite useful in such operations.

2) Increase emphasis on new conventional cruise missiles that can accurately strike inland targets at long range and supersonic speed. While everyone was amazed at the precision with which cruise missiles launched from sea struck targets in Iraq, these systems must be improved for future strike missions against high priority targets such as nuclear, biological or chemical sites. If the President is to consider using submarines against such targets, he must have a high degree of confidence that the mission can be accomplished at long range without enemy detection or interception. A supersonic capability is the next logical step for this revolutionary weapon system.

Intelligence

An equally important mission in the post-Cold War era will be intelligence gathering. Submarines, as mobile stealth

platforms, are especially well suited for such missions. However, minor improvements could help make subs even more valuable in the future as reconnaissance systems.

1) Develop unmanned aerial vehicle (UAV) capability for submarines. Submarines are currently very effective in monitoring activity in sea lanes, harbors and on shorelines. However, subs are limited in their ability to monitor activity inland. One way to extend coverage of submarine reconnaissance is through UAVs. UAVs could be used to provide both visual and electronic intelligence of inland activities including missile locations, troop movements, and radio communications. Additionally, these UAVs could be used to detect surface to air missile sites in operations similar to those used by the Israelis in the Middle East. Such a capability could prove vital in future power projection missions involving long range air operations.

2) Increase use of submarines in special forces operations. The submarine is a natural platform for long range special forces insertion and extraction missions. Special forces can provide very valuable human intelligence on inland operations. Unlike air insertion which may be detected by radar, submarine insertion would be undetectable. Additionally, submarines can remain on station to immediately relay intelligence from these ground teams to the national command authority. If these teams encounter enemy forces, submarines are also readily available for fire support of extraction operations. We should expand the role of submarines in such missions through increased training and additional construction of unique special forces submarine equipment.

<u>Conventional Fire Support</u>

A major mission for surface combatants is fire support for ground forces, both Army and Marine. With the continued development of precision guided conventional munitions, submarine operations could be expanded to include fire support for ground forces. Keys to expanding this role include:

1) Increased joint training with Army and Marine ground forces. Liaison officers have proven to be extremely valuable in coordinating close air support for ground forces. The Navy, especially the Submarine Force, should offer liaison officers to ground units to increase the knowledge and coordination of naval fire support in Army and Marine operations. Many times

naval fire support will not even be considered due to a lack of understanding about the capabilities of naval systems or how to even request such support. Liaison officers can greatly improve Army and Marine understanding of what submarines can offer, as well as return to the submarine community a better understanding of the type of support ground units need.

2) New development of submarine launched conventional munitions. Submarine weapons must be expanded beyond cruise missiles capable of striking specific point targets. New emphasis must be placed on cruise missiles capable of engaging tank formations with submunition warheads. Research should also be conducted on larger, long range missiles such as those used by MLRS (Multiple Launcher Rocket System) artillery batteries. New conventional missiles could be deployed on current or former SLBM boats and provide ground commanders with a quick and devastating artillery *punch*. In future long range deployments where close air support and ground artillery capability is limited, such a sea-based force could provide the needed edge in firepower for both defensive and offensive operations.

Sea Superiority

Submarines will remain a key force in maintaining *sea superiority*. Operating in a role similar to that envisioned by the Air Force F-22 air superiority fighter jet, Navy attack submarines will be counted on in the future to take the fight directly to the enemy by either denying access to sea lanes or actually destroying other subs and ships. Emphasis must be placed in the future on utilizing American attack submarines in this sea superiority role. As Third World submarine and surface ship proliferation continues, we cannot afford to wait for a potential enemy to strike our surface ships, including carriers and sealift. We must be prepared to utilize attack subs in preemptive offensive operations against hostile vessels within their own waters. Such strategy may require a new emphasis on shallow water operations, conventional torpedo engagements, and multi-sub attack engagements. If necessary, equipment procurement should be changed to reflect such emphasis.

Diplomacy

Unlike surface ships, especially battleships and aircraft

carries, submarines do not seem especially useful in *gunboat diplomacy* operations. *[Ed. Note: See Jan Breemer's Deterrence, Naval Presence, and the Submarine Fleet in the October 1992 SUBMARINE REVIEW.]* However, in the post-cold war world, such *show the flag* operations will likely grown in importance. The Navy should expand the role of submarines in these operations through new and creative deployment schemes. While battleships and carriers may be impressive in size, the sudden appearance of a Trident or a group of six attack boast in a harbor could have an equally impressive diplomatic effect. In a crisis situation, sometimes the element of surprise is more desirable than a slow deliberate deployment.

Additionally, the National Command Authority, based upon the capabilities previously mentioned, should expand the stated use of submarines in deployments. By announcing a specific intent to deploy a certain number of subs for ballistic missile defense, surveillance, or conventional strike missions, a great deal of uncertainty could be introduced into the planning considerations of our enemies. Unlike surface combatants, however, submarines would remain protected by stealth since only a general area of operations would be known to the adversary.

These are only suggestions for the Navy to consider. Navy officials, especially Vice Admiral Roger F. Bacon, Assistant Chief of Naval Operations for Undersea Warfare, have already done tremendous work in identifying new roles and missions for the submarine force. However, the submarine community must continue to evolve and look towards the future in reshaping its operations. A changing threat and declining budget are only the *tip of the iceberg* that stands in the way of smooth sailing for the Submarine Force here in Congress. By carefully weaving the roles and missions of the Submarine Force with those expected from the rest of the military, we can ensure that the U.S. maintains undersea and world military superiority well into the next century.

[Congressman Dornan is a former U.S. Air Force fighter pilot and current member of the House Armed Services Committee, including the Subcommittee on Seapower. He is also a senior member of the House Select Committee on Intelligence.]

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SUBMARINE COMMUNITY CHANGES

by VADM Henry G. Chiles, USN
COMSUBLANT

With the Department of the Navy reorganization, sponsorship of the submarine community will pass from OP-02 (VADM Roger Bacon) to COMSUBLANT. It is expected that this will occur before the end of the year. RADM Tom Ryan is already onboard OPNAV as the new Director, Submarine Warfare Division (N87) and reporting to the newly established DCNO for Resources, Warfare Requirements and Assessments (N8).

Several fundamental changes will occur on the Type Commander staffs as a result of this organization. Some of these are:

a. Both Type Commanders will renumber existing staff codes to conform to the JCS/CINCSTRAT convention. This will not involve any major shifting of functions.

b. Both Type Commanders will stand up a requirements section to deal with future needs of our forces and interface with the Fleet Commanders and N-87 in research and development and budgeting priorities. The head of this section, to be called N8, will be a Captain.

c. COMSUBLANT will form a small group to handle community sponsorship issues pertinent to the submarine community as a whole. The head of this group will be a post commanding officer, designated as the Submarine Warfare Sponsor Officer (Code 02Z, initially Commander Lynn Wessman).

The Submarine Warfare Sponsor officer on COMSUBLANT staff will assist with liaison concerning: submarine warfare policies, the retired community, Naval Submarine League, USNA, submarine recruiting, preservation of submarine traditions, and congressional testimony. He'll be busy. Naval Submarine League chapters should continue to deal directly with the senior Submarine Commander in their respective areas. For example, we expect that N-87 (RADM Tom Ryan) would be the appropriate contact for many Submarine League issues specific to the D.C. area.

COMSUBLANT and COMSUBPAC will function as spokesmen on submarine matters geographically. In general,

COMSUBPAC will deal with public affairs issues west of the Mississippi and COMSUBLANT with those to the east. On matters involving policy, whether operational issues, public affairs, submarine warfare or personnel planning, the two Type Commanders will coordinate as they have in the past.

The establishment of the requirements section and the change of Submarine Force sponsorship from OP-02 to COMSUBLANT are major moves. We are resolved to make these changes smoothly and without loss in dealing with outside activities. OP-02 has worked closely with the Type Commanders to present the fleet view in Washington. We're dedicated to ensuring there is enthusiastic, competent Submarine Force representation in D.C. during a crucial period of our history! ■

Call For Sea Stories

SUBMARINE ANECDOTE BOOK

In the summer of 1993, with the cooperation of the Submarine Officers Wives Club, we will publish a book of submarine anecdotes. The book will be the same size and shape as the **Submarine Review** and will contain approximately 100 pages. Any organization or individual submitting a particular anecdote will be given credit for the submission.

Complimentary copies of the collection will be provided to each regular member of the League. The Submarine Officers Wives Club also will sell the book, with the proceeds benefiting the Dolphin Scholarship Program.

We hope to come up with stories covering a broad spectrum which includes anecdotes about submariners, staffs, support organizations and the submarine industrial community.

We are ready to receive inputs now, and will hold the door open until June 1, 1993.

STRATEGIC IMPLICATIONS OF THE *NEW WORLD ORDER* FOR THE U.S. SUBMARINE FORCE

by Dr. Richard Thompson

[Ed. Note: Dr. Thompson received his Ph.D. from the University of Illinois. He served six years at the Naval Research Laboratory and is currently a faculty member of the University of Maryland.]

As all readers of the SUBMARINE REVIEW are aware, the sweeping changes amongst the former Warsaw Pact states have already had an enormous impact on the submarine force, and these changes are likely to continue. The purpose of this essay is to try to anticipate some of the changes (technical and political) which will affect the Navy and Submarine Service and the effects these will have on their roles, missions, and force levels.

Perhaps the major consequence of the fragmentation of the old Soviet Union for our Navy and Submarine Forces is the rapid drawdown in the Commonwealth of Independent States (C.I.S.) armed forces, both conventional and nuclear. In particular, the land forces formerly part of the Red Army and Warsaw Pact have degraded to the point that it would take some years at least for these forces to reconstitute a threat. Similarly, much military hardware from existing stocks is for sale at giveaway prices, as has been widely reported in the press. These developments have dramatically reduced our requirement for a European forward-based military presence. Much of the former Soviet Navy has been scrapped, or is for sale, and the remainder seems to be operating at a lower tempo than before.

The situation of the former Soviet submarine force, from our perspective, is less rosy. Certainly, scores of older units have been discarded, with attendant concern in the West about the disposition of nuclear reactors. Submarines of many types are evidently for sale, including nuclear boats like the Charlie I *leased* to India. The size of the old Soviet Navy submarine force was so large, however, that the Russians could discard or sell everything but their most recent SSNs, SSGNs, and SSBNs, and still retain a very credible capability. In particular, the C.I.S. could get rid of hundreds of hulls and still retain rough number parity with our attack and strategic submarine fleets.

What reason is there to suspect the Russians will retain even a token submarine force? Historically, the Soviets (and the forces of the Czar before them) have always operated large submarine forces compared with other nations. The Soviet fleet grew rapidly after the Soviet Civil War and was the largest submarine fleet in the world when the Germans invaded in 1941[1]. Strategically, the C.I.S. will be less in a power projection posture than a defensive posture for some time to come. Classically, submarines have been used by minor powers as a defensive weapon for sea denial to prevent invasion and blockade, and the C.I.S. will probably wish to retain this capability. Additionally, a viable submarine force gives the C.I.S. a means of vetoing overseas power projection by other nations. As has been pointed out by others as well, if the C.I.S. had chosen to interdict the buildup of Coalition forces in Saudi Arabia, the Gulf War might have turned out very differently. Moreover, a substantial fraction of C.I.S. nuclear weapons still reside on SSBNs, and it seems likely that the C.I.S. will retain them to deter attack, primarily by ourselves or the Chinese. It should be noted that even if the Delta IVs and Typhoons do not go to sea, their missiles can still reach many targets in the U.S., and thus they still represent a threat (like a missile silo) even tied up at the pier. Of course, it is impossible to tell where the Russian SLBMs are currently targeted. Even if one believes the columnists, that the C.I.S. is now a friendly nation, **the uncertainty regarding C.I.S. command and control arrangements (not to mention their intentions) together with a retained nuclear capability and the other reasons cited above suggest that the C.I.S. submarine force remains a threat to the U.S., and therefore a concern of the U.S. submarine force.**

Amongst the other likely consequences of the world's emerging into a *New Order* will be a new level of disorder; armed conflict on limited scale, but literally in dozens of places worldwide. In the last several months fighting has broken out or continued in Liberia, the remains of Yugoslavia, the Kurdish regions of Iraq and Turkey, Thailand/Cambodia, Armenia/Azerbaijan, Lebanon, Afghanistan, and tensions are simmering in many other places as well. The reasons for this are evident; the relaxation of Soviet domination has eliminated the restraints that kept religious, ethnic, and nationalist impulses in check in the old Soviet bloc and added to the normal level of conflict. The fifty-odd ethnic groups officially recognized in the old Soviet Union now have nothing in principle to prevent them

from seeking to establish independent nations. The parallel to post-colonial Africa, with its scores of tribes and externally imposed borders which resulted in decades of war and revolution is frightening. The twenty-five or so newly autonomous states, together with a number of American and Soviet allies and client states which will no longer consult the *home office* before acting, virtually guarantee an unprecedented number of armed conflicts in the decade ahead.

One important consequence of increased conflict around the world will be a proportionate need for intelligence about the conflict, the combatants, and their military and political activities. While some of these small ethnic and religious conflicts will have little impact on us or our security, probably the majority will be of some interest, and some will be of vital interest. Unfortunately, the shrinkage of our overseas base structure will have a crippling effect on our ability to collect intelligence, especially using aircraft. Of course, satellites can make up this shortfall to a degree, but their times of passage overhead are widely known in the Third World. Surface vessels such as warships can provide continuous coverage, but they are hardly discreet and may even be provocative. In this case, as in many others, a suitable platform for intelligence gathering is a submarine, which provides continuous, discreet, nonperturbing intelligence collection. Similar examples can be found elsewhere of conflicts erupting long distances from U.S. bases, but close to the sea. **The likely increased volume of conflict, taken together with our reduced ability to monitor it due to a shortage of overseas bases, means that intelligence collection will comprise a much greater fraction of SSN missions than it does today.**

The probable drawdown in overseas bases has consequences for the projection of power as well as intelligence collection, as has been noted by others.[2] A portentous example of this was the attack on Libya by FB-111s based in the United Kingdom. These aircraft were refused overflight rights over France and were obliged to take a circuitous, overwater route that required many night refuelings. As the world becomes more multipolar, we may anticipate that our diplomacy will seldom be adroit enough, fast enough, or discreet enough to secure overflight rights or permission to use bases, even from allies. The overseas base shrinkage will limit the effectiveness of our bombers in that their ranges are intercontinental only with modest (i.e., nuclear) bombloads. To carry large conventional

bombloads long distances, substantial air-to-air refueling of the bombers is necessary; however, the tankers themselves require secure bases to operate from, or tankers to refuel the tankers. For tactical aircraft with shorter ranges, the need for nearby basing for effective use is even greater. The Gulf War is widely and correctly viewed as anomalous because the Saudis had constructed superb airbases which were immediately available to the Coalition forces, and could be supplied easily with fuel and bombs by sea.

The short answer to all the problems of employing land-based air power without overseas bases, which has been pointed out by Friedman and others, is sea-based air power. Primarily, this means aircraft carriers and fixed wing aircraft, and in view of our likely need for presence at, or intervention in, limited conflicts in the next decade, we will find it prudent to maintain our capabilities and force levels in naval aviation.

Unfortunately, two technical developments may conspire in the next century to put our carriers at substantially greater risk than before, and thereby jeopardize their effectiveness. The first development is ocean surveillance satellites, and the second is ballistic missiles with terminal guidance. Of course, the Soviets operated nuclear-powered radar ocean reconnaissance satellites for some years. While it is likely that these radars could identify aircraft carriers and determine their position, their choice of radar rather than an optical sensor probably was due to the prevalent cloud cover over the North Atlantic and Norwegian Seas. A satellite employing an optical sensor, however, might be perfectly satisfactory for surveying most of the Earth's surface, and in particular observing aircraft in revetments, troop deployments, or ships in harbor. Apart from a larger telescope with solid state detector, a tactically useful reconnaissance satellite might be very similar to the earth resources remote sensing satellites such as the French SPOT 1 or the Indian IRS-1A launched by the Soviets; such technology is or shortly will be within the grasp of many nations. One can imagine widely separated regional powers forming consortia to jointly launch and operate satellites monitoring their respective areas of interest.

Such technology would require very little improvement to tell the position (and probably course and speed) of an aircraft carrier and its consorts, and to provide this information in real time to the *customers* on the ground. Such a capability would substantially degrade the threat posed by an American aircraft

carrier to a determined adversary. At the least, the information could be used to guide a strike by aircraft carrying sea-skimming missiles. Accurate, timely target position data would probably enhance the effectiveness of even diesel-electric submarines. Possibly most important to an adversary would be the elimination of the unknown about our strength, if not our capabilities and intentions, and the difficulty of concealment or deception. The need to find and fix the enemy, a problem as old as war at sea, might be pretty much eliminated. Of course, such reconnaissance satellites might be eliminated by an antisatellite weapon, but it would take some time to reconstitute our capabilities in this respect.

A more grave threat to aircraft carrier battle groups in the next century would be the emergence of ballistic missiles with terminal guidance, similar to the Pershing II or reputedly, the Soviet SS-NX-13. Long range ballistic missiles date back to the V-2, of which the Scud family represents only slightly improved offspring. ICBMs and SLBMs, like the V-2, are aimed at a fixed point on the Earth's surface. How much the impact point of a ballistic missile differs from its aimpoint depends upon the quality of the guidance system, the accuracy of the geodetic data, and in some cases midcourse correction. Inasmuch as a ship like an aircraft carrier is a moving target and not a fixed point, it is ordinarily not at risk from ballistic missiles. Pershing II (and probably SS-NX-13) was different from other ballistic missiles in that it had an active sensor akin to that on a Harpoon to guide it to its target during the terminal phase of its ballistic flight. The Pershing frightened the Soviets because its mid-yield, multi-kiloton W-85 warhead could be placed within a reputed 100 feet of its target, thus holding their hardened targets at risk. If its early and midcourse guidance could be reprogrammed in real time and the terminal guidance sensor taught to *recognize* a ship, a weapon like a Pershing II might represent a real threat to a carrier battle group. While the Pershing II ordinarily carried a nuclear warhead, even a conventional 800 pound warhead plunging into a carrier deck at hypersonic speed clearly would be very destructive. Moreover, the 1800 kilometer range attributed to the Pershing II would permit it to attack the CVBG at ranges beyond which the carrier aircraft can be effectively employed. The technology of the Pershing II is not currently within the grasp of potential aggressor nations apart from the C.I.S., but the proliferation of such technology is harder to control than that of nuclear

technology. Probably within the next twenty years nations capable of launching satellites today could develop terminal guidance technology like that of the Pershing II.

It is impossible to predict the degree to which such developments will represent a threat to the aircraft carrier in the next century. The Strategic Defense Initiative Organization's protestations notwithstanding, even point defense against ballistic missiles remains a substantial technical challenge, and providing such defense within the weight and size constraints of a warship would appear doubly difficult. We should not deceive ourselves that the Iraqi Scud-Bs are an accurate measure of the threat potential of ballistic missiles in conventional conflicts. **In general, we cannot assure that Saddam's incompetence in not defending his littoral sea- and airspace will be repeated by other regional powers.** Ultimately, we cannot predict if the aircraft carrier will be substantially more vulnerable than it is today, but as the principal instrument of American power projection, any nation in conflict with America will seek to make it so.

What then of the submarine force? It would seem foolhardy to draw down our attack and strategic force much further **until we can be sure that the C.I.S. strategic and attack submarine forces are incapable;** clearly, further mutual reductions could be negotiated. **Increased tasking for intelligence collection and surveillance** might also suggest a slower drawdown in attack submarines than currently planned; until now, intelligence gathering was not widely viewed as a driver in submarine design or force levels, but it seems to be a significant portion of the submarine force mission. **If the effectiveness of our long range bomber force and carrier aircraft are compromised by geography and technical developments, then a larger fraction of our striking power must be submarine-borne.** A regional power determined and able to defend its littoral air and sea space might be a very tough nut to crack unless substantial numbers of submarine-launched cruise missiles were available to suppress air defenses. At present, attack submarines cannot match the weight of ordnance deliverable by a carrier's attack aircraft, but this seems unnecessary as **the submarine's targets will be the command and control centers, radars, and missile batteries whose destruction will permit the attack aircraft to carry out their missions.** Nevertheless, the number of precision-guided munitions launched from stealthy platforms in the early air campaign of Operation Desert Storm suggest that scores to

hundreds of missiles might be necessary against a determined opponent, and that in the future many of these will be launched from submarines.

Finally, what does the foregoing say about force levels, particularly of attack submarines? Ultimately, this is a political and economic question as well as a strategic one, so other factors will be included in force level decisions. Nevertheless, some of the above strategic factors may help shape the required force levels in the next century. **For strike missions, we might take as a benchmark the ability to launch a coordinated (e.g., nearly simultaneous) cruise missile attack consisting of sixty missiles against a capable opponent.** This presumes that the targets are out of range of, or are too numerous for other stealthy platforms such as B-2s, F-117s, or in the future, AXs. A total submarine force of sixty SSNs using current technology in a *surge* mode is clearly capable of launching sixty cruise missiles in a coordinated attack (taking into account boats refitting, in port, and on other missions), whereas a total force of twenty SSNs probably could not. From the standpoint of intelligence collection and surveillance, details are unavailable regarding taskings of submarines. However, **if our need for surveillance becomes greater and our non-submarine means cannot fulfill an increased requirement such that submarine tasking grows, some compensating adjustment should be made in force levels. Finally, the force level should not be permitted to decrease below that necessary to address the capability of the C.I.S. forces or, in the future, those of another power.** As in other correlated forces, this means rough numerical parity and qualitative superiority. The bottom line is that if the C.I.S. essentially scraps its submarine force and no other potential opponent attempts to construct a numerous, capable submarine fleet, then we can probably get by with no fewer than thirty SSNs. **If, as argued above, the C.I.S. retains a relatively numerous and capable force (about forty SSNs, twelve SSGNs, all modern), it would appear risky to maintain fewer than sixty U.S. SSNs for the foreseeable future.**

References

1. N. Polmar and J. Noot (1991) Submarines of the Russian and Soviet Navies: 1718-1990, Annapolis: U.S. Naval Institute Press.
2. N. Friedman (1991) Desert Victory, Annapolis: U.S. Naval Institute Press.

SILENCE IS NOT GOLDEN

by LCDR Michael J. Baumgartner, USN
U.S. Naval War College

The Submarine Community has for years adhered to the policy that operations were not to be discussed. Considering the Soviet anti-submarine warfare (ASW) capability, the reliance on secrecy for success, and the undisputed allocation of financial resources, this policy was prudent and necessary. However, the threat is no longer what it was and neither is the financial climate. In order for the merits and capabilities of the submarine community to be understood and supported by Congress and the public, it is time to understand that silence is not golden. Without effective advertising, a viable, necessary capability will wither on the vine through lack of funding.

Advertising requires an audience be targeted, messages or *commercials* identified, and the choice of mediums selected. This advertising initiative, to be most effective, should be force-wide. However, the focus of this paper will be from a middle management (Executive Officer or Commanding Officer) point of view. *[Ed. Note: See end-note for a brief resume of recent higher-level efforts to reach the public.]*

The Audience. Deciding on an audience is not difficult. Congress ultimately funds submarine operations and construction but the public holds influence over Congress. One would have to assume that, if the general public got the submarine community's message, so would Congress. So, to kill two birds with one stone, the public should definitely be the target of interest.

The Commercials. OP Plan 1-43 was a top secret document issued by the Commander, Submarine Force, U.S. Pacific Fleet (COMSUBPAC) on 24 June 1943 detailing the submarine missions of World War II. It listed sea control, mine laying, support of naval and land forces, reconnaissance, raids, intelligence operations, evacuation of friendly forces from enemy held areas, and resupply as the current submarine missions.[1] On 18 January 1992, OP-02, Assistant Chief of Naval Operations for Undersea Warfare released an unclassified document entitled Submarine Roles in the 1990's and Beyond. *[Ed. note: a condensed version was carried in the April 1992 SUBMARINE REVIEW under the title Submarine Roles in the Future.]* It

listed the submarine roles as peacetime engagement, surveillance, deterrence, regional sea denial, precision strike, task group support, and ground warfare support.[2] Comparison of the two documents shows that the majority of missions are held in common. The similarity suggests that the missions are valid and enduring and that having a force of some size is justified. This force justification, updated as possible with current operational examples, should be the first commercial.

The second message should be the submarine force nuclear safety record. There are frequent articles and news stories covering the deplorable state of the nuclear power industry in general and the government's nuclear weapons production reactors in particular. The Savannah River site in South Carolina has been in the news, yet rarely if ever does one read about the dozens of reactors which are routinely operated around the picturesque city of Charleston. The reason is that these plants have an outstanding record of safe and responsible operation. However, in today's financial climate, the absence of negative exposure is not good enough -- the submarine community needs to reveal **pro-actively** the unequaled record for safe reactor operation. This should be the second commercial.

The third should be the quality of the submarine sailor. Although presented last, this is the most important message of the three. Anyone volunteering for submarine duty is subjected to a stringent screening process. The standards are high and the rigorous training received prior to being assigned to a boat weeds out many would-be submariners. The end result is that the sailors who make the cut are the best to be found in the Navy. Showing the public could only benefit the force.

The Medium. Selecting the medium is a difficult decision because of the wide range of choices. The commercials can be presented to the public directly without using the media as a go-between. This type of approach has the potential of best communicating the quality of the troops and what they do. However, it will only reach a limited audience. Indirectly delivering the commercials through the media has the potential advantage of reaching a wide audience and best describing the technical issues of force justification and reactor safety in easily understood terms. A prudent decision would be to keep all options open and engage the public both directly and indirectly as the opportunities present themselves. This promises the

most exposure and the most effective coverage of the submarine community message.

Direct Advertising. Direct advertising is what the submarine community does best and is an area in which it has been excelling for years. From a middle management point of view, it consists of tours and rides, HARP (Hometown Area Recruiting Program) duty, and public services. Each option will be discussed in detail.

Submarine rides and tours have been going on probably as long as there have been boats. They are outstanding for communicating the quality of the troops if they are done right. *[Ed. note: see In the Presence of Greatness in this issue of the SUBMARINE REVIEW.] Right* means having the duty section perform the tours (on watch personnel for rides) with groups of five or less. It allows every crew member to explain his specialty and the working of his ship. Nothing demonstrates better the quality of the sailor and the degree of his in-depth knowledge than an opportunity of this sort. They reach all levels of society from local civic leaders to members of Congress and Assistant Secretaries of the Navy, from family members to local Boy Scout troops, from midshipmen to allied admirals directing their undersea warfare forces.

HARP duty is another way to get the submarine message out. HARP duty is a recruiting initiative which allows sailors to assist recruiters in their hometowns on a temporary basis (approximately six weeks). Not only is this a good deal for the sailor (free leave) but it also provides the submarine community an opportunity to have one of its own speak at several local high schools. It's an opportunity to get the message out albeit to a young audience.

Public services are the last direct avenue for advertising the commercials. Services which come to mind are local "Adopt a School" programs and tutoring programs. "Adopt a School" is a program in which a ship or shore activity donates time and sometimes tools to assist the adopted school with self improvement projects such as cleaning up school grounds, getting a football field ready for the season or building and painting new dugouts for the baseball field. Tutoring programs are similar except sailors and officers donate their time to tutor high school students in math, physics, or the sciences. These programs allow submariners to demonstrate the type of people the

majority are -- hard working and intelligent. This is the commercial the public should understand.

Indirect Advertising. Indirect advertising is the most difficult due to a deep-seated organizational bias of non-disclosure. However, as previously mentioned, it offers the substantial advantages of reaching a large audience and of presenting potentially detailed commercials in clear, everyday language. There are widely known approaches such as documentaries like Pride Runs Deep and Steel Boats, Iron Men and novels/movies such as The Hunt for Red October. However, these are typically outside a commanding officer's or executive officer's ability to influence either in their making or in their showing. Indirect initiatives from a middle management perspective consist of professional articles, news releases, and media tours.

Professional articles in magazines such as U.S. Naval Institute Proceedings and The Submarine Review provide vehicles to send the most technical of commercials. They reach a large audience and allow control over what is printed. However, on the down side, they are like preaching to the choir. The audience is typically military and, in the case of The Submarine Review, mostly all submariners. This shortcoming greatly limits the utility of this type of medium.

News releases to the local paper and *hometown news* provide an excellent opportunity to show off individual sailors or the command to a wide, potentially non-Navy audience. Although it probably would not communicate the commercials of force justification and reactor safety, it can convey the quality of the troops and is a task even the most junior collateral duty public affairs officer could handle. These advantages make it a useful medium.

Media rides are the final option which has the largest potential advertising payoff as well as the largest risk. The payoff is that this avenue, particularly if it is video, has the ability to communicate all three commercials to a large, uninformed public. The obvious risk is, unlike any other advertising initiative, whether justified or not, it will not be career enhancing. It would also involve the most command effort from the C.O. or X.O. to sell the idea to the chain of command and to the media it is trying to attract. However, the bottom line is getting the message out and this avenue is too promising to ignore.

In conclusion, the submarine community can no longer afford to be the *silent service*. The commercials of a justified capability, reactor safety, and the quality of the submarine sailor need to be widely disseminated. It can be accomplished at the ship level directly through tours and rides, recruiting, and public services. It can be accomplished indirectly using the media through professional articles, news releases, and media rides. With effective advertising, a viable, necessary capability can be maintained through public support of funding.

NOTES

1. U.S. Navy Dept., Submarine Operational History, World War II (Washington, 1947), I, pp. 41-42.

2. U.S. Navy Dept., Submarine Roles in the 1990's and Beyond (Washington, 1992), pp. ii-iii.

Editor's End-Note: In addition to Submarine Roles in the 1990s and Beyond, the ACNO (Undersea Warfare) has published two glossy magazines: America's Nuclear Powered Submarines of 28 pages, and Around the World, Around the Clock, Always Ready of 22 pages.

The number of submarine rides for 1991 and the final half of 1992, doubled the number of rides for the two years preceding. Of those in 1992, one-third were for the press. A notable event was the flying up to the Arctic Circle of 8 reporters for an overnight underway on USS GRAYLING. Several interviews of note have been given, including:

Vince Thomas of Seapower
Barbara Starr of Janes Defense Weekly
Wolf Blitzer of CNN
David Evans of The Chicago Tribune
Suzanne Schafer of AP
Charles Corddry of Baltimore Sun
Bart Gelman of Washington Post
Eric Schmidt of The New York Times

An internal video was produced explaining what the submarine can do in the current world situation. This video has been distributed to a variety of internal naval commands for indoctrination purposes.

■

Submarine Technology in a League by Itself.

General Dynamics Electric Boat Division has been designing and building nuclear submarines for more than 40 years. We are the sole designer and builder of Trident ballistic missile submarines, and we build SSN688 class attack submarines.

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GENERAL DYNAMICS
A Strong Company For A Strong Country

REDUCING THE RUSSIAN SUBMARINE CONSTRUCTION BASE

by George K. Kraus, Jr.

[Ed. Note: Reprinted with permission from Notes of Foreign Systems Research Center of Science Applications International Corporation. George Kraus is a member of the League and is a retired Naval Intelligence Officer.]

Over the years, the Soviet Union developed a very large infrastructure to build nuclear submarines. Facilities were dispersed throughout the country, with relatively steady additions expanding the capacity and providing the widely dispersed Northern and Pacific Fleets with indigenous nuclear submarine construction yards. None of these yards were located outside Russia proper, nor were the nuclear boats' home ports. Now, however, the resources to continue to support this infrastructure seem to have evaporated and the substantial construction rates of the 1970s and 1980s have slowed. As the service draws down, the large construction base must find other things to do.

Centralized Construction

On 8 May, an article in Red Star noted that President Yel'tsin had designated the Northern Machine Factory (Sevmashzavod) at Severodvinsk the State Center for Atomic Submarine Construction. **The article stated that Severodvinsk would henceforth be the only yard producing nuclear submarines,** and the other facilities that formerly also produced these vessels would be converted to civilian production. In addition to submarine building, Severodvinsk will also dismantle military and civilian ships and salvage radioactive waste from submarine reactors.

This means a substantial reduction in the Russian yards and ways devoted to submarine building. In addition to Severodvinsk, the current infrastructure includes the United Admiralty yards at St. Petersburg, formerly producing VICTOR III nuclear and KILO diesel boats, the Gorkiy yard that has been producing KILO and SIERRA in low volume, and the Komsolmol'sk shipyard on the Amur River in the Far East, producing KILO and the AKULA SSN. This system of yards has produced ten

or more submarines a year for most of the past twenty years and has enough covered ways to expand well beyond that number. Severodvinsk is, however, the largest submarine construction yard in the world, with three large building halls and the largest submarine ways in Russia. This facility is the only one large enough to have built TYPHOON and DELTA IV SSBNs, OSCAR SSGNs, and that has the capacity and facilities to build any of the most modern nuclear boats. Nevertheless, the consolidation has significant costs and implications.

Single Yard, Smaller Force

First and foremost, fewer facilities translates directly into fewer submarines in the immediate future (once current submarines on the ways in these facilities have been rolled out). Admiral of the Fleet Chernavin had observed during remarks at the U.S. Naval War College (November 1991) that the Russian Navy would, in the near future, be building only two AKULA SSN and two KILO SS per year. This low construction rate was hard to correlate with an infrastructure of four yards and the disparate programs noted above, but does fit well with the newly-reduced infrastructure. Clearly the decline in naval resources has been a driving force in this drawdown.

However, there are several additional implications for the navy. If the Komsomol'sk yard is converted to civilian production, there will be no submarine construction in the Far East. Since the majority of the nuclear submarines resident in the Pacific Ocean Fleet have been built at Komsomol'sk, this development portends a possible decline in the size of the force there. Although units have been transferred from Northern Fleet in the past, this practice has been very selective. The most modern SSBNs, TYPHOON, and D-IV for example, have not been transferred to the Pacific. As the number of sea-launched ballistic missiles is reduced to meet much lower START ceilings for reentry vehicles, it is possible that the Pacific Fleet will lose its SSBN force.

It may also be significant to see what "civilian" tasks the newly released shipyards take in hand. The large number of nuclear submarines coming out of the inventory provide an almost unsolvable problem for the overtasked repair infrastructure, and the use of these former building facilities could make

the prospects for dealing with this problem much brighter. However, in other instances where conversion of shipyards has been tried, the inability of the Navy Department to pay in hard currency (or in some cases in any currency), has moved the Navy's work to the very back of the queue. It remains to be seen if this time a rational confluence of resources and tasks will occur to help with the Navy's submarine repair and dismantlement problems.

A final observation is pertinent for those also watching the decline of submarine construction in the United States. **Even with the reduction in Russia to a single facility for nuclear construction, the Severodvinsk shipyard has more ways and is larger by itself than both Newport News and Electric Boat taken together. If it is maintained in even this reduced status, the surge capacity of that one facility is potentially formidable.** However, it is also clear from previous open-source material that the loss of secondary tier suppliers is also a problem for the Russians. The loss of these subcontractors is likely to continue as the three other yards shift production from nuclear submarines. Ultimately, this may be the major limiting factor for any future surge in production.

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NEWS RELEASE

"World Premiere Discovery Series Delves into the Mysterious and Deadly World of Submarines"

--SUBMARINES: Sharks of Steel includes first-ever Western footage of shots aboard Soviet TYPHOON submarine--

PREMIERE

Sunday, February 14, 1993:

- Episode 1, **"The Hidden Threat"** 7-8:00 PM
- Episode 2, **"The Submariners"** 8-9:00 PM
- Episode 3, **"The Hunter & The Hunted"** 9-10:00 PM
- Episode 4, **"In The Belly Of The Beast"** 10-11:00 PM

Episodes will be repeated on subsequent weeks. ***All times are Eastern Time: Consult Local Listing***

A Brief History of The Push-Pull of Submarine Combat Control Systems

by Daniel A. Curran

Combat Control is the link between the sensors, like the periscopes, radar, communications intercept and sonar, and the weapons, torpedoes and missiles. The earliest combat control system was the Commanding Officer's brain, and while the later systems became sophisticated computer arrangements, like the Submarine Combat Control System (CCS) MK 2, we still rely on the human brain as the final integrator.

The term "Submarine Combat Control Systems" needs a layman's definition before we discuss the history. A proposed definition is: A submarine system, part of the submarine "command, control, communication and computer system" (see Jerry Holland's article, "Submarine Command and Control in the New World Order", October 1992, SUBMARINE REVIEW) that correlates all sensor inputs, including off-board information, and produces target track, contact management and command weapon employment information needed to shoot any one of several weapons.

The first question is, "Haven't we just defined a fire control system?" And the answer is, "Yes, sort of." In fact, the fire control (weapon employment) function is an important part of the submarine combat control system. What we have described as *Fire Control Systems* in the past, as we will see shortly, were really command-integration systems forming a complete picture of the sensor inputs much as the Navy Tactical Data System (NTDS) has done on the surface ships to integrate the radar, and sonar pictures. As the data collection and correlation have shifted to increasingly capable electronic systems, the Combat Control System becomes more of a command tool than one strictly for weapon employment. For this reason, I propose we use the term ***Combat Control System*** in the future rather than the term *Fire Control System*.

Each submarine combat control system we discuss here can be categorized as having resulted from either a *weapon pull* or a *technology push* requirement. By *weapon pull*, it is meant that the change in the Combat Control System is the result of

DEVELOPMENT/ START SERVICE	COMBAT CONTROL SYSTEMS	TECHNOLOGY PUSH WEAPON PULL	TECHNOLOGY	WEAPONS	CLASS OF SUBMARINE
1920s & 1930s	IS-WAS, Banjo and Remote Gyro	*Pull*		Early Torpedoes	Early Classes
1930s & 1940s	Torpedo Data Computer (TDC)	*Push*	Electro-Mechanical Computer		P-Class, V-8 Class Fleet Submarines
1940s & 1950s	MK 101 and MK 106	*Pull*		MK 37, MK 45 and MK 48 Wire Guides	Post WWII Classes up to SSN 594, WWII Fleet (106)
1950s & 1960s	MK 113 (Note Mod 10 was – a MK 117 with SUBROC)	*Push*	Digital Electronics and Displays, digital MK 101		SSN 594, SSN 688, TRIDENT
1960s & 1970s	MK 117, MK 118, Central Computer Complex CCS MK1	*Pull*		Tomahawk, Harpoon, SUBROC, MK 48 ADCAP(637) and Mines (688)	SSN 637, SSN 688I, TRIDENT
1980s & 1990s	BSY-1, BSY-2, CCS MK-2	*Push (ADCAP Pull for TRIDENT)*	Integrated Sensor Inputs, Workstations, New Computers		688, 688 VLS, 688I, SSN 21 and TRIDENT
1990S & 2000S (Projected)	CCS MK-2 Improved (Projected)	*Pull*		New Standoff Weapons, New Lightweight Torpedo & AAW Weapon for Shallow Water, Mines (SSN 688)	New Attack Submarine (Centurion)

weapon changes requiring new control functions. By *technology push*, it is meant that the existing combat control functions have been updated with newly available equipment and computer software. As a matter of interest, the *push* and *pull* influences on submarine combat control systems seem to alternate about every ten years.

The earliest submarine fire control system was nothing more than the *MK I Eyeball* aiming the bow of the submarine in the direction of a target, but the torpedoes were erratic.

The problem of torpedo directional accuracy was solved in the late 19th century when gyroscopes were used to control the torpedo's vertical rudder. By the turn of the century, the torpedo had evolved into a deadly accurate naval weapon. Fire control was something else. The Holland class boats still had to be maneuvered so the torpedo was fired directly at the target.

In the 1920s the Bureau of Ordnance fitted the submarines with remote, outside gyro-setting devices which enabled the course of the torpedo, after it was loaded in the tube, to be adjusted up to the time of firing. Neither target range nor speed could be estimated accurately so various devices were developed to help the firing officer. One was the Submarine Attack Course Finder, the "Is-Was", a circular slide rule that was used to determine bearing after the submarine commander made his best estimate of course and speed. To quote John Alden in, The Fleet Submarine in the U.S. Navy,

> "The device was called the 'is-was' because all too often by the time the commander was able to get an answer to the question, 'where **is** the target' it **wasn't** there any more."

Another hand-held device developed in the 1930s was called the banjo angle solver because of its shape. Angled shots at other than 0° and 90° could be made. This is an example of *weapon pull* where the change in the weapon (the remote setting gyros) caused a change in the combat control.

The next change driven by better device technology in the 1930s was the Torpedo Data Computer, the TDC, which was an electro-mechanical computer. The TDC was a significant advance over the hand held slide rules. Here the instrument combined a position keeper section with an angle solver that calculated the correct firing angles continuously and transmitted the information to the torpedo tubes and automatically set the

angle on the torpedoes. Last minute submarine maneuvers were eliminated. Range to and speed of the target still required the *seaman's eye* but single-ping ranges, radar ranges, and the development of periscope stadimeters helped solve those problems. The TDC was the standard through World War II although some other ingenious devices were being developed.

The proliferation of torpedo types at the end of the war leading the wire guided MK 37, MK 45, and eventually the MK 48 torpedoes provided a rigorous *weapon pull* that brought about the MK 101 and the MK 106 Fire Control Systems. (The term Fire Control is used for historical purposes only.)

The MK 101 was designed as a system and the chief improvement was the automatic transmission between units, the reception of all target data simultaneously, automatic analysis of target course and speed, longer position keeping ranges, and other synchronous functions.

The original MK 101 could handle the straight runners as well as the various wire guided torpedoes up to the MK 48. Various modifications were installed on the post WW II submarines from the TANG class through NAUTILUS and SEAWOLF and up to, but not including, the PERMIT class.

The MK 106 FCS was just a post war system for the older submarines that could not accommodate the full MK 101. The system was build around the existing torpedo data computer. Like the MK 101, the MK 106 could handle the wire guided torpedoes up to the MK 48.

The MK 113 fire control system, introduced in the 60s, was designed to operate with the AN/BQQ-2 sonar system on the PERMIT class and with the simpler sonars on the strategic submarines.

Architecturally, the MK 113 was a digitized MK 101; a lot of analog equipment remained. Later versions of the MK 113 used CRT displays and like its predecessor, displayed the data on a series of dials showing relative target and own ship's heading. Since the MK 113 was introduced as a fully passive fire control system, Target Motion Analyses (TMA) plotting became very important.

Various modifications of the MK 113 were installed with even mods on the attack submarines and odd mods on the strategic subs. MK 113 Mod. 10 which allowed the system to handle the analog SUBROC standoff weapon was close to the MK 117 FCS (see below). This could be categorized as a *weapon pull* rather than a *technology push* like the rest of the

MK 113 modifications.

The MK 117 which began in the early 70s was the first all digital fire control system and was forward fitted on the later 637 class and the SSN 688 and backfitted on the long hull and earlier 637s and the 594 classes. The MK 118 was a simpler version for the OHIO class strategic submarines.

The introduction of the central computer complex on the 688 class, using the Navy standard AN/UYK-7 and AN/UYK-44 computers combined with the MK 117 FCS, defined the CCS MK 1. The introduction of weapons like the Tomahawk and Harpoon missiles, the advanced capability MK 48 torpedo for SSN 688s, mines for SSN 637, and the MK 48 torpedoes for the Trident submarines, was definitely a *weapon pull* for this combat control system. The complexity of the weapons requiring over-the-horizon targeting and the growing complexity of the sensor suites was taxing the capacity of the existing computers. So many configurations existed that a sailor with a weapons rating who transferred from submarine to submarine had to literally go back to school to learn about the next boat. Fortunately, the computer technology was geometrically progressing at this time and the problem was addressed with a new *technology push*.

The BSY-1 is an integrated combat system that replaces the AN/BQQ-5 sonar suite and CCS MK 1 control system on the later SSN 688 class submarines. This is a system that combines the information from a variety of arrays and melds the data into a single tactical display. New Navy standard computers are introduced and the AN/BSY-1 incorporates the combat control functions of the older CCS MK 1 for the various missiles and torpedoes.

The AN/BSY-2, being designed for the SEAWOLF (SSN 21) submarine, was split from the AN/BSY-1 when the AN/BSY-1 development experienced problems in 1985 and 1986. The system has increased capability against the projected Soviet threat, but now with the demise of the Soviet Union and the apparent end of the SEAWOLF program, there is some question about where the program is headed.

The latest CCS, the MK 2, was started a year after the AN/BSY-2 in 1988 as an update of all of the older CCS MK 1 and CCS MK 1-based systems, such as the AN/BSY-1, as well as to provide performance enhancements for command, passive ranging, over-the-horizon, and MK 48 ADCAP for Trident.

The CCS MK 2 uses militarized commercial workstations and Reduced Instruction Set Computers to provide commonality

across the three SSN 688 versions (basic 688, vertical launch 688s and BSY-1 688s, called 688Is) and Trident and provides a basis for future growth. There is a slight *weapon pull* for the MK 48 ADCAP torpedo for Trident but essentially the CCS MK 2, the AN/BSY-1, and the AN/BSY-2 are all *technology pushes* as we attempt to bring more current computer technology to the submarines.

What for the future? Historical trends would indicate a *weapon pull*. If we examine some of the new submarine missions, we recognize that there will probably be a requirement for a new standoff weapon (Sealance?), a new shallow water torpedo, some sort of an AAW weapon for shallow water operations, as well as introducing mines to the SSN 688s when the SSN 637s are retired.

The next period of submarine development is shrouded by the dramatic changes in the world political situation. I read an interesting book recently called Men, Machines, and Modern Times by Elting E. Morison, a nephew of S.E. Morison. The book was published in 1966 by the MIT press. Ed Walsh, the Editor of Seapower, loaned me the book because we had been discussing the causes of major changes in the naval systems. Dr. Morison's thesis is that we hold on to the past and retain too much of the past conventions. This stifles development of new naval systems.

A good example is the proliferation of mods to the CCS MK 1 discussed above which finally caused the *technology push* to develop the AN/BSY-1, AN/BSY-2, and the CCS MK 2.

Now we are developing open architectural systems using new standards which are software based. The future *push-pulls* for the combat control systems and the weapons will be based on common hardware and software elements. This will provide a more stable base for program specific developments and hopefully reduce the costs and schedules of these developments in the future.

We need to encourage our young officers and sailors to use the modern tools we have presented them to create what is needed for the submarine missions of tomorrow. **At the same time, we should recognize that there is a certain rhythm in the development of our combat systems that hold lessons for our future work.**

■

SUBMARINE VERSUS SUBMARINE SUBMERGED

The Only Actual Sinking

by CDR Richard Compton-Hall, MBE, RN(Ret)
Director, RN Submarine Museum

Submerged submarines have sunk many of their kind on the surface; but, in all history, there has only been a single instance of one submarine sinking another when both boats were dived - and that was towards the end of World War II.

The victim was U-864 and the attacker, HMS VENTURER. Neither boat had sophisticated sensors by today's standards, except for excellent periscopes. VENTURER'S instruments were, as usual, made by Barr and Stroud with brass tubes which vibrated abominably at speed. But, to avoid a tell-tale feather, no British commanding officer worth his salt would use the *stick* at more than three or four knots unless the sea was rough - and then only sparingly. On 9 February 1945 at midday, when the attack took place, the wind was Force Two from the southwest, Sea State 3, visibility 7 with broken clouds. Thus, the captain of VENTURER, Lieutenant James (Jimmy) S. Launders, used his periscope with due caution; but not so Korvettenkapitan Rolf Reimar Wolfram of U-864, who evidently had scant regard for proper periscope drill.

Wolfram commissioned U-864, a Type IX D2 *oversea* cruiser displacing 1,084/1,616 tons, on 9 December 1943. His previous command was U-108, a smaller Type IX Atlantic boat. He had plenty of experience, but no luck. His claim to have sunk a Liberty ship loaded with munitions is not supported by the records.

A year passed with continual problems before U-864 was pronounced ready for sea; twice the normal delay common to Schnorchel-fitted boats. She sailed from Kiel for Horten, near Oslo, on 5 December 1944 to test the schnorchel there, and two days after Christmas went on to Kristiansund before moving up to Farsund, always cautiously hugging the Norwegian coastline, for yet more trials. On New Year's Day 1945 the recalcitrant U-cruiser sailed for the operational base at Bergen. If she had been ready soon after commissioning, she would doubtless have joined her sisters in the Indian Ocean; but the Normandy landings denied the long-range deployment which her range of 13,000 n. miles at 10 knots allowed.

Wolfram, Class of '30, was 32 years old when his new command finally sailed for its first war patrol on 6 February

after a month in harbor, with the 11th Flotilla, endeavoring to make remaining defects good.

Unfortunately, the machinery was still not right. One has to wonder whether the crew's heart was really in the game. Two hundred and fifty U-boats had been lost in the past twelve months for half that number of merchant ships destroyed. When only three days out, Wolfram decided that he must return to harbor. What exactly went wrong is not known but we can suppose that the schnorchel failed and at least one item of machinery was dangerously noisy. Unknown to Wolfram, HMS VENTURER's patrol area lay athwart the big U-boat's course back to Bergen.

Launders was seven years younger than the German captain but much more aggressive and professional despite a mere four years in submarines. He learned his trade as First Lieutenant of HMS P35 in 1942 under the renowned Lynch Maydon in the Mediterranean where he won his first Distinguished Service Cross (DSC). Maydon recommended him for Perisher (command course) which he joined in January 1943. Judging by the remarks of *Teacher* (the formidable, supremely expert, Teddy Woodward), it is clear that he found it hard going. Maydon, whom he had watched sink a number of ships, might have created the impression that attacking was easy; Jimmy found it anything but. Some of Woodward's written comments in the Attack Teacher were scathing: "turned in too late and missed D A (Director Angle)", "poor estimation", "missed last zig (of target)", "bad ranging", "said wrong bow for first estimation", "badly lost at end". Nevertheless, errors cancelled out more often than not, and fourteen out of twenty-four dummy attacks scored. Woodward appended 'very lucky hit' for a couple. In real life Launders would have been rammed twice by targets - the deadliest of sins for a Perisher. But Jimmy Launders' luck held. Woodward believed, in the end, that he would make a good CO and passed him after observing his performance in the Perisher boat at sea.

Woodward's faith was justified. Appointed to command the small but handy 545/740 ton, first-of-class VENTURER in May 1943, just after launch at Vickers, Launders took her to Holy Loch where she joined the Third Submarine Flotilla, supported by the depot ship HMS FORTH, in August. In July 1944 he received a bar to his DSC for sinking two German supply ships off Norway. He was awarded his first Distinguished Service Order (DSO) for dispatching U-771, a Type VII C making a

surface transit off northern Norway, on 11 November 1944. He was also engaged on Special Operations: a euphemistic term for landing agents on an enemy-controlled coast. A bar would be added to the DSO for his next attack on a U-boat.

HMS VENTURER set off from Lerwick for her eleventh war patrol at 1500 on 2 February 1945, four days before U-864. She had only 190 miles to go from this most northerly port in the British Isles to her assigned patrol area off Bergen, a mere 15 hours at 12 knots. With a full 12 hours of darkness at that time of year and foul weather at the start, Launders felt it was safe to stay on the surface. Although radar detected an aircraft 22 miles away at about midnight (not bad for the crude little dipole Airguard set), VENTURER arrived without enemy interference. Launders dived at dawn in a position some 50 miles west of Fedje (then Fejeosen) Island marking the northern, and most frequently used, entrance to Bergen Fjord. During the day he ran slowly towards the Norwegian coast and thereafter patrolled the route leading to and from the fjord, recharging batteries by night on the surface, and diving by day. Apart from sundry aircraft (which were no threat), a few fishing vessels and some unexplained underwater Morse transmission, nothing disturbed the patrol pattern. In fact, the first five days were thoroughly boring.

However, at 0932 on Friday, 9 February, Type 129 ASDIC, a small rotating active/passive set located at the forward end of the keel and tuned to 19kHz, reported very faint Hydrophone Effect (HE) bearing 340 degrees. The Leading Seaman HSD (Higher Submarine Detector) operator had, of course, no analysis equipment but he thought it sounded like a diesel engine. This contact may well have been a fisherman; but at 1010 HE was again reported, now bearing 295, increasing in strength and drawing right. By 1035 the bearing was 320 but nothing was in sight. That was strange because, throughout the patrol so far, ASDIC had not detected anything over the horizon. Vessels heard were invariably in view through the periscope. Launders' suspicions were aroused. Only six miles off Fedje he was right on track for any U-boat that might be snorkeling, or perhaps running trimmed right down, towards the fjord. VENTURER kept very quiet.

The periscope drill was standard for British boats. A quick look all-round in low power (x 1.5 magnification) on the search periscope for aircraft or any immediate dangers, taking only a few seconds, and then a very careful look in high power (x 6)

all around the horizon taking the best part of five minutes. The periscope was then lowered for five minutes and the process repeated. (Some commanding officers preferred to dip the periscope more frequently; that is, after the all-round look and between searching each half of the horizon, but Launders differed.)

At 1050 Lieutenant Andy Chalmers, First Lieutenant and Officer of the Watch at the time, concentrated on the bearing indicated by ASDIC and sighted **a thin mast.** It quickly disappeared but Launders altered course northwards to intercept.

At 1115 Launders briefly sighted a definite periscope and prepared to attack. The crew was by now at diving stations (i.e., action stations) and the Attack Team was closed up. The target was north of the expected route but seemed to be heading for the fjord. Launders was puzzled. Although he and Percival Head, the ASDIC operator, reckoned the noise was like a diesel, there was certainly no Schnorchel with its accompanying exhaust *gefuffle*, to be seen. He concluded that the submarine was running some exceptionally loud machinery, perhaps an air compressor. Launders looked at the chart and surmised that the north-north-westerly tidal stream, which he himself was contending against, had set the U-boat northwards and that its course would have to lie between 120 and 170 degrees if it was indeed intending to make harbor.

Some indication of range was given by the periscope sighting but not enough for a good fire-control solution: exact target speed, albeit undoubtedly slow, was unknown, and a zig-zag was suspected. Launders therefore decided not to fire hastily but to take station on the target for a while and catch up to fire when better estimations were available from the plot.

At 1122 two periscopes were visible for quite a long time, one showing about eight feet above the surface and another three feet. This was unforgivably careless in Launders' view. In a Type IX D2, like most U-boats, the so called *sky* (or *navigation*) periscope was in the control room while the attack instrument was in the kiosk in the conning tower above. Thus it was not impossible for the captain in the kiosk to have a look while not appreciating that the other instrument was raised as well. However, there is another conceivable explanation which would excuse the German captain. Perhaps Launders did not see two periscopes but mistook the periscopic radio mast, emerging from a well at one side of the bridge, for one of them.

After all, Wolfram must have been anxious to communicate with shore at this juncture in order to establish his identity and avoid friendly aircraft scoring an *own goal*.

Either way, the two masts were well separated, telling Launders that he was broad on his target's starboard bow. They also enabled him to align the inevitably inaccurate ASDIC bearing with the visual bearing; a very necessary check if it turned out that he had to fire by ASDIC. The tactic of keeping station at 3.5 knots was very different from today's practice of changing own speed and course to determine differing bearing rates and thereby establish Target Motion Analysis (TMA) with the help of a computer. VENTURER boasted no computer, just a rudimentary analog *Fruit Machine* calculator. But Launders had a keen mathematical brain. He must have realized that, although he had no choice of tactics in this instance, the stationing method of calculating enemy range, course and speed was plainly untrustworthy. Nevertheless, it was obvious that the U-boat was making about 3 knots; it was losing bearing marginally while VENTURER was on a more or less parallel course at 3.5 knots; and that obviated gross errors.

Launders was convinced, after a while, that the target was zig-zagging; but the author agrees with a distinguished ex-Perisher Teacher (Vice Admiral Sir Ian McIntosh) that U-864 was probably on a steady south-easterly course. The zigs plotted by Launders' navigator were too fine and too frequent to give the U-boat adequate protection, yet they would have reduced still further the speed of advance in an area where it seems that Wolfram did not expect to be torpedoed.

Launders was sufficiently confident to fire a salvo of four Mark VIII straight-running, non-homing torpedoes on an ASDIC bearing at 1212. The tubes had no angling gear and he employed the normal British *hosepipe*. This meant that the fish were fired at calculated intervals, along the same path, such that the enemy's own movement in effect created a spread. It had been impossible to overtake the target (without risking noisy speed and counter-detection) so the salvo was fired from the target's starboard quarter on an estimated Track Angle of 140 degrees and with a Deflection Angle of three degrees by ASDIC. The range on firing was reckoned to be 2000 yards but, judging by the time which elapsed before one torpedo hit (probably the first in the salvo), it was actually about 3000 yards.

The first torpedo was aimed at the stem (adding aim-off to the ASDIC bearing) and the remaining three fish were spread

by firing interval in half-target lengths to one half-length astern. This unusual decision was made because, with the long firing interval of 17.5 seconds (necessitated by the hosepipe method), the enemy was very likely to hear the fish coming and turn away. The spread would cover that eventuality, and alternate torpedoes were set to run at thirty and thirty-six feet to explode on impact. Few COs in the Royal Navy trusted magnetic-influence pistols.

Explosions were heard at 2 minutes 12.5 seconds, 5 minutes, 5 minutes 16 seconds, and 5 minutes 33 seconds after the first torpedo left its tube. One fish undeniably hit; the remainder detonated on the seabed. ASDIC reported prolonged reverberations on the target bearing followed by breaking-up noises. The HE had ceased. Two minutes after the first explosion, a smaller one followed, conjectured to be internal, and the ominous sound of rushing water could be heard. U-864's stout bulkheads with equally strong circular doors were designed to help a boat survive a surface catastrophe. They could not withstand pressure at depth.

Launders took his boat, still dived, to inspect the scene through the periscope. There was an extensive and spreading oil film over the spot; and, amongst scattered wreckage (mostly wood from the U-boat's spacious decking), a torpedo-size canister was floating. U-cruisers carried several pressure-tight containers externally for various stores. This one may well have been intended for the dismantled autogyro frequently provided for long-range submarines as a tethered reconnaissance device. No bodies were seen.

There is no doubt about it, another German submarine had gone to the bottom where 781 U-boats would lie by the war's end. HMS VENTURER's kill was unique; a one-off with torpedoes that were certainly not smart. But the fact that no other submerged submarine versus submarine engagements have been successful in war seems worth noting. As Jimmy Launders might have said (he died a few years ago), the proof of the pudding is in the eating. Nobody has sampled a real dessert in the past 45 years.

[Ed.note: CDR Compton-Hall has published several notable submarine books. Among them are:

The Underwater War 1939-1945; Blandford, Poole, 1982

Submarine Warfare; Monsters & Midgets; Blandford, Poole, 1985

Submarine versus Submarine; Orion Books, New York, 1988] ■

THE PERILS OF PASSAGE

by RADM Mike Rindskopf, USN(Ret)

This story goes back to February 1942 and tells of the transit of DRUM (SS 228) from New London to Panama, and thence to Pearl Harbor. She was, in fact, the first new construction boat to arrive there after the declaration of war. But that's getting ahead of the story.

Mid-winter in New England on an open, wet bridge is no fun. But sea trials, a deep dive, post shakedown operations, torpedo tube tests in Newport, and a sound test in Gardiners Bay during which we left the skipper wet up to his waist on the bridge as we inadvertently bottomed had to be completed before deployment.

But what we remember most clearly is bidding wives and a few children farewell early on a dark day.

DRUM sailed under CTF FIVE OpOrder 2SA-42 dated 12 February 1942, leaving New London at 1609 17 February, following GATO (SS 212), the other unit of TU 5.6.1, by 24 hours.

The intelligence provided in the OpOrd consisted of three short paragraphs:

"1. (b) Extensive AXIS submarine activity is widespread along the ATLANTIC COAST OF THE UNITED STATES, and in the WESTERN ATLANTIC AREA.

(c) AXIS surface craft, possibly under neutral or friendly flag, probably are acting as supply ships for AXIS submarines in the WESTERN ATLANTIC AREA.

(d) Commander Task Force FIVE will transmit to submarines known information of own and allied war vessels, as well as enemy vessels of any character, which may approach route described in ANNEX AFIRM."

What additional data may have been given orally to LCDR Bob Rice, our competent skipper, will never be known. We junior officers were, no doubt, cautioned that "This was the real thing", and that safe passage depended upon an alert OOD with his well trained watch section.

Only recently have good accounts of the German U-Boat activity off the U.S. East Coast shortly after the start of the War been published. I refer to Operation DRUMBEAT or *Pauken-*

schlag by Dr. Michael Gannon; and U-Boat Ace by Jordan Vause, USNA 1978, as typical examples.

ANNEX AFIRM of the OpOrd routed DRUM through a point seven miles east of Montauk Point, thence south toward Mona Passage, remaining within 100 miles of assigned positions. Of significance is the order to remain submerged by daylight until Latitude 33, then on the surface at discretion day and night.

DRUM was *at war* only 29 hours after getting underway. Here's the log entry for 18 February, 1942:

> "20-24 Underway as before. 2116 Sighted wakes of three torpedoes crossing port to starboard ahead of ship. 2120 Quick dive, course 182. 2141 C/C to 225. 2335 Surfaced, course 225. 2345 Emergency on 4 engines." John D. Harper, Ensign USN

This, and another laconic entry on 21 February, 1942:

> "16-20 Underway as before. 1850 Sighted enemy submarine at estimated 4 miles. Proceeded west and southwest for three hours. No further contact." Manning M. Kimmel, Lt USN

prompted me to see if I could uncover data which might confirm these two events.

The Naval Historic Center in Washington has, as all of us know, a wealth of diverse material on WWII land, sea, and air actions. An initial general search for information on U-Boat activity along DRUM's track and at the point of sightings in particular, uncovered the following from the noted sources.

a) U-Bootwaffe Command (B.d.U.). Translated logs for each day of the war include U-Boat positions in the German world-wide grid, U-Boats in transit, Air Recce, Reports on the Enemy, current operations on specific U-Boats, and Success Reports. A Portion of the U-Boat dispositions for 18 February looks like this:

U-94	BD 93	U-128	Op(FLA)
U-96	E.Coast U.S.	U-432	OP CA
U-107	CB 66	U-504	DC 75
U-108	CB 89	U-564	CC 17

b) Kriegstagebuch (In German) for each month of the War. This was a high command summary of world-wide operations. The Seekriegsleitung (Naval Warfare Management) portion was provided to Grand Admiral Raeder. This was at such a high level that only significant action by an individual U-Boat was recorded.

c) Daily Plots by Commander-in-Chief, US Fleet (COMINCH) in which the 1700Z location of all friendlies at sea or in port was shown along with reported U-Boat operating areas and sinkings. The positions of GATO and DRUM are shown based upon their OpOrd.

d) U-Boat War in the Atlantic 1939-45 by Fregattenkapitan Gunter Hessler of the German Navy contained graphics showing the operating area of every U-Boat throughout its career. This data is corroborated by the daily U-boat position data in the B.d.U. log cited above.

From these reference documents, I concluded that U-432, -108, -107, and -564 were in or near Grid Square CA (Cape Cod to Hatteras, east to 67W) through which DRUM passed. There is no evidence, however, of a sighting or attack upon a U.S. submarine.

A logical next step was to tap the best source of U-Boat activity in the War, Prof. Dr. Jürgen Rohwer, author of Axis Submarine Successes 1939-45. He holds forth at the Bibliothek Für Zeitgeschichte (Library of Contemporary History) in Stuttgart. He kindly investigated his data for the time and place of the DRUM's torpedo sighting, commenting that he possesses **all** torpedo shooting reports of U-Boats which returned from patrol.

He concluded that U-108 was the most likely attacker, though there are discrepancies in the attempted match. On the positive side, U-108 reported firing at "a low lying vessel without a mast and with an oblique bow". That neatly describes a Fleet Boat! However, U-108 fired only one torpedo from a stern tube, hearing an explosion eight minutes three seconds later, followed by two more detonations. The time of attack agreed within reason, but the position was some 150 miles to the north of DRUM. Casting more doubt upon this event is the fact that U-108 fired a wakeless electric torpedo!

In further correspondence, Professor Rohwer suggested that "It may be that the sighted torpedo wakes came from whales or

other natural cause." He also recommended that U.S. sources be tapped to ascertain if another ship (or submarine) was attacked closer to the reported position of U-108. I have found no such data, however.

Professor Rohwer also addressed the submarine sighting near Mona Passage. He noted that U-Boats were deep in the Caribbean at that time, but that an Italian group, Da Vinci, was operating north of the Antilles. He suggested that his friend, Ammiraglio Renato Siccurezza, of the Ufficio Storico of the Marina Militare in Rome might shed light on the matter. And indeed, the Admiral sent a section from the Italian Navy World War II Submarine Operations History (in Italian). It describes in detail the activities of Grupo Da Vinci from 29 January 1942 to 4 April in and around the Antilles, including Mona Passage. The Admiral noted, however, that there was no evidence of a submarine sighting on 21 February, but DRUM's sighting by SS AGWIDALE in Mona Passage close to the time DRUM was scheduled to transit the area. Did DRUM see TAZZOLI, as suggested by Prof. Rohwer (or another boat from Grupo Da Vinci)? Did AGWIDALE see DRUM? In any event, disengagement was effective and no confrontation developed from either sighting.

DRUM moored safely at Coco Solo, CZ at 1440 25 February, 1942, without further incident. The passage was exciting, perhaps even perilous to the *uninitiated*.

DRUM proceeded directly to Pearl Harbor, although I have found no CINCPACFLT OpOrd. GATO carried out the CTF Five OpOrd, proceeding to San Diego (to correct a material problem, if I recall).

While studying the DRUM sighting near Mona Passage, I found a cryptic note on the COMINCH plot for 23 February, 1942, cited above, which stated that McCORMICK (DD 224) was overdue enroute Boston. No related notes were found on subsequent plots. Later, I learned that reports of McCORMICK's demise were greatly exaggerated. Her ship's history states that she participated in the Neutrality patrol, escorted convoys to Iceland, and finally was sold to the breakers in 1946.

This intrigued me sufficiently, however, to investigate the only loss of a new construction boat in transit, that of DORADO (SS 248) in October 1943 enroute New London to Panama via the same track DRUM had taken 18 months before.

DORADO's CTF 25 OpOrd No. 150-43 of 30 September contained four paragraphs related to Axis submarine activity, as

well as several devoted to movements of friendly forces: "Friendly aircraft patrols may be encountered at any time along the route prescribed herein."

DORADO no doubt was far more alert to U-Boat activity in the Western Atlantic than was DRUM. It is also obvious that Allied and U.S. Anti-Submarine operations were highly effective during DORADO's passage, while little to none existed in February, 1942.

The COMINCH plots for 12 and 13 October, 1943 show one SS in the Caribbean some 700 and 350 miles from Coco Solo. This was DORADO which had sailed from New London on 6 October. The plots also show the convoy GAT-92 escorted by two British PG and three US PC; and one U-Boat (U-214 according to B.d.U. records) close to DORADO on 12 October.

DORADO's loss was never clarified beyond a doubt, although Theodore Roscoe's Submarine Operations in World War II notes (p. 248) that aircraft out of Guantanamo Bay operating in support of convoy GAT-92 dropped three depth charges on one submarine; and also was fired upon by a second which had failed to respond to recognition signals. The first could have been DORADO, the second U-214.

DORADO is listed as lost on 12 October, 1943.

The perils of passage!

■

PS: WE WERE NOT ALONE
A Vignette from U-Boat History

by RADM Mike Rindskopf, USN(Ret)

In researching the preceding article on the transit of DRUM (SS 228) from New London to Panama in February 1942, I chanced upon the daily War Diaries of the B.d.U. (U-Bootwaffe Command).

An entry on 23 February 1942, under Section VI. General. merits the light of day in 1992:

"The number of misses reported is again unusually high, certainly at least some are caused by failures. In the meantime the investigation of the possibilities of failures yielded the following information:

> Because of a report from U-94 that at times considerable excess pressure existed in the depth gear pockets, the number of torpedoes were examined by the Inspectorate

of Torpedoes. It was established that due to faulty assembly and insufficient greasing by the automatic grease cup, 6.1 percent of the depth gear pockets had not the required pressure-tightness and were, therefore, inclined to run too deep. Previous methods of testing had not shown up this source of failures. Even though this small percentage does not explain all unaccountable misses, this office considers that a most important source of failures has been discovered. The Inspectorate of Torpedoes has therefore tightened up on the testing methods. It has also issued instructions on filling the grease cup and the type of grease to be used. These instructions were to be passed immediately to submarines out on patrol, who were to act on them, so that those torpedoes that could no longer be overhauled by the fitting out depots, would be handled correctly. Special emphasis was laid on the need to vent the depth-gear pocket with normal pressure in the boat. This case again shows that operational personnel's suspicions as to the cause of failures were in the main, correct. Again this proves how difficult it is despite complicated tests to discover causes of failures, as it is almost impossible to re-construct actual operational conditions at such trials. Therefore B.d.U. agrees with the Inspectorate of Torpedoes that the fullest possible tests and trials must be carried out for the sake of efficiency of operational torpedoes.

B.d.U. has requested a more speedy development of a depth gear that is completely unaffected by excess pressure in the torpedo. In the meantime C-in-C Navy has ordered its immediate construction.

It is hoped that failures caused by pistol failures will be still further reduced by the Pi G7h pistol which is now coming into use."

Theodore Roscoe, in his 1946 U.S. Submarine Operations in World War II, describes the U.S. Navy troubles with torpedo depth and exploders, and the excruciatingly slow march to correction. He notes in passing that the Germans had similar problems (p. 251). Could it be that he had access to this same B.d.U. report?

■

ALLIGATOR
Mr. Lincoln's Submarine

by Richard A. Worth

If not for conflicts between its French designer and the contractor selected by the wartime Federal government to build it, ALLIGATOR might have altered the course of the Civil War. By preceding its Confederate counterpart, CSS HUNLEY, by almost two years, ALLIGATOR, had it been employed successfully at Hampton Roads against MERRIMAC as intended, would have an honored place in Naval history, rather than an obscure footnote.

In September of 1861, a French nobleman offered to no less than the President, Abraham Lincoln, the services of his submarine vehicle and himself and crew in defense of the Union. The gentleman making the offer was M. Brutus de Villeroi and the submarine vehicle a 35 foot long, crank propeller vessel. It had been build in Philadelphia two years earlier with private financing by the Girard family for salvage work. The possible salvage target was the British warship HMS DE BRAAK which had capsized off Lewes, Delaware in 1798 with $10 million in specie aboard. De Villeroi, who had built and demonstrated several submersibles in France prior to coming to the United States, resided in Philadelphia. His submarine came to the attention of the U.S. Navy in May, 1861 while the vehicle was in the custody of the Philadelphia Police Department. It had been impounded after some zealous citizens saw it operating in the Delaware River and reported it as a possible infernal machine of the Confederacy with potential employment against the nearby Philadelphia Navy Yard.

Captain Samuel F. Dupont, Commandant of the Navy Yard, undoubtedly intrigued by newspaper reports and detailed descriptions of the craft in the Philadelphia Evening Bulletin, as well as by direct appeals to him for an inspection of the craft by de Villeroi, ordered a board of three officers, including the Yard's Chief Engineer Robert Danby, to examine the craft and report back to him. This was done on May 30, 1861, thirteen days after the craft's arrest and impoundment by the Philadelphia Police Department. The Board undertook a very detailed examination of the craft, taking numerous measurements of

interior and exterior dimensions and extensively interviewing and querying de Villeroi with whom they were apparently very impressed. The results of their evaluation, including observing several dives, concluded, among other things, that: 1) de Villeroi's machine could remain submerged for a considerable period without fatigue to the crew; 2) the boat could be submerged or raised at the will of the commander; 3) the crew could leave and return without surfacing; 4) a man could leave the ship and exist comfortably underwater using an air tube from the submarine; 5) a larger vehicle with a larger crew could attain speeds of one mile per hour; and 6) a diver deployed from the vehicle could attach an explosive device to the hull of a hostile vessel and return to the safety of the vehicle prior to detonation and remain completely undetected. This report was submitted to Captain Dupont on July 7, 1861 containing the following conclusion:

> "We therefore consider that the services of the distinguished engineer would be very valuable to the Government and that the possession of his invention would be of the greatest importance.."

This report wended its way through the Navy Department, including the office of Gideon Welles, the Secretary of the Navy.

Because of the threat of MERRIMAC, and its availability date in March of 1862, of which the Navy was well aware, it was decided to award a contract to Martin Thomas of Philadelphia on November 1, 1861. Mr. Thomas then subcontracted with shipbuilder Neafie & Levy who hired de Villeroi as superintendent of construction. The contract was for a larger vehicle than that demonstrated to the Navy on the Delaware at Philadelphia. Keyed to the March 1862 delivery of MERRIMAC, the contract called for a 40 day delivery and a contract price of $14,000. At the end of 40 days the craft was incomplete and the Government extended the date. The craft was still incomplete in March of 1862 when MERRIMAC sortied against the Federal blockade at Fort Monroe, Virginia.

Part of the blame was placed on the shipbuilder for its construction delays and part upon the general contractor, Thomas, for failing to deliver some equipment on time, including de Villeroi's *secret* oxygen generating system, probably a

hydroxide exchange system. In a letter published by the Philadelphia Public Ledger on March 26, 1862 written by Louis Hennet, the Engineer of the *Submarine Propeller*, he concluded by stating:

> "It is almost certain that if the Submarine Propeller that for the last two months has been lying at the factory of Messrs. Neafie & Levy, Philadelphia, had been in service at its destination [Fort Monroe] things would have gone differently. The MERRIMAC would have been destroyed, or at least rendered harmless."

On April 30, 1862 the submarine was finally launched at the shipyard of Neafie & Levy. She was given no name at the time and was referred to as the *submarine propeller* until her initial deployment at Hampton Roads, Virginia. Additionally, in her as-launched condition, she had no propeller but rather was propelled by sixteen oars, eight to a side, both on the surface and underwater. Her full crew was sixteen rowers and the submarine commander. Her physical dimensions were 46 feet long, 6 feet high, and 4 feet 6 inches wide. She was equipped to carry a minimum of two spar torpedoes similar to that carried on Lt. William Cushing's steam launch two years later when he attacked and sank CSS ALBEMARLE in the Roanoke River. ALLIGATOR also was constructed with a bottom hatch for ingress and egress of swimmers at or very near the surface. It lacked de Villeroi's oxygen generating system.

The submarine, after builder's trials at Philadelphia, was ready to go to war. After a five day tow via the Chesapeake & Delaware Canal, she arrived at Hampton Roads on June 23, 1862. Her first orders upon arrival were to attempt to blow up the Petersburg Bridge over the Appomattox River, a part of the Confederate supply route during the ongoing Peninsular Campaign. She was assigned, along with her tug FRED KOOP and support steamer USS SATELLITE, to Commander John Rogers who had command of naval operations on the James River.

After just four days, Commander Rogers returned ALLIGATOR to Admiral Goldsborough, his superior and head of all naval operations in the Norfolk area, expressing that the ALLIGATOR was incapable of operating in the shallow water and fast currents of the rivers of the area because of its lack of

speed and turning capability. Admiral Goldsborough commented when it was returned:

> "I never thought that it would be of the slightest service to you...I have always thought that it would prove, as it has done, only a source of expense and embarrassment."

Goldsborough was saved from further worries about the submarine and how to get some sort of utilization of its capabilities. On July 3, 1863 he was ordered by the Secretary of the Navy Gideon Welles, to send ALLIGATOR to the Washington D.C. Navy Yard for tests and modifications to improve performance. It arrived at the Washington Navy Yard under tow on July 9, 1862. At the Navy Yard they concluded also that it lacked endurance and speed. The shipyard attempted to correct the speed/control problem by removing the sixteen oars and installing a hand operated, screw-type propeller, the identical type propulsion that de Villeroi had recommended and was already installed and demonstrated in his prototype vehicle. The problem of endurance could not be solved as de Villeroi and his *secret* air purification/replenishment system were nowhere to be found. The next he was heard from was a death notice in 1874 in a Philadelphia paper.

It was decided to obtain some use from the submarine and ALLIGATOR was ordered to join the South Atlantic Blockading Fleet under Admiral Dupont. On March 10, 1863 she left Washington under tow of USS SUMPTER. On April 2, 1863 ALLIGATOR was lost in a heavy storm off Cape Hatteras after being cut adrift because she was endangering the towing vessel. Rather ironically, these were the same waters in which USS MONITOR, the ultimate hero of the battle with CSS VIRGINIA (nee MERRIMAC), was lost.

Thus ended the rather undistinguished career of the only submarine actually launched and operated by the Federal Navy during the Civil War, a full year and one-half prior to the CSS H.L. HUNLEY, the relatively successful Confederate submarine.

■

THE SUBMARINE REVIEW

THE SUBMARINE REVIEW is a quarterly publication of the Naval 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.

A stipend of up to $200.00 will be paid for each major article published. Annually, three articles are selected for special recognition and an honorarium of up to $400.00 will be awarded to the authors. **Articles accepted for publication in the REVIEW become the property of the Naval Submarine League.** The views expressed by the authors are their own and are not to be construed to be those of the Naval Submarine League. In those instances where the NSL has taken and published an official position or view, specific reference to that fact will accompany the article.

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.

Articles should be submitted to the Editor, SUBMARINE REVIEW, P.O. Box 1146, Annandale, VA 22003.

U.S. SAID TO HAVE RETRIEVED SOVIET WEAPONS

Ed. Note: The following article appeared in the Morning Edition of IZVESTIYA on May 13, 1992. It is an interview with Rear Admiral Anatoliy Shtyrov by Nikolay Burbyga. This reprint appeared in the FBIS of 19 May 1992. The second article is a follow-up to the interview and appeared in IZVESTIYA on May 15, 1992.

"[Text] **This episode, which has never been ultimately figured out, occurred in 1976; it dates back to the era of harsh confrontation between two superpowers—the United States and the USSR. A Soviet strategic bomber on air combat patrol had an accident and crashed into the water. There were nuclear weapons on board the bomber. What happened to them afterward?**

We approached a person who was privy to this episode, and asked him to discuss this.

At the time, Rear Admiral Anatoliy Shtyrov held the position of chief of one of the key directorates of the staff of the Pacific Fleet.

Shtyrov said: "The fleet was not informed about our strategic bomber crashing in the Sea of Okhotsk. Since Moscow did not set this task, we did not engage in a search in the estimated area of the loss of the plane. I came upon the aircraft by chance. As a former submariner in charge of the work of analysts in my department, I noted a quite routine report to the effect that the American submarine GRAYBACK had arrived at the Yokosuka naval base, along with the Commander-in-Chief of the U.S. Pacific Fleet, who attended a ceremony to decorate the crew of the submarine with orders and medals. A total of 67 people had been decorated, which amounted to 90 percent of the crew members. If we take into account the fact that the Yanks are moderate with combat decorations, that they do not give them out lightheartedly, and that *anniversary award showers* are not a tradition there, this immediately begged the following question: How outstanding would the accomplishment have been?

As a former submariner, I was well aware that in 1967 a U.S. submarine, perhaps the same GRAYBACK, had stolen two

inertly loaded state-of-the-art sea mines from an area to the south of Russkiy Island in the Bay of Peter the Great. The mines were placed during a period when the fleet was inspected by the Main Inspectorate of the Ministry of Defense. Two months later, these mines ended up in New York.

Many years later, it became known that the U.S. Navy successfully used its submarines in the extensive operation *Ivy Bells*, which involved the attachment of eavesdropping devices to underwater communications cables in the Sea of Okhotsk and other seas and their retrieval.

It was also known that the GRAYBACK was not a regular attack or general-purpose submarine, but rather a special-purpose one. It was converted from a submarine carrying cruise missiles into a special submarine for reconnaissance missions and raids. This is why I called in an officer with a chronological readout analyzing the cyclical use of the GRAYBACK submarine. It turned out that the submarine had dropped out of our field of vision for 25 days. Where did it go? According to our data, this submarine had not *left tracks* in Vietnam; nor had it appeared along the coast of China and North Korea. Only repeated processing of intercepted radio traffic from the Northern Sector of the Japanese Air Defense System SAGE helped us guess what was going on. The Japanese Air Defense detected the sudden disappearance of an air target to the east of the coast of southern Sakhalin. Processing yielded the time, bearing, and distance to the air target which had disappeared. Simple calculations on the map indicated that the plane came down in Prostor Bay, 20 miles away from a deserted shore. The depths in the area are uniform, up to 40 meters, and the floor consists of dense, silty sand.

Based on all this, it was concluded that information about *Ivan's* strategic bomber which had crashed was graciously communicated by the Japanese to the U.S. Navy command in Japan. The Yanks, being men of action, certainly went for the idea of examining the plane resting on the floor and borrowing what *was of interest to them.*

[Burbyga] How do you know that there were nuclear weapons on board the plane?

[Shtyrov] I got in touch with the staff of strategic aviation on a secure line. We had approximately the following conversation: "Was the lost plane yours?" "Unfortunately, yes." "Do

you confirm the time and the place?" "Yes." "Did you have 'red heads' on board?"—this is how nuclear weapons were referred to in the slang of staff officers. "We did." "How many?" "Two".

[Burbyga] What happened later, when you learned about the episode involving the snatching of our nuclear bombs?

[Shtyrov] After processing all the data, preparing a map, a chronology of events, and a written substantiation, and drafting an encrypted message to the Commander-in-Chief of the Navy, I asked the Commander of the Pacific Fleet to receive me for a confidential report. Admiral V. Maslov received me. I remember the content of my report to this day. I reported: "Approximately one month ago, U.S. special services carried out a covert operation to examine our strategic bomber which came down in Prostor Bay, using the special submarine GRAYBACK. There were two nuclear bombs on board the plane. Here is a substantiation and a draft report to Moscow."

The Fleet Commander looked at the map and the chronology for a long time. Then he asked: "So, you want me to report this to Moscow?" I answered: "Yes."

He moved the papers away in silence. I could clearly read this in eyes: "So, I am supposed to report this and be called on the carpet? The plane is not mine all right, but the sea is!...."

I silently gathered up the documents and left." "

■

[Ed. Note: The following appeared in IZVESTIYA on May 15, 1992 and is reprinted here form the FBIS of May 20, 1992]

Further on Okhotsk Sea Nuclear Recovery

[Article by Sergey Agafonov, Nikolay Burbyga, and Andrey Illesh, IZVESTIYA: "International Scandal Around the Nuclear Bombs from the Bottom of the Sea of Okhotsk"]

" [Text] IZVESTIYA **(No. 110) published an article under the headline "How Our People Gave Two Nuclear Bombs to the Americans as a 'Present,' and How the Japanese Facilitated This." The article dealt with events that took place in 1976. Rear Admiral Anatoliy Shtyrov was at that time one of the top officers in the staff of the Pacific Fleet. He informed our**

IZVESTIYA **correspondent about a sensational fact: the crash of a Soviet strategic bomber on air combat patrol carrying nuclear weapons...**

According to this expert, the American submarine GRAYBACK managed to be the first to arrive at the location in the Sea of Okhotsk where the Soviet strategic bomber had crashed. It was able to recover from the sea bottom the Soviet nuclear weapons—two atomic bombs. That was facilitated by the fact that the Japanese quietly cooperated with the Americans in this operation, and Moscow did not task the High Command of the Pacific Fleet with a search for its own strategic bomber(!). At that time Anatoliy Shtyrov used the help of the Pacific Fleet special services to conduct his own investigation; then he wrote up an appropriate report and sent it to his commanders. Admiral V. Maslov, Commander-in-Chief, listened to Shtyrov and took no action. The tragedy thus remained secret to the public until the day our article was published.

Japan was the first to react to the IZVESTIYA item. The Japan Defense Agency denied the IZVESTIYA assertion that "in 1976 the Armed Forces of this country helped the United States in the recovery of two nuclear bombs; the bombs were found on board the Soviet bomber that crashed into the Pacific east of South Sakhalin. The deputy director general of the Agency, Akira Hiyoshi, and Air Force Chief of Staff Akio Suzuki emphasized the fact that this was the first time they had heard about the incident."

The next message came from Washington. We quote: "I have nothing to tell you with respect to this issue," was the answer from U.S. Department of Defense representative G. Hartung to the ITAR-TASS correspondent's inquiry about the reaction of the American military agency to the IZVESTIYA article. "I have checked into your inquiry and I have nothing to say about it," the Pentagon spokesman added. In our opinion, this is circumstantial proof that the newspaper item was correct, because our article went into considerable detail about the crew award ceremony on board the GRAYBACK submarine soon after the crash of the Soviet bomber in the Sea of Okhotsk, and about what operations this submarine could have conducted at that time and where.

The KYODO TSUSHIN agency conducted its own mini-investigation in Japan after the publication of the IZVESTIYA

article, the results of which are now the center of attention of the Japanese press.

Local commentators note the fact that IZVESTIYA is not the kind of publication to try and dig up a sensation just for the fun of it; they have asked some prominent Japanese military officials to add to the published story.

The official responses run as follows:

— Hirokazu Samejima held the post of commander of the Joint Chiefs of Staff Committee in the Japanese Self-Defense Forces in 1976. He said that he did not remember an incident with a Soviet nuclear bomber taking place 16 years ago. Samejima also doubts that an American submarine would have dared such a risky operation as a removal of nuclear bombs from a crashed plane in the immediate vicinity of the Soviet border.

— Eiichiro Sekikawa, one of the leading civil experts on aviation affairs, emphasized the fact that the Japanese Self-Defense Forces have a major radar complex in operation in the north of Hokkaido, in the Nemuro area. This radar complex can cover huge expanses, and the IZVESTIYA article sounds convincing from this point of view alone. "I doubt", said Sekikawa, "that an American submarine could 'remove' nuclear weapons from a Soviet bomber, but as for the incident itself, the chances are quite high that it could have taken place in the former USSR."

The quoted Japanese responses may lead us to at least two conclusions: First, there are differences in how the incident was viewed by military and civilian representatives; secondly, most doubts revolve around the nuclear bomb removal operations and not around the incident itself. If we assume that the incident did occur under such circumstances as described by IZVESTIYA, then we have one version of it which can explain both the bad memory of the Japanese military and the doubters about the *underwater looting* of nuclear arms.

Well, let us assume that the Americans managed to remove the *cargo* from the crashed plane. What would their actions be after that? Naturally, they had to stop at some port to unload this *cargo*. We could suppose that the submarine headed for a continental Navy base in the United States, but it is doubtful that the Americans would carry this *catch* across the ocean, as

this would take a dangerously long time. Most probably they looked for a closer port, and here Japan was the only *candidate*. Let us now return to the Japanese military; had they acknowledged the incident, it would be easy to check which American submarines visited which Japanese ports at any given time. A submarine from the *Okhotsk patrol* would have been the one we were looking for. But it is common knowledge that Japan is operating "on three nonnuclear principles"—it will not have, produce, or allow nuclear arms on its territory. With this in mind, no official will ever *remember* an old episode or will *doubt* its details, so that he does not put himself and his superiors on the spot.

This version contains too many *ifs*, of course, to be accepted as the fundamental one. But it cannot be totally discarded either. Judging by appearance, however, the first official responses from Japanese are not the last.

As you can see, making public the story of a crashed Soviet bomber that was carrying nuclear bombs is an event of considerable importance for the whole world. IZVESTIYA hopes to obtain some information from official military sources which will allow it to shed additional light on this incident. As soon as we receive such data we will publish it. We hope that it will then become clear what happened to the two Soviet nuclear bombs."

■

MEMBERSHIP STATUS

	Current	Last Review	Year Ago
Active Duty	975	998	1010
Others	2717	2707	2767
Life	242	239	230
Student	28	28	28
Foreign	76	84	74
Honorary	20	20	23
Total	4058	4076	4132

PLEASE RECRUIT 2 NEW MEMBERS FOR 1993!

SUBGUIDE: THE WALRUS CLASS

by Norman Polmar

Quietly and without fanfare, what may be the world's most advanced diesel-electric submarine visited Norfolk, Virginia, and, subsequently, New London, Connecticut this past spring. The undersea craft was the DOLFIJN (Dolphin), the third submarine of the Dutch WALRUS class to be completed.

The Atlantic crossing of DOLFIJN, launched in 1990 and placed in commission in 1992, partially demonstrated the long-range capabilities of this design. These are torpedo-attack submarines, intended specifically to operate in the anti-submarine role against other diesel-electric **and nuclear-propelled** submarines. The submarine force of the Royal Netherlands Navy is intended to carry out both NATO and national roles. In the NATO context, they are intended to occupy stations in the Barents and Norwegian Sea areas.

The WALRUS design is a refinement of the previous Dutch ZWAARDVIS class, with two submarines built to that design being completed in 1972. The ZWAARDVIS, in turn, was a development of the American BARBEL (SS 580) class, the last diesel-electric combat submarines to be built for the U.S. Navy. *(See P.L. van Ewijk, "History of the Dutch Submarine Force," THE SUBMARINE REVIEW, July 1992.)*

The new WALRUS class boats have a standard displacement of 1,970 metric tonnes and are 2,800 metric tonnes submerged (slightly larger than the BARBEL class). The Dutch submarines have an overall length of 222 feet, a beam of 27 feet 7 inches, and are propelled by three SEMT-Pielstick diesel engines with Holec generators that charge batteries for a single Holec electric motor; there is a single propeller shaft. Speeds are 12 knots on the surface and in excess of 20 knots submerged. At slow speeds their non-snorkeling submerged endurance is more than six days; range is estimated at 10,000 nautical miles at nine knots with snorkeling. The submarines have an operating depth considerably in excess of 1,000 feet.

While they appear similar to the BARBEL design (including a partial double hull), *[Ed. Note: See Figures 1 and 2.]* the WALRUS class is fabricated of HY-100 steel and is far more advanced in several respects. First, the Dutch boats are highly automated; that was the first observation to the author by both

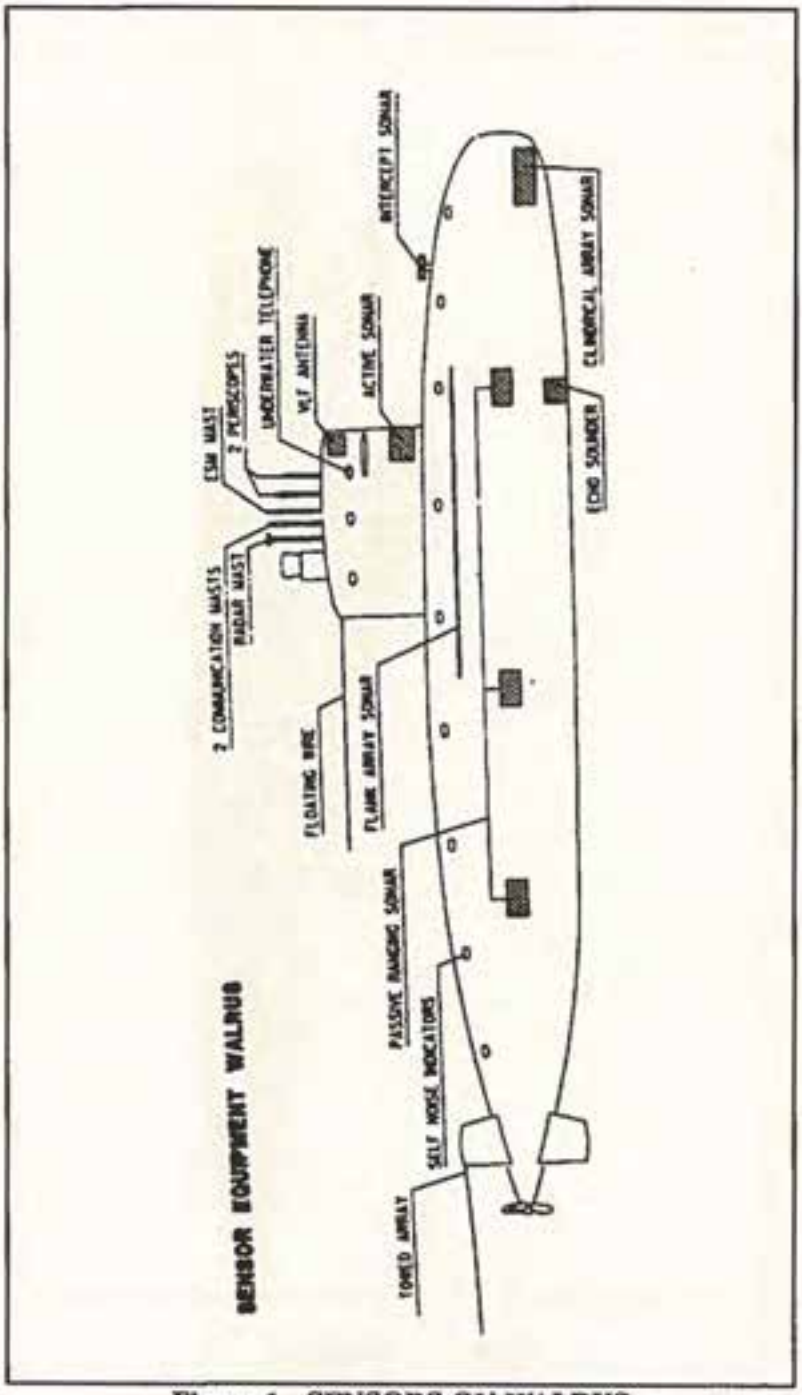

Figure 1. SENSORS ON WALRUS

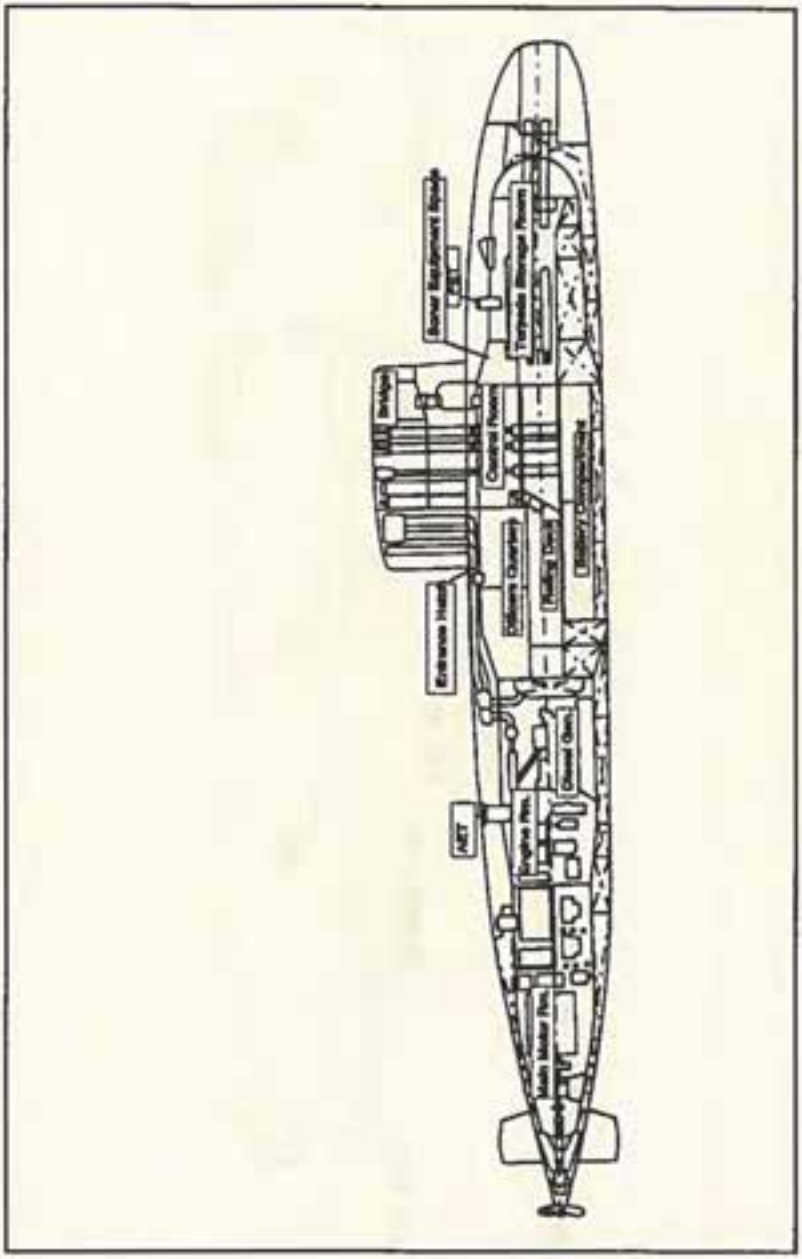

Figure 2. WALRUS

Vice Admiral Henry G. Chiles, Jr., Commander, Submarine Force, U.S. Atlantic Fleet, and Gerald Cann, the Assistant Secretary of the Navy for Research, Development, and Acquisition, after they went to sea in the DOLFIJN.

For example, from the submarine's central operating panel, the propulsion plant, battery charging system, and trim system can be controlled. The trim system has an integrated microprocessor and provides real-time recommendations for trim and/or weight corrections.

When at battle stations the submarines--which have three main compartments--have only two men in the forward compartment (weapons) with the remainder of the 50-man crew in the amidships compartment (berthing, mess, control); the after (engineering) compartment is normally unmanned, with a sophisticated monitoring and fault correction system being provided. The high degree of automation has led to requirement for a crew of only seven officers and 43 enlisted men (women do not yet serve in Dutch submarines, although they are embarked in surface combatants).

The WALRUS class requires no *hot bunking* and stores are carried for 60-day-plus patrols. There are separate officer cabins (three double plus a captain's cabin), wardroom, general mess, and separate spaces for the four chief petty officers and for the eight senior petty officers.

The design provides an X-tail configuration with four independently controlled rudders with two rudders being sufficient to operate the boat. This permits a high degree of control, another feature cited by Admiral Chiles. Also, the rudders do not exceed the circumference of the hull, which is an advantage for shallow-water operations and simplified mooring. (A similar arrangement was evaluated in the USS ALBACORE (AGSS 569).)

If any criticism is to be leveled at the Dutch design it is the fitting of only four Mk 67 21-inch torpedo tubes, a feature copied from later U.S. attack submarines at the suggestion of the U.S. Navy (the BARBELs had six tubes). More tubes would have permitted more weapons launch flexibility, an important factor with the variety of weapons now available to submarines. The boats can carry 22 full-length torpedoes while tube-launched mines as well as Harpoon anti-ship missiles can be embarked in place of torpedoes. A rapid, automated reload

system is fitted. (The submarines are Harpoon capable, although the Dutch Navy does not now have the submarine version.)

Supporting the design's ASW mission is a relatively complex sonar suite consisting of the Thomson Sintra TSM 2272 with a bow-mounted Eledon array plus a passive range-finding sonar using three hydrophone arrays on each side of the hull. The submarines are fitted for the Marconi Type 2026 clip-on, towed-array sonar, but this is not normally shipped; rather it is installed (at Faslane, England) when a boat deploys.

All sensors, data analysis, and weapon control systems are integrated in the Signaal Sewaco-VIII Gipsy data complex. All electronics are fully integrated with multi-purpose screens and panels permitting a very high degree of combat systems integration.

The WALRUS class submarines have encountered some cost overruns while the lead boat was delayed by a fire while under construction, which caused no structural damage but did cause her to be the second boat to enter service. Still, the average cost per submarine was Dfe500 million or $250 million, about one-quarter that of a contemporary LOS ANGELES (SSN 688) class submarine.

Three submarines of this class are in commission: WALRUS, ZEELEEUW, and DOLFIJN; the BRUINVIS will enter service in 1993. All are constructed by Rotterdamsche Droogdok Maatschappij (RDM), in Rotterdam, now the only submarine construction yard in the Netherlands. RDM has developed a modified WALRUS Mk 2 design with six torpedo tubes and other improvements.

The Dutch Navy had originally envisioned six submarines of this class, to replace all earlier submarines. Financial considerations led to only the four being procured, with the two ZWAARDVIS-class submarines now scheduled to remain in service until at least the year 2000.

While RDM has been proposing the construction of WALRUS class boats for other nations, the firm is now marketing a more advanced design--the Moray--that is specifically intended for operations in regional areas. This is a highly innovative design, certainly the next generation in conventional submarine development. The Moray is specifically intended for Air Independent Propulsion (AIP), although the WALRUS

design is convertible to AIP.

While the new Swedish Kockum Type 471 design being built for Australia as the COLLINS class will challenge the WALRUS design, at the moment the Dutch design appears to be the most advanced non-nuclear submarine afloat, at least outside of Russia. But few Americans have been privy to the *secrets* of the WALRUS. The DOLFIJN's trans-Atlantic shakedown cruise was intentionally kept quiet, at the direction of the U.S. Navy. A.J. Plunkett, a top writer at the Norfolk Daily Press, did visit the submarine, but most attempts by journalists and others to see the craft were rejected.

Some U.S. submariners who toured the Dutch boat called her "the wave of the future," wrote Plunkett. It was pointed out that the DOLFIJN could perform some missions better than larger American SSNs, and other jobs not as well. Plunkett quoted the DOLFIJN's skipper, LCDR John Weyne, as saying, "The one cannot take the job of the other." Still, with the increasing U.S. political-military interests in littoral naval operations and potential combat scenarios that will involve Third World submarines, the WALRUS class does offer a valuable look into future undersea combat--a Dutch weapon with an American heritage.

■

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DISCUSSIONS

SUBMARINE LIAISON OFFICERS
Got No Mama, No Papa, No PX

by CAPT John F. O'Connell USN(Ret)

Shortly after I relieved as COMSUBDIV 41 in Charleston in early 1971, CDR Al Baciocco, who was COMSUBDIV 42, approached me with a proposal. One of my commanding officers, CDR Hoppy Hohenstein, CO, REMORA, was about to be detached and had orders to be the first of a new breed - a Submarine Liaison Officer (SLO) on a carrier group staff. Al suggested that competent as Hoppy might be as CO of a Guppy III, there were probably a few things he didn't know about SSNs and the 637 Class in particular. Al asked if I objected to him offering Hoppy a chance to go out in a 637 for a few days and be shown how they operated and what they could bring to the direct support role. I was delighted, but wondered at the time why this wasn't a submarine force initiative rather than the product of one very perceptive submarine officer's mind.

Time passed, and in May, 1972 I reported as COMSUBPAC N3 after a tour as COMSUBGRU 7 Chief Staff Officer. During the early part of that tour and while at SUBGRU 7, I had spent some time thinking about the SLO positions and their occupants. The slots were being filled with post-command diesel officers. Therein lay a problem. While serving as OP-313 (Submarine Manpower and Training) prior to the DivCom assignment, it became clear to me that the submarine forces were facing two submarine officer shortage problems. The paramount one was the great nuclear trained officer exodus in progress in 1969-1970 when they were bailing out at the rate of one a day. Less obvious was the impending shortage of diesel officers as they recognized that they had little future in a force that was becoming more and more nuclear. All were good men but most could see little professional challenge or opportunity ahead. Many were looking for a viable future outside the submarine service. Flag rank was entirely out of reach, and the rank of Captain getting less achievable. A few managed to transition back to surface ships. Others decided upon early retirement.

This group was the source of SLOs in the early 1970s. They had a lot in common. They were all post diesel COs, all had good records, a few might have served in a SSBN as navigator or weapons officer, but none had SSN operational experience.

Unless someone as farsighted as Al Baciocco was standing in the wings, they all lacked any knowledge of 637 Class operations. However, they were essentially being cast adrift by the submarine service with no training provided by either force for the submarine support role, no formal ties, and no assurance (except perhaps the odd detailer letter) that their new jobs were going to advance their careers in any way. Oh yes, one more thing - the new job was almost assured to provide them a lot of deployed time. These then were the submarine force's representatives for better or worse. Their position can be summarized in the plaintive words of the orphan waif standing outside the main gate with his hand out, crying, "No mama, no papa, no PX."

It seemed to me that the submarine forces were assuming a great deal when they sent these men off to be the only submariners whom most carrier group admirals would deal with on a day to day basis. It assumed a state of knowledge that didn't exist and a loyalty that was shaky. That didn't seem like a good recipe for success for the new SSN direct support role. I recalled Al's initiative and discussed the problem with the SUBPAC N2, CAPT Joe Logan. He agreed that something needed to be done. His tactical analysis section put together a program to train prospective SLOs in direct support operations. COMSUBPAC then convinced BUPERS that all new Pacific Fleet SLOs should be ordered for about a week's TAD at COMSUBPAC headquarters for indoctrination prior to reporting to the new Group command. Each was given a several day theoretical introduction to the SSN in the direct support role, a short underway period in a 637, and provided a small library of submarine tactical publications and the assurance that updates would be provided in a timely fashion.

In addition, the N2 division under Joe Logan and later under Jack Nunnelly, hosted an annual SLO conference with COMSUBPAC footing the travel costs. These conferences brought Pacific Fleet SLOs together to learn new techniques, to exchange ideas, and to make recommendations. There was no question that they were valued members of the Pacific submarine community - the time, effort, and dollars spent in talking with them was proof positive. Although there was no way to measure the success of that program in a quantitative manner, there was also no doubt in my mind that submarine support operations in the Pacific were greatly improved thereby.

Recently I had a chance to observe a carrier group staff during a major exercise, and spent some time talking with the

submarine officer assigned. He, of course, is nuclear power trained as are all SLOs these days, so that is no longer a problem. *Direct support* is gone as a buzz word and *support submarine* is in. He had attended the Fleet Tactical Commanders Course given by TACTRAGRULANT, and that helped him adjust to the operational routine of a carrier group staff underway. However, when I asked about any submarine force indoctrination or continuing interest in SLO activities, I drew a blank. There seems to be none, just as there are no annual conferences with the SLOs to discuss submarine support matters, no submarine tactical publications provided, and, incidentally, apparently no contact not initiated by the individual SLO. He noted that despite being in a submarine port, he only found out about the last Submarine Birthday Ball by accident. Why did I think I was listening to the familiar orphan's plea?

The demise of the USSR has left all the services scrambling to justify their future structure and forces. This is singularly true for the submarine service which had been largely, and correctly, focused on the ASW role. VADM Roger Bacon, ACNO for Undersea Warfare, is quoted in various interviews talking about possible uses for submarines outside the usual ASW role. Essentially the submarine service is now in the same position it was when I graduated from Submarine School in the mid 1950s - looking for a mission(s). One of the best sources of information and ideas about how modern SSNs can be factored into fleet operations is the set of SLOs assigned to carrier and cruiser/destroyer group staffs. It is in the interest of the submarine forces to ensure that they feel very much part of the submarine community, and that there is formal, ongoing discussion with them regarding possible new submarine roles in fleet operations, as well as fine tuning others already being tackled. The submarine forces need to ensure that each of them is educated in the details of all submarine capabilities, and not take for granted that they are all knowledgeable. For instance, how many SLOs are familiar with the use of SSNs in support of Special Operations Forces (Seals and Green Berets)? How many are experts in submarine TLAM and Harpoon employment?

It appears that it's time again for the submarine forces to adopt some orphans! They might even give some thought to future assignments for these fleet experienced submarine officers, so that they can continue to make an input to serious thinking about submarine roles. ■

FAST ATTACK REFIT CREWS

by Lieutenant John L. Shea, USNR
formerly Combat Systems Officer
USS GROTON (SSN-694)

In Clear the Bridge, Dick O'Kane wrote about TANG's return to port from her second war patrol:

> *"Again working priorities, payday for the ship's company and buses to the Royal Hawaiian took precedence . . .*
> *"We glanced back at our ship's washed out paint jobs, running rust by the exhausts. Grudgingly, I admitted that she needed sprucing up. When we would next see her, she would be a camouflage haze gray with white beneath, the color of a gull."*

While it seems unrealistic to parallel current fast attack submarine operations to the high stress experienced in World War II war patrols, I contend that a refit crew system is a viable option to modern fast attack operational schedules. After all, the refit crew system was in place well before the war. The refit crew system is the turnover of a submarine for periods of in-port repair from its operational crew to a refit crew.

With the current down sizing of the entire submarine force, there is no time like the present to reevaluate the SSN's normal operating cycle and upkeep/refit periods. With approximately 154 submarine crews (88 SSN and 66 SSBN blue and gold crews) gainfully employed in 1991 being reduced to less than 100 crews by 1996, there is a large resource of trained submarine refit crew members available. With some modifications made to repair activities we could implement periods of repair for our fast attack submarines executed by special refit crews. This could provide a period of training, rest and relaxation for the operational crew, especially after an extended deployment.

How would the refit crew system be implemented? Basically, refit crews would be utilized for periods of extended upkeep and selected repair availabilities of at least six weeks. New construction and overhaul ships would be manned with operational crews. The refit crew will consist of a command qualified repair officer and a full complement of officers and crew qualified to stand in-port watches. The refit crew must be

capable of getting the ship underway in the event of inclement weather or emergencies. The refit crew's primary objective is to complete repairs and/or alterations in a refit package provided by the operational commanding officer and squadron commander. Crew turnover for the refit period should take no longer than three days. During refit, the operational commanding officer and other supervisory personnel will conduct periodic spot checks of the progress of repairs. The responsibility for final receipt and acceptance of the work would remain with the operational commanding officer. The acceptance and turn over period after the refit should take no longer than a week. Turnover will include underway sea trials with members of both crews.

How many refit crews would be needed? No more than ten refit crews on each coast would be sufficient to implement this system. Restructure of current repair activity manning augmented by additional personnel, resulting from ship decommissionings, could provide more than enough qualified people, while still downsizing the entire force. Each squadron will be assigned a number of refit crews based on the number of submarines assigned. The refit crews will work directly for the submarine squadron commanders, vice a separate support facility. This will streamline the refit process through direct repair support.

The operational crew, during the refit period, could enjoy some quality time in home port followed by a training period similar to that experienced by our Fleet Ballistic Missile submarine counterparts during off-crew. We lose too many good people due to arduous operational schedules, with no light at the end of the tunnel. Furthermore, it is impossible to provide quality in-port training while trying to conduct a major repair period. Enhanced morale, greater selectivity for retention and higher quality training will result in a higher state of readiness of our fast attack submarines.

With the current down-sizing, it is an ideal time to adopt a relief crew system. Perhaps such a system could be considered by other forces such as the surface warfare community. In any case, the relief crew system will ensure a better quality of life and improved performance. Our people are the highest priority. ■


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REFLECTIONS
IN THE PRESENCE OF GREATNESS

by Larry Blair

[Ed Note: For all those who have served in submarines, this is a rare view of our world from one who has visited, and used his own experience in other walks of life to characterize ours. Larry Blair is a spokesman on television and radio commercials; narrator for corporate communications productions; author of articles on maritime subjects. He has been a director/writer/host in TV and radio. The underway visit he describes was done at the invitation of the Navy.]

Webster defines greatness as: eminent, distinguished, markedly superior in character. These are appropriate descriptions of the men of the United States Submarine Service. Boats the crews drive are marvels of American technology. It is, however, the dedicated personnel who possess total expertise at their art which makes for greatness.

The perfect blending of man and boat conforming to each other brings to mind the analogy of a symphony orchestra. Endless rehearsal culminates into exactness and order as each instrument section and solo melds into one cohesive performance. From the captain (conductor) to executive officer (concert master), down through the ranks of junior officers and sailors (musicians), there is a melody produced by man and machine which forms a sonorous duet. Unlike the short length of a musical piece, submarine patrols must sustain tempo and harmony 24 hours a day. Those who serve aboard surface craft are no less efficient. However, if the dimension of the unforgiving underwater environment is added, this injects a cacophony of destructive elements just waiting to happen. As with the musician, but with a life or death outcome at stake, each submariner incessantly relies on the shoulder next to him to perform at the highest peak of tonality.

The LOS ANGELES class attack boat USS AUGUSTA (SSN 710) under Commander Edward J. Rutkowski eased away from her berth at the New London Submarine Base. The gray lady slid gently down the early morning calm of the Thames River; past New London Ledge Light, through The Race; to somewhere east of Fishers Island in Block Sound. Twenty-five

guests had the distinct honor to ride her for a daylight Navy VIP Cruise, hosted by Rear Admiral Howard W. Habermeyer, Commander Submarine Group Two.

Ballistic missile submarines with their Trident I and II nuclear tipped warheads transit to specific stations and remain deep until ordered to fire their weapons. Attack boats, however, purposely go in harms' way. Among their many sea control missions: they guard SSBNs, attack submarines and surface ships, lay mines, protect carrier support groups and embark SEAL teams for reconnaissance and guerrilla warfare operations.

Traveling on the surface to an assigned area, twenty-four men and one woman comprising the observer group were ushered into the enlisted messroom. The overture was about to begin by way of an introduction to the boat. The first solo was taken by Chief of the Boat C.J. Dreer. All eyes and ears were captivated by the sub's senior enlisted man as he went through chapter and verse on safety measures to be taken in the event of fire or flooding. A rehearsal was held, audibly presenting his new charges with the various alarm systems. He also staged a run-through of the donning and hooking-up of the Emergency Air Breathing masks. They would be a lifesaver and first line of protection should an interior fire break out.

A Q&A session followed with AUGUSTA's acting Executive Officer Michael Higgins taking the lead. On this cruise the VIPs represented a cross section of civilian executives, with a sprinkling of diesel boat sub vets. The majority had no connection with the submarine community, let alone ever served on a sub.

After an overview of coming events by Admiral Habermeyer's aide, we were split up into groups of five, each to be led by a Chief Petty Officer. Our team was assigned to Chief Hospital Corpsman R.M. Antilla. He deftly conducted a tour of the various forward compartments, explaining in great detail their functions. Due to the classified nature of the Engineering and Reactor sections, these aft spaces were off limits.

A highlight of the walk-through was the Torpedo Room. All evolutions of flooding, firing and venting the tubes are executed at a computerized panel centered between the two port and two starboard tubes. One of the Torpedoman forewarned us of the high intensity sounds to come. His suggestion to cover our ears

was accepted by a few as two individual water slugs were fired, simulating the real thing, minus the ordnance. A resounding bass drum thud was followed by injection sounds of high pressure air to clear the tube of water. Wide-eyed, we all agreed the performance was most impressive. Attack subs carry a mix of torpedoes, Harpoon anti-ship missiles and the now famous Tomahawk missile. These were used for the first time in combat by submarines USS LOUISVILLE and PITTSBURGH during Operation Desert Storm. Missiles on early Los Angeles boats are forced from torpedo tubes. The newer SSNs (Improved, or 688Is) have vertical launchers in the bow section.

By the end of our lunch break, the diving alarm sounded from the Control Room/Attack Center. We all scurried for a front row position by the diving station to witness this complex and intense facet of submarining.

Now on center stage was a quartet who would play out their portion of the work. Conducted by the Diving Officer situated behind and between the Planesman and Helmsman, our 6200 ton behemoth began her submergence. He stood, eyes transfixed on myriad gauges, dials and panels of Christmas tree-like red and green lights issuing calm, clipped commands to the Officer of the Watch to his left. The Chief responded instantly; alternately flooding and venting ballast tanks from his control board. Proper and precise *trim*, or balance, of the boat for positive, negative and neutral buoyancy is crucial.

At the same time, stationed at airplane-type steering columns, the Planesman controlled all vertical motion, while the Helmsman maneuvered for port and starboard movement. Each of their actions coincided so as to propel AUGUSTA twenty degrees *down bubble* (reference to planesman's inclinometer which registers incline and decline). With trim complete at periscope depth, the submarine began to track back and forth for an hour and a half. The time allowed all of us to take turns at manning the attack scope.

We became totally absorbed in the multiple activities going on around us. I for one found myself going from diving station to navigating board to sonar every few minutes. Some lingered at a particular station, while others stood off to the side taking in as a whole all the audio/visual input. Caught up in the concentration of it all, 90 minutes seemed like 30.

Since leaving port the Navigation Officer and his two

assistants kept a running plot of the boat's direction and location. This is accomplished with Ships Inertial Navigation Systems (SINS), LORAN and other navaides. All electronic data is backed up by manual plots on charts of the area. The human element is never subjugated. Man still overrides machine. As one Quartermaster said, "Suits me fine. Wouldn't have it any other way. I trust me more than I trust it."

Off in a corner of the Center, seemingly in a world of their own, sat three Sonarmen in a darkened booth. They were monitoring green and red lights coupled to computers which pick up all sounds outside the hull through powerful hydrophones. They not only sort out sounds in the sea, but also their visual counterparts as they appear on mesmerizing green scopes. Each white speckle saturated within the green represents a sound source. Their well honed senses identify the staccatos and vibratos emanating from any type domestic and foreign surface ship and submarine. They also have the added task of decoding the sounds of what sonarmen call *biologics*. These are the multitude of receptions from schools of fish and other sea creatures including minute crustaceans such as shrimp.

By mid-afternoon AUGUSTA surfaced and began the final leg of our journey. The climax of the trip was permission for us to scale the 30 foot Control Room ladder up to the bridge. Two at a time we did so and were met by the Captain, Admiral, Officer of the Deck and two lookouts. This period began a time of reflection for many on this all-too-short a day. The exhilaration of being some two stories above the sea, wafted by a gentle breeze, while carried on the back of a dormant fighting machine knifing her way home, was truly awesome. Nearing New London Ledge we were cleared to go topside with the docking crew. Some talked, others just stood gathering in the shoreline sights, as well as their own once-in-a-lifetime experiences of the day. Beyond the Gold Star Memorial Bridge, and a few miles downriver from the base, a tug deposited two harbor pilots aboard. This finale brought an end to a truly magnificent work.

Where do we get such men? These warriors who give up a simpler, safer existence in other branches of the armed forces, or to work a nine-to-five job in civilian life. Not unlike other military men, they come from cities and towns across American and varied socio-economic backgrounds. Here the similarity

ends. First, they are all volunteers. They allow themselves to be sealed for 60 to 70 days at a time in a 360 foot by 33 foot steel tube. Many are at sea 70 percent of each year. Detached from family and friends, they are deprived of the natural sensory experiences to which the human race has been accustomed since birth. Where do we get such men?

Without delving into the psychological aspects of Submarine Medicine, the simplistic answers are as diverse as the men's personalities. Love of adventure and excitement are notable. Many will tell you it is belonging to an elite service with its special camaraderie. Serving on a small boat rather than a large vessel where they will just be a number is a factor. Part of the profile is their recognition as an individual for the corps and being treated so. The service offers faster advancement along with greater responsibilities. Additional submarine pay and having the best food in the Navy, if not all the armed services, are perquisites.

A very high degree of motivation and self discipline is inherent in both the officer and enlisted personnel throughout their training. The bottom line is reflected in an extraordinary amount of success, very likely due to their overall self esteem and achievement standards. The zenith for them is to obtain the much revered dolphin insignia which denotes ***Qualified in Submarines***. Their drive and ambition doesn't end here. The perpetual learning and training processes are ongoing up an endless ladder of challenges. This is a constant for however long they remain on submarine duty, at sea or ashore.

For the reader who has never served aboard one of our ballistic missile or attack boats, or has never been related in any way to the submarine community, rise to the occasion if invited on a Submarine VIP Cruise. To be in the audience and watch the fine tuning and orchestration of all departments, is an experience never to be forgotten. You too will find yourself in the presence of greatness.

■

REMARKS AT GRADUATION OF THE UNDERSEA MEDICAL OFFICERS

12 June 1992

by CAPT Robert L. Bumgarner, MC, USN

[Ed. Note: Captain Bumgarner Qualified in Submarines in WOODROW WILSON (SSBN 624) as a line officer after an interim tour in GROUPER (AGSS 214), Nuclear School at Bainbridge and a five week SOIC course at Submarine School. He was released after 30 months on WILSON to attend Medical School on an active duty scholarship. He has been a Medical Corps officer since 1971 and has served as Force Medical Officer for SUBPAC.]

Thank you ladies and gentlemen. Commander Sach that was a most kind introduction. I am pleased to be with you, to join the staff of the Naval Undersea Medical Institute (NUMI) and distinguished visitors, namely family, to celebrate the graduation and qualification of the members of Undersea Medical Officer Class 9201, to be with you before you embark on your most satisfying ventures in operational medicine in this great Navy of ours.

And it is great to be back in Connecticut, the blue skyed coastal region of historically seafaring importance. I had three tours here, the first in 1968, starting on the USS Grouper (SS-214). We put to sea on a windy, cold 15°F sunny day, on, I believe, 15 January, into the wintery North Atlantic. A diesel sub that cannot dive in rough weather because of its righting moment is a bit different than a nuke. That deployment I'll never forget. Next I attended NUMI out of med school, and finally, as you have heard, I was the pathologist here several years ago. This is a great community and a great base - none is finer, in my view.

Three weeks ago at the Uniformed Services University of Health Sciences commencement, Health and Human Services Secretary Louis Sullivan wryly observed that his graduation remarks should be brief for they wouldn't be remembered. Dr. Sullivan recounted a story from General Norman Schwarzkopf of his West Point graduation. The General indicated to Dr. Sullivan, and a host of others, that at his West Point graduation he suffered through a 45 minute talk. General Schwarzkopf indicated that a 15 minute talk was fine, which Dr. Sullivan vowed he would do. Hopefully I'll do even better; that is, my

remarks will be shorter than that. I am also mindful that I must make stirring comments about nothing much in particular. We shall see how I do.

To be serious, your role in the greater context is to help our Defense establishment prevent war, and in a more specific context, your job is to keep your ship well. I will not dwell on that now, but I want you to think of it as we go along this morning.

To paraphrase General Colin Powell: sailors are different; sailors endure separation, loneliness, deprivation, confinement; sailors, particularly sub sailors, are incommunicado. You will work with people that sacrifice more than you might have imagined. For what? The answer lies in the fact that subs are the linchpin of the defense arsenal.

Historically, the Fleet Ballistic Missile Submarine concept was initiated and sponsored by Admiral Arleigh Burke. He recommended putting a missile on a submarine, where it would be protected and out of reach. The Polaris patrols that started in 1960 still continue; our security requires it, armed for Armageddon, to prevent it. Subs are alone in their great work. I think in the eyes of the National Security Council, subs must be doomsday machines; when subs enter the fray, matters are very serious: it is a global affair. Yet America's place in the New World Order depends on reliance in the creditable defense capability of the Fleet Ballistic Missile Submarine.

Let me relate to you a sort of experience you might find yourself involved in, while in port and a ship is at sea. Let me read you a message that echoes the remoteness of submarine duty alluded to by General Powell:

PRIORITY
FM COMSUBGRU NINE
TO USS (SSBN ON PATROL)
INFO GOLD CREWCOMSUBRON SEVENTEEN
COMSUBPAC PEARL HARBOR HI
BT
UNCLAS PERSONAL FOR CO FROM CHIEF OF STAFF //N00000//
SUBJ: HUMS RPT ICO LT (BLANK) USN,

1. COMSUBGRU NINE REGRETS TO INFORM YOU OF THE DEATH OF LT (BLANK'S) FATHER. MR. (BLANK) DIED SHORTLY AFTER 2AM EST (DATE). DEATH CAME AFTER A LONG ILLNESS.

FAMILY MEMBERS REPORTED THAT MR. (BLANK) DIED PEACEFULLY IN HIS SLEEP.
2. THE FUNERAL WILL TAKE PLACE ON SATURDAY, 0 FEB.
3. INFORMATION PROVIDED BY LT (BLANK'S) BROTHER INDICATES THAT THEIR MOTHER IS DOING VERY WELL. HE WANTED HIS BROTHER TO KNOW THAT THEY UNDERSTAND THE IMPORTANCE OF HIS DUTY AND THAT HE SHOULD NOT FEEL BAD OVER NOT BEING ABLE TO COME HOME. THEY KNOW HE WILL BE WITH THEM IN HIS THOUGHTS. ALL SEND THEIR LOVE.
4. IN VIEW OF AVAILABLE FAMILY SUPPORT AND OPERATIONAL CONSIDERATIONS, HUMEVAC IS NOT BEING RECOMMENDED.
5. CSS 17 AND COMSUBPAC SEND CONDOLENCES.

Consider that message for a moment; consider your possible roles in assisting the respective crew member's family and friends, and your responsibilities to the ship's CO and the squadron commodore. Your new practice of undersea medicine can take some unusual and sensitive twists as you wind your way through these matters.

And your job is to make the ship well, so it can function, so it can protect America. To keep the ship or other unit well you must be assertive, but politely so. Think it through...consult...speak to us, your fraternity of Undersea Medical Officers. Remember, there is a difference between being frank and outspoken. Bear in mind that the very common factor in all of your equations is your CO's personality. Understand him. Take care of his people, your people; train them, guide them, enable them, push them. Pay attention to details; heed history. The devil is in the details. You are the eyes and hands of Navy Medicine, and you are special counsel to your CO, or COs if you are the squadron doc. Sprinkle magic dust in the far corners of your kingdom. Watch what happens in your fiefdom as you get out of sick bay, walking the decks and spaces going about your unit, keeping the ship or ships well.

And note that to these ends, namely keeping the ships well, we need idea people. Don't throw away a good idea merely

because it is not well received; rather save it. Put the idea on the shelf, save it. Note the idea of the Diving Medical Officer (DMO) pin. An idea's time may come when least expected. That DMO pin idea failed to be approved at least twice as official recommendations in the last several years. So if your CO says no, wait, keep your idea, but continue to help your CO accomplish his aim, to fight the ship. Advise him and look out for his people.

Your practice of medicine will be largely of a preventive nature. But a day a week in curative medicine in a traditional setting is an appropriate thing to do. You just have to protect your hard earned skills as a hands-on, caring physician.

In the end, do what you are happy with. Be true to yourselves; don't bank too heavily on delayed gratification, as many of us did in med school. What if your desired payoff never comes? Remember, when the paradigm changes, things, many things, may go back to zero. Don't leave yourself out. Keep in mind life after the Navy. But recognize that our greatest joy is accomplishment. Accomplishment is more important than anything else to most doctors, more important than location per se, unless there is a stressful, real family geographic situation. Placing physicians in billets that matched professional desires, abilities and requirements, which yielded a chance for true professional accomplishment, and satisfaction has been the key to the successful UMO assignment policy. Undersea Medical Officer billets are good jobs, all hard billets with solidly validated requirements. All UMO billets provide superb professional satisfaction. So it is that undersea medicine is a special fraternity, that keeps its ships well.

Let me recount some dark moments, moments that led to the cementing of your roles as medical officers vis-a-vis your subordinate corpsmen, namely, Independent Duty Hospital Corpsmen (IDCs).

In 1984 on the USS DAVIDSON (FF-1045) there was a death due to adult respiratory distress syndrome, and in 1985 on the USS WORDEN (CG-18) a malaria death occurred in the face of inadequate medical care. There was, then, often no accountability afloat for medical care, especially in the surface Navy, not in sick bay nor on the bridge. There was inconsistent accountability ashore, too, in my view. Assignments were perfunctory for IDCs, and physician and command oversight often did not exist. After the courts-martial of a number of principal officers associated with these medical misadventures,

COs inappropriately started holding the IDCs accountable for matters well beyond their capability or control. Morale and retention of corpsmen plummeted. No one wanted to be an IDC, which the Navy Inspector General (IG) somberly noted.

HMCM(SS) Steve Campbell, now on the Medical Inspector General Team, HMCM(SS) Tom Gray, now retired, and HMCM(SS) Charlie Williams, the Medical Force Master Chief, among other notables, and I wrote OPNAVINST 6400.1 as a response to a Navy IG tasker consequent to these two medical misadventures. OPNAVINST 6400.1 is the IDC Charter. It establishes a certification program and a training requirement, much like that which exists for physicians (where it is called credentialling and privileging) and others, such as the nonphysician health care providers. The Instruction assures that only a properly qualified IDC is transferred into an IDC billet. Now remember, in 1985 there were two varieties of IDCs: surface and submarine. Today, because of the widespread problems we discovered, there are five varieties of IDCs, three being new ones: Marine Reconnaissance IDC, Special Warfare IDC, and Deep Sea IDC. We reasoned that if we were going to fix the IDC problem, comply with the Navy IG's charge, we must totally fix it, all of it, and make it right. The plain fact was that the corpsmen assigned to these three new IDC warfare communities were every bit as independent of medical officer support as our surface and submarine IDC communities, if not more so in certain ways I cannot discuss now.

The Instruction is to clarify responsibilities, to prevent witchhunts or creation of scapegoats for untoward results. Of most importance was the Good Samaritan clause in the Instruction. It clearly took the IDC off the CO's hook for an untoward event. All that the IDC could be held accountable for when faced with a medical crisis beyond his expected skill level was to provide care and comfort as best he could, which is in keeping with the Hospital Corpsman's Oath. The Good Samaritan clause was hotly debated. But it is central, it is the heart of the Instruction and the conduct of the IDC program. The Instruction has become institutionalized, a part of the fabric of Navy Medicine upon which the fleet, the Marines and the SEALs depend.

I doubt that the Instruction, however imperfect it may be, will be drastically altered at any time in the foreseeable future. It was simply too difficult to promulgate. Remember, take care of your IDCs who will keep yours ships well. Listen to your

IDCs, help them, learn from them. They are your eyes and ears and hands out there, out of reach, deep in the sea.

A last word about standards of the Manual of the Medical Department. Standards are the result of many bad, horrible experiences. True, standards change or evolve, but only with sanctioned reason. Don't take it upon yourself to try to shoehorn a sailor back onto a ship, especially when he doesn't meet medical standards. Even if the XO or CO insists, don't do it. Keep the ship well. Do not encumber the ship with a long shot medical case. Help the captain fight his war. Keep his ship well, and don't forget it. In cases you wonder about, call one of us old UMOs about it, one of us in your fraternity of UMOs. Talk to us, we'll help you out. What you need in difficult cases when you are caught in the middle on an issue of standards is a waiver from the Chief of Naval Personnel, a waiver recommended by the Surgeon General, that is, the Director of Undersea Medicine. That is how we keep the ships well. We owe to you - more than that, we owe to each ship, the Navy, and indeed, our nation, our best efforts to help you keep the ships and units well.

Remember, too, that you have a special relationship to the CO. He fights the ship, and he really wants it well. Anything that could impact medically on that ship is his direct business. Leave the administrative stuff for the XO. Remember your special role as a physician, now that you've been *ordained*. Now you are really between the bean counters and the line types on one side and the patients - their patients, your patients, on the other side - and you are in the middle because you are qualified to make certain judgements.

Now I welcome you to Submarine Medicine. I'm most proud of you. I'm happy for you. You are now part of the finest medical fraternity. Enjoy your tours. And talk to us. Keep your ships well! Be happy as you go about your arduous but vitally important work. Now, we are almost out of time, but on time, ladies and gentlemen. It is time to go, you and me, it is time to depart from here, from NUMI and blue skyed Connecticut. I thank you for your kind attention and I thank you for having me here today to celebrate the initiation of your careers as Undersea Medical Officers.

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ON DECOMMISSIONING OF AN SSBN

Remarks delivered June 27, 1992
at Charleston, South Carolina
by RADM A.B. Scott, Jr., USN(Ret)

If you were to come back aboard ex-LEWIS AND CLARK this afternoon, you would see it as nothing more than a hulk - thousands of tons of steel laced with miles of pipe and wire - good for little other than the salvage value of the material itself; an inert, lifeless mass.

Go and look if you like, but, if you do, be sure you realize you will not be seeing the LEWIS AND CLARK we knew, my shipmates and I. The LEWIS AND CLARK we remember is the one busily passing through the jetties at Charleston or by the sea buoy at Rota or the lower Clyde headed out on a run, rigging for dive, securing for sea.

People - in this case dedicated, able-bodied men - make the difference between a lifeless hulk and a vital, useful instrument of national policy.

Plans and programs are the same way. Designing and building a submarine that can go anywhere in the world and back submerged and independent of the earth's atmosphere; or fashioning a missile system that can deliver a ballistic payload with unbelievable accuracy from a totally submerged position at sea: these were idle dreams until incredible people led by the likes of Rickover and Raborn turned them into reality.

Those of us here today know, because we lived it, that during the latter half of the twentieth century a relatively small group of people sailing submarines, manning missile silos and flying airplanes, allowed the Untied States of America to use the nuclear paradox with remarkable effect and to the great benefit of the world at that time.

Perhaps my characterization is flawed, but I see it as a paradox that given the credible ability to deliver a nuclear attack, together with the national resolve to do so if necessary, the need will never exist. But regardless of what one calls the process, it worked. The totally unbelievable events surrounding the demise of communist totalitarianism offer overwhelming approbation to the policy of nuclear deterrence. **Readiness, willingness, patience, and perseverance won the Cold War.**

And we, my shipmates, were certainly among the warriors

making the greatest contribution. The long watches, the anxiety through emergencies, the training, the drills, the difficult repairs made at sea and out of touch, the long hours during refit and the rigorous examinations to assure our fitness; all of these things, which few other than we understood or knew about, made a tremendous contribution to the national policy of this country.

But, unfortunately, history will miss us. There will be no victory parade, neither will there be a wall with our names written on it. Few of us died in action, and for us to have told our story as we went along would have worked against our reliability and it would have violated the principle of reticence which we as submariners have always valued and respected.

No, we did not lay down our lives for our country, **but we certainly laid down a good portion of them, you and I.** When there were more lucrative things we might have done, things which would have kept us closer to our families, we chose instead to bring fine ships such as this to life and through doing so to allow our civilian leaders to count on the potentially devastating effect we could deliver.

It's over, shipmates. The horror and total unacceptability of a global nuclear exchange finally wore down the hard liners on both sides who might once have ordered it. But as the crew marches off LEWIS AND CLARK this morning, relegating this once proud ship to the status of a hulk, let's take a minute, you and I, and along with our families let's remember our own collective personal contribution to the peaceful status our world enjoys today. **It may be that we have given new meaning to the thought of giving one's life for one's country. . . .the contribution need not be terminal nor directly combative to be substantial.**

■

USS Andrew Jackson (SSBN 619)
REUNION
15-18 April 1993, Charleston, SC
Richard Wehle, P.O. Box 26
Goose Creek, SC 29445, (803) 553-7243

A SUBMARINE BIBLIOGRAPHY
Part I

by Dick Boyle

Editor's Note: At the Annual Symposium in June, the Advisory Board noted that it would be useful for junior officers to have a bibliography from which to learn about the non-technical lure and lore of submarining. For an initial edition of such a reading list, Dick Boyle has extracted from the extensive bibliographies which he is using in his ongoing work on a submarine history. The following includes only books, not periodical articles, and only those done in English by U.S. publishers. That leaves plenty of room for expansion to those other categories, as well as additions to Dick's initial list.
We hope to make this a continuing project for THE SUBMARINE REVIEW, therefore we ask that all readers who have favorite books or articles about submarines and/or the people who build them, man them or write about them, to send in your entries and we'll add them to our bibliography.
Part II of this bibliography will list those books which have been reviewed in THE SUBMARINE REVIEW.

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ON PATROL FIFTY YEARS AGO

by Dr. Gary E. Weir

GREENLING's third war patrol was one of the best conducted against the Japanese merchant fleet. Lieutenant Commander Henry C. Bruton pressed home attacks that cost the enemy 32,050 tons of merchant shipping. In addition, he is credited with damaging a 22,000 ton converted carrier. This patrol was conducted off the northeastern coast of Honshu after a one week transit during a little more than three weeks on station. Several material problems were encountered following the three week refit period at Midway, however all were either resolved by the crew or were worked around.

USS GREENLING -- Report of Third War Patrol
Period from September 23, 1942 to October 22, 1942

NARRATIVE:

September 23, 1942

1740 M Departed Midway under escort.

October 1, 1942

2300 K Entered assigned areas. Began closing coast in vicinity of O SHIMA.

October 3, 1942

0410 I Sighted four lighted sampans.

0440 I Sighted smoke to the northwest. Commenced approach. 0440 sighted small freighter heading down coast. 0445 dived, as it was getting light. 0450 sighted sampan, as day broke, about 15 ft. from periscope. 0600 abandoned approach; unable to close to less than 6000 yards. Lat. 38°-47'N, Long. 142°-15'E.

0615 I Sighted second steamer heading down coast. Commenced approach. 0700 fired three (3) torpedoes. One (1) hit. (Attack No. 1). Very loud explosion about one minute after torpedo detonation, probably boiler. Target sank in less than six minutes. Target was about 4000 tons., southbound, and was heavily loaded. Sampan

approached scene of sinking, apparently picking up survivors. Lat. 38°-46 'N, Long. 142°-02 'E. Continued to close coast.

0935 I Sighted large patrol sampan approaching scene of sinking. Evaded him at periscope depth. Sighted 38 additional sampans before dark.

October 4, 1942

1250 I Sighted small patrol yacht, distance 3 miles, headed down the coast. Attempted to evade him at periscope depth. When range reduced to 2500 yds., yacht changed course toward us. Went deep, ran silent and commenced evasive tactics. Yacht came very close aboard but the expected depth charge attack did not occur. Yacht gradually passed out of sound range astern. Apparently he had a sound contact but could not retain it. No echo ranging was used. Lat. 39°-48 'N, Long. 142°-11 'E. Resumed periscope patrol, continuing to close coast.

1435 I Sighted three additional small ships further inshore. All were heading north. Still unable to get one within firing range. These ships were only about 500 yds. off the shore. Lat. 39°-48 'N, Long. 142°-08 'E.

1500 I Sighted large vessel headed up the coast, angle on bow 10° stbd., range 9000 yds. Commenced approach. (Attach No. 2.) 1620 fired three (3) torpedoes. Two (2) hits. Screws stopped. Five minutes later entire after portion of ship, except the mast, was underwater with only the bow completely above, and at a 30 degree angle with the horizontal. Ship was settling rapidly, so decided against further torpedo expenditure. Target was a modern flush deck vessel of about 8000 tons, the amidships upper deck structure being considerably larger than that of the average freighter. Sinking occurred two miles off shore about three miles north of MYOJIN HANA.

October 6, 1942

Off O SAKI. Poor visibility, rough seas.

October 7, 1942

0830 I Fog enveloped entire coast. Seas became rougher. Trim pump hot and very noisy from almost continuous use.

0935 I Unable maintain depth control at periscope depth due rough seas. Broached several times. Trim pump satisfactory after it cooled off. Headed south. Made irregular periscope exposures during the day. Considerable roll at 100 ft.

1810 I Surfaced in storm. Wind and seas from north. Seas over 30 ft. high. Set course to ride it out.

October 10, 1942

1745 I Surfaced 7 miles off coast. Night dark, low visibility, heavy rain and hail throughout the night. Heavy seas continue. Have had to run with main induction closed last four nights.

October 13, 1942

1740 I Surfaced 1½ miles off TODO SAKI. Night dark and rainy.

2008 I Sighted vessel with side lights burning. Closed to 1800 yds., but no shape discernible. 2034(I) vessel began flashing a light in our direction. Unable make out letters being sent, if any. Avoided at increased speed on the surface. It was either a large sampan or a very small ship or patrol vessel, too small for a torpedo. Decided not to reveal presence or identity by use of gunfire. Steered course east at 4 kts during the night, having determined that this would just about keep us in the same position. Continuous rain during the night. Lat. 39°-35 'N, Long. 142°-13 'E.

October 14, 1942

0440 I Submerged about five miles off TODO SAKI. Rough seas and high winds from north.

0545 I Sighted large ship to north, range 3000 yds., angle

on bow 5° port. Commenced approach and at 0604 attacked (Attack No. 3) with three (3) torpedoes. Three (3) hits. Target, a 9000 ton naval auxiliary, sank in less than six (6) minutes. Went to 140 ft. to make reload and check torpedoes in forward tubes which had been flooded. Attack took place 6 miles off TODO SAKI. Set course to pass down coast.

1801 I Surfaced. Sighted RYORI SAKI light exhibiting listed characteristics. Position 4 miles, bearing 220° T from light. Patrolled 5 to 10 miles off RYORI SAKI during night. Sea rough, but visibility fair.

2350 I Sighted small darkened vessel very close aboard. First picked him up by sparks emitted from stack. Avoided him at increased speed on the surface. Much too small for a torpedo. Sighted six lighted sampans during the night.

October 15, 1942

0615 I Sighted patrol vessel or gunboat, angle on bow 5° stbd., range 200 yds. Rigged for silent running and was about to get tubes ready when enemy stopped his screws. Decided not create additional noise by getting tubes ready while enemy listening. Enemy re-started screws and headed directly for us on a constant true bearing. Started to 200 ft. Enemy came very close aboard (screws heard over half of dial) and again stopped. Evaded at silent speed on an easterly course.

1200 I When about 18 miles east of RYORI WAN sighted smoke to northwest. Commenced approach. 1202 sighted patrol yacht range 3000 yds., on various southerly courses, in direction of smoke. Evaded him at periscope depth. Smoke drew rapidly to south. 1245 sighted masts of six (6) ships, range about 12000 yds. Angle on bow of trailing ships 90° port, range 9000 yds. 1330 heard echo ranging by two different vessels from direction of convoy. Echo ranging grew weaker

and was no longer heard as convoy passed out of sight. 1340 abandoned approach; could not close to firing range.

October 16, 1942

Enroute to station off SHIOYA SAKI.

1240 I Sighted masts and stack of large patrol vessel which quickly pulled out of sight on a westerly course, passing to the north of us. Position Lat. 37°-21 'N, Long. 141°-21 'E.

October 17, 1942

0047 I Since no smoke or large ships yet sighted, decided open out to eastward at slow speed upon assumption shipping is running further out.

0235 I Sighted one large and two smaller vessels, escorted by a destroyer or fast patrol vessel, bearing 120°T, distance 4000 yds. Commenced approach on larger vessel, a large three island freighter, heavily loaded. Began running silent. 0254(I) escort changed course toward us, angle on bow zero, range 2000 yds. 0255(I) fired three (3) torpedoes at target; two (2) missed ahead, one appeared to hit target near amidships but did not detonate (Attack No. 4). Turned tail to escort and retired at high speed after firing. Escort fired torpedo at GREENLING about same time we fired. Convoy zigged to west while escort chased GREENLING. Managed to elude escort on various courses at high speed. Spent remainder of night trying to close convoy and get on other side, if possible, but escort always managed to keep between us and convoy. Dark partially starlit night. Tried to get ahead of convoy just before dawn when we dived. Immediately thereafter heard screws of two high speed vessels approaching on unchanging true bearings. Too dark to see through periscope. Evaded by running silent. Convoy pulled away to south. Lat. 37°-00 'N, Long. 141°-10 'E. Retired to northeast planning to operate along same lane the follow-

ing night.

0600 I Torpedo firing circuits to forward tubes completely grounded out. Water enters ships through interior of cable, the amount increasing at deep depths.

0700 I Port stern tube gland leaks badly. Cannot be tightened further. Must renew packing or add additional packing.

2045 I Southeast storm sprang up, heavy seas, low visibility and rain nearly all night. Patrolling KINKASAN - SHIOYA SAKI lane.

October 18, 1942

0055 I Destroyer crossed our bow starboard to port about 400 yds. ahead. Rough seas, very heavy rain, very low visibility. Was in sight only about a minute. Destroyer apparently was headed for ISHINOMAKE WAN and undoubtedly did not see GREENLING. Target out of sight before tubes ready. Lat. 37°-44 'N, Long. 141°-27 'E.

0305 I Sighted large southbound ship. 0325 fired three (3) torpedoes. One (1) hit amidships. (Attack No. 5). Target settled somewhat aft, appeared to stop and caught on fire. Crossed to other side of target, closed to 750 yds., and fired two (2) additional torpedoes to finish her off. Both missed, probably erratic runs (Attack No. 6). Two (2) torpedoes passed close aboard GREENLING. Maneuvered stern to target, which was now going ahead slowly, with crew fighting fire and apparently making progress. Target did not appear to be sinking. Fired one (1) additional torpedo, which hit forward (Attack No. 7). Target broke in two and sank two (2) minutes later. Lat. 38°-46 'N, Long. 142°-02 'E. Began opening out to coast to repack port stern gland.

2130 I Began heading up coast, planning to operate next off BENTEN ZAKI.

October 20, 1942

0410 I Sighted large sampan or patrol vessel to north,

distance 4000 yds. Avoided on surface, too small for a torpedo.

0700 I Patrol vessel picked us up by sound, came close aboard and conducted light depth charge attack, three (3) charges, none close, no damage. Fair sound conditions. Vessel passed directly above GREENLING, its screws being clearly heard through hull. Not seen on previous observation although visibility good. Lat. 39°-46 'N, Long. 142°-08 'E. Attributed sound contact to our increased main motor noise even when running silent, shaft vibration, and noises and vibrations produced by port sound projector and No. 1 lighting motor generator. Cannot use port sound projector when running silent. Starboard projector cannot be trained faster than slow speed without producing excessive noise. Evaded patrol vessel by 1000, continued to close coast north or TODO SAKI.

1800 I Surfaced four miles off the coast in bright moonlight, 3/4 moon, sky clear. Since no shipping or smoke sighted during day, considered it probable that shipping is routed further out and in convoys. Decided operate along TOKYO-ALEUTIANS route for a few days while moon is full and up nearly all night, searching for convoys enroute. Decided use guns during night if opportunity offered.

October 21, 1942

0009 I Sighted small darkened vessel, later identified as a 50 ton sampan. Attacked with machine guns and deck gun. After five 3" hits, about 200 .50 cal. hits, and about 100 .30 cal hits, sampan disabled and dead in water, but showed no sighs of sinking. Crew undoubtedly all killed. (Attack No. 8). Went close aboard; threw two buckets of oil on sampan followed by a lighted fire-ball on a swab handle. Sampan caught fire immediately and was burning fiercely from stem to stern when last seen over an hour later. Lat. 39°-37 'N,

Long. 142°-45'E. Continued toward southeast corner of area along TOKYO-ALEUTIANS route.

October 22, 1942

0300 I Arrived in TOKYO-ALEUTIANS lane, began patrolling parallel to it.

1026 I Sighted destroyer dead ahead, range about 2000 yds. Commenced approach. Glassy sea, heavy swells. Increased depth to reduce length of periscope exposed but went too deep to see. Finally saw tops of masts of large ship. Shifted approach to this vessel. Due heavy sell and depth control difficulties did not get a satisfactory look at target for some time, when recognized it as a carrier or auxiliary carrier, angle on bow 130° starboard. Began swinging to follow target, tubes not yet ready. When tubes ready, fired five (5) torpedoes, one degree spread, range 2800 yds. (Attack No. 9). Two (2) hits. Lat. 37°-30'N, Long. 145°-00'E. Got heavy after firing; could not see, so decided to go deep temporarily until inevitable depth charge attack over. Three (3) minutes after torpedoes detonated, depth charge attack began. No damage. Started to periscope depth twice but each time when part way up destroyer returned to vicinity. It was almost an hour after firing when we got back to periscope depth; nothing in sight. Closed estimated target position when hit. Later heard destroyer's screws to north, then to northwest and then to west. Closed bearing of screws but could see nothing. AT 1500(I) one hour after screws no longer heard, left vicinity. Am certain target was not disabled in the vicinity. Target either sank or cleared vicinity at reduced speed, probably to westward, heading for land.

1700 I Left assigned areas, set course for Midway. Began overhauling torpedo tube firing and operating gear.

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LETTERS

ADMIRAL RICKOVER AND NAVAL WAR COLLEGE REVIEW

26 October 1992

I was particularly interested in your July issue's excerpt from Theodore Rockwell's new book, The Rickover Effect: How One Man Made a Difference, published by the Naval Institute Press in October.

Included in the excerpt was an account of Admiral Rickover's response to a review he disliked about his book How the Battleship Maine Was Destroyed. The review appeared in the Fall 1977 issue of the Naval War College Review. In the next issue, that for Winter 1978, this journal carried Admiral Rickover's complaint, written to Vice Admiral James B. Stockdale, then the President of the Naval War College. Toward the end of his letter Admiral Rickover wrote, as you quote him accurately on page 66 of the July issue, that "eliminating the Review would be a noteworthy, precedent-setting action by the War College."

Clearly that suggestion fell on stony ground. Even Admiral Rickover seems to have taken it lightly, for in April 1982, shortly after I became editor, he called me by phone. He commented on one or two articles he had read in recent issues, expressed some of his general views about the Navy, and then, as was his custom (at least with editors of naval journals), hung up, having had a one-way, but I suppose satisfactory, conversation.

In his letter Admiral Rickover made some cogent observations about the responsibilities of a book reviewer. In each issue we reprint those observations at the head of the book review section. Those useful words are Admiral Rickover's lasting contribution to the Naval War College Review.

In order to provide you with some of the flavor of Admiral Rickover's conversation, I enclose a copy of my letter to him written the same day.

Sincerely,
Frank Uhlig, Jr.
Editor

15 April 1982

Admiral H.G. Rickover, USN (Ret.)
Washington Navy Yard
Building 200
Washington, DC 20374

Dear Admiral Rickover,

Thank you for your phone call this morning. I wish I shared your thought that the development and management of technology is a bigger part of modern naval work than 'shooting the guns' is, for ours is a Navy rich in highly able developers and managers of technology: Dahlgren, Isherwood, Melville, Fiske, Moffett, Hooper, Cochrane, Raborn, and Rickover, to name but a few. In fact, many of the finest achievements of our ordinary officers, such as the OREGON's run around the Horn, the cruise of the White Fleet, and the continuous keeping at sea of our fleets in the Second World War were wholly or largely matters of managing technology.

But at some point the OREGON had to shoot reasonably accurately and people at least had to believe that the White Fleet could do so, too. It is the **shooting** part in which most of the Navy glories. But, so far as I can tell, that is the part in which we do least well. Our performance in this regard was not all that good in 1861, or 1889, or 1942 or, so far as I can tell, more recently. If we get to the fight and then do badly, it would have been better had we not gotten there at all.

You say your interviews indicate the average civilian candidate for the nuclear power program is more intelligent than the average naval officer. That may be so, though I am not convinced that the average junior officer is less able than his college contemporary who chose a career in some other field. Where a serious problem lies is with the middle-aged officer, even if he holds high rank. All too often something seems to have gone adrift with his imagination, his curiosity, and the breadth of his thought. But perhaps that happens to men in other fields, too.

One of the best things we could do for the Navy and the country it serves is to nurture (where weak) and keep alive

(where strong) the imagination, broad curiosity, and spirit of inquiry upon the part of the officers who serve in our ships, in our staffs, in our operational, administrative, and technological headquarters, and most of all, in positions of command.

Very respectfully,
Frank Uhlig, Jr.
Editor

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SUBMARINE MEMORIALS

21 June 1992

Hard on the heels of the May 16, 1992 dedication (see Jan '92 **SUBMARINE REVIEW**, p. 112) of the Williamsport, PA, WAHOO Submarine Memorial, I read that the boys down in the Bluegrass State are at all-ahead-flank to eulogize one of the scrappiest submarine skippers to dare to enter Empire waters.

Much credit must go to the two Owensboro, KY men, Frank Boarman and Bill McDonough, for their current yeoman effort to erect a memorial to Owensboro native, CDR Dudley W. Morton. Unknown to them they are steaming in the wake of another determined spirit, George E. Logue of Williamsport, PA. He already has put in place a memorial to that submariner who, as Thomas Jefferson put it, *"Refreshed the tree of liberty with his blood."*

RADM Richard H. O'Kane in his book, WAHOO: The Patrol of America's Most Famous WWII Submarine, also paid tribute to CDR Morton. His book describes how Morton and his 80-man crew came to rest in an iron coffin on the bottom of LaPerouse Strait in Northern Japanese waters. Post WWII reports show that it took a lot of blasting by sea, shore, and air power to finish off that valiant crew on October 11, 1943, well in sight of people on the shoreline.

That sad news, because of silent service press restrictions, was long reaching the Logue family in Williamsport. George, the younger brother of Fire Controlman First Class, Robert Logue, a WAHOO crew member, only then knew that his brother was gone.

And forty-eight years later, without any taxpayer dole, George and his volunteer submarine veteran shipmates set in motion another all-hands *ship's store* evolution. They put in

place a memorial on the banks of the Susquehanna River, not only to brother Robert, but also to CDR *Mush* Morton, LT Dave Sloan, Jr., lost on CORVINA, and the LTJG Ed Szendry, lost on SEAWOLF. **All were Williamsport natives.**

The 12 foot high combination submarine torpedo/ship's anchor/submarine propeller (spare from TORSK) memorial carries the Pennsylvania Lehigh Valley Chapter of Submarine Veterans stamp. Logue is an associate member of same. It stands in bold tribute, as did the *broom* on the shears in bygone years, high on the West 4th Street hill, a badge of gratitude not only to Williamsport sailors, but to all veteran warriors lost in support of freedom for mankind.

Bearing witness to the merit of the occasion were guest speaker, CAPT B.L. Heid, past Commander of the Norfolk Submarine Training Facility, and famed WWI M-1 submarine ship's company, Bert Miller.

The real estate, donated by Mr. Logue, an Air Force veteran, for the Submarine Memorial will be the future site of other memorials for Lycoming County, PA.

EMCM(SS) Martin F. Schaffer, USNR(Ret)

IN THE NEWS

Toward a New Design Submarine

• Inside The Pentagon of July 30, 1992 commented on the Navy's submission to Congress of a report on "...design concepts, technical alternatives and goals for the Centurion." The weekly trade paper lead their piece with "The Navy is planning on a 'streamlined' acquisition process for its next generation attack submarine, the CENTURION, in order to begin construction in FY-98."

The article reported that the Navy did not provide a cost goal to Congress but went on to say that "The report estimated that research and development will cost $3.4 billion for Centurion and another $725 million to $750 million for developing a new nuclear propulsion plant. The report said the Navy is eyeing a Centurion submarine between 6,000 and 8,500 tons in order to incorporate the technology and weapons systems necessary to satisfy the Navy's preliminary goals for the boat."

Inside the Navy of September 7, 1992 reported on the action taken by Pentagon acquisition chief Donald Yockey after approval was granted for the Navy to move ahead with concept definition studies. The article explained that "Following an Aug. 18 Defense Acquisition Board review of the Navy's program, Yockey issued an Acquisition Decision Memorandum, dated Aug. 28, that includes tight guidelines for a Cost and Operational Effectiveness Analysis the Navy will perform on designs for the new sub."

The article continued to report that Mr. Yockey has directed that "The Navy is to move ahead immediately with the COEA and as part of that process it should examine six design alternatives the Office of the Secretary of Defense has laid out." It went on that "Yockey is asking the Navy to examine the feasibility of the following six submarine alternatives:

-SSN 21: ...at a production rate of one boat per year at one shipyard.

-SSN 21(V): ...two lower cost versions...in the range of 10,000 tons.

-SSN 688I: ...variations that would incorporate all available technology.

-A new nuclear-powered attack submarine: ...to include designs smaller than the 688I. The Navy is to look at

designs under 5000 tons also.
-Trident(V) ...variations to the Trident design with differences in tube volume.
-Conventional submarines...to consider diesel power, closed cycle diesel, air independent propulsion, fuel cells, a sterling engine, advanced batteries, and a hybrid submarine using a small reactor to recharge its batteries. In examining the alternatives, the Navy is asked to consider the effect of overseas basing of submarines."

• Defense News of August 31-September 6, 1992 reported further on that action with "Despite approving the U.S. Navy's request to begin designing a new attack submarine, top Pentagon acquisition officials limited funds for concept studies to $30 million until a submarine industrial base study is completed, according to a synopsis for a Defense Acquisition Board review, released Aug. 28."

Submarine-Related Technology

• Inside the Navy of November 2, 1992 reported that "A joint U.S./Russian project exploring new techniques for detecting submerged Trident ballistic-missile submarines from space so far has not produced the detection capability Russian scientists claimed it would, according to a naval analyst. Russian scientists 'believe they have succeeded in developing the technology for locating submerged Trident submarines using airborne or space-based microwave sensors' and offered to conduct the joint experiments to show the Navy the Russian capability, according to the Senate Armed Services Committee.

Inside the Navy's article went on to say that "The Russian scientists made their claims in the defense publication Signal earlier this year," and that "According to the committee, a letter from Under Secretary of Defense Paul Wolfowitz to Dr. Euvgeny Velikov, vice president of the Russian Academy of Sciences, 'confirmed that, for more than a year, U.S. and Russian scientists have been working together to design a cooperative project to understand the scientific phenomena related to non-acoustic imaging of ocean surface features and had recently completed a remote sensing test off the east coast of the United States that involved use of the Russian ALMAZ satellite.' The Committee said Wolfowitz indicated in his letter that in the next phase of what is expected to be a two-year test

program, 'joint experiments will be conducted next summer off the eastern coast of Russia.'"

In an interesting tangent to the U.S./Russian joint project, the trade paper noted that "...the committee urged DOD to maintain an independent program within the U.S. intelligence community for conducting research and development on non-acoustic antisubmarine warfare technology. The committee expressed concern that the program, Project Tsunami, possibly was being considered for termination or for being phased out. The committee believes that 'Senate approval of the START II treaty should be accompanied by strong support for the joint U.S./Russian submarine detection test program and robust funding of Project Tsunami.' Project Tsunami is a Central Intelligence Agency project, the naval source said. He said the project was started about six or seven years ago to independently assess the technology, aside from what the Navy has done, and has been ongoing since through a major funding effort."

U.S. Export of Diesel Submarines

• Inside the Pentagon of June 25th reported that "The Navy...delivered a long-awaited report to Congress outlining the criteria that U.S. shipyards must meet to receive Navy approval to export diesel-powered submarines. Although the Navy report lays out stringent criteria, sources familiar with the report say it represents a reasonable beginning for moving the issue forward." The paper quoted an unnamed source as saying that "It's a good start, but there's still a lot to resolve." The paper also commented that "Some of those pressing for the Navy to approve export of diesel submarines object to some of the criteria, saying that they reflect Cold-War concerns that no longer apply in the new world order."

• The Baltimore Sun of July 2, 1992 carried a commentary by Richard Sia of its Washington Bureau headlined "Members of Congress press Navy to end opposition to diesel-sub exports." The article's lead paragraph stated that "Members of Congress are engaged in an election-year effort to 'save American jobs' by trying to reverse the navy's long-standing opposition to diesel submarine exports--even though U.S. shipbuilders seem reluctant to dive into the market and haven't built a conventionally sub for more than 30 years."

Later in the article reference was made to that industrial

reluctance with "A senior shipbuilding executive, who declined to be identified, said the legislative maneuvering would only raise false hopes for thousands of workers who may eventually find themselves out of work. U.S. entry into the export market is 'not very realistic because there are lot of suppliers of diesel subs in the world, and the market's not that good,' the executive said. 'None of us has a product to sell...'"

Another viewpoint was offered by the commentator with "The U.S. intelligence community has concluded that international sales of diesel submarines are nearing a saturation point. Many prospective buyers are finding they no longer can afford the $300 million-plus price tag for a small boat that has more prestige value than actual application in projecting a credible defense of local coastlines, one analyst said."

Prior to listing various legislators involved in the effort to authorize diesel sub exports, the paper offered a pro view with "Advocates of submarine exports, such as John J. Stocker, president of the Shipbuilder Council of America, have heard the Navy's objections before and regard its warnings of technology losses as grossly exaggerated. The shipbuilding industry, which is totally dependent on one customer--the Navy--finds itself in 'a truly awful situation' because it has few remedies to offset declining business, he said."

U.S.N. Submarine Force Structure

• Inside the Pentagon of August 6, 1992 carried a story entitled "Navy to Dismantle 100 Nuclear-Powered Submarines by Year 2000". The paper's lead paragraph stated that "The Navy is going to spend $2.7 billion through the year 2000 to deactivate and dispose of 100 nuclear-powered submarines, according to a new report by the General Accounting Office. Although the Navy has dismantled only two nuclear submarines to date, The GAO says the Navy is stepping up its efforts and will have fully disposed of 85 of the 100 submarines by 2000."

The paper went on "The July 22 report, Nuclear Submarines: Navy Efforts to Reduce Inactivation Costs is one of the detailed descriptions to date of the efforts to deactivate Navy submarines and dispose of the nuclear materials. The first deactivation of a nuclear-powered submarine began in FY-69, but between 1969 and 1980 the Navy started deactivating only four, according to GAO. Through FY-91, the Navy has started 42 deactivations at a cost of $1.2 billion; the service intends to start 48

submarine deactivations during FY-92 to FY-2000 at a cost of $1.5 billion."

In explanation of the process, the paper stated that "When submarines are deactivated, the reactors are defueled, the ship's systems are shut down, and the missile compartments are dismantled. The nuclear reactor compartment is removed from the boat and towed up the Columbia River on a barge to Energy Department's Hanford Nuclear Reservation, where it is buried. The GAO says the disposal of reactor compartments is expected to continue at the rate of six per year through FY-99. The deactivation process takes about six to eight months."

• Inside the Pentagon of September 3, 1992 reported on the completion of the recommended submarine force level study by the JCS. The entire piece is quoted: "The Joint Chiefs of Staff has established a new Base Force goal for Navy attack submarines in the range between 50 and 60 submarines, but 55 will be the likely number that will guide Navy planning, according to sources familiar with the Joint Chiefs of Staff study establishing the new requirement. The JCS recommendation overturns the current Base Force goal of 80 attack submarines.

"The Navy currently has just over 80 attack submarines in the active fleet; so the planned reduction means that the Navy does not have to start building new submarines again until early in the next decade, when the SSN 688 class submarines start to retire. But because the SSN 688s will retire at the rate of three to five submarines per year, the Navy wants to start ramping up production of submarines in the late 1990s to prepare for the rapid retirement of the SSN 688 fleet.

"In order to sustain a fleet of 55 attack submarines, the Navy would have to procure about two submarines a year, submarines have a service life between 25 and 30 years. The Defense Science Board currently is studying ways to extend the service life of nuclear-powered submarines.

"The JCS was tasked in January to re-examine the Base Force requirement for attack submarines as part of an overall Pentagon review of the Navy's submarine force."

• Inside the Navy of November 16, 1992 commented on the further delay of the Defense Department report on the future of the Submarine Force. "The report ordered in January by Deputy Defense Secretary Donald Atwood to assess the future

of the submarine force once again has been delayed. Originally, Atwood requested that the report be delivered in late July but that a deadline was impossible, a Pentagon spokesman said." The trade paper went on to say that the Pentagon is "shooting for the end of the year".

The piece also explained the make-up of the desired composite report: "In a Jan. 22 memorandum, Atwood assigned various tasks to the Navy, the Joint Chiefs of Staff, the Under Secretaries of Defense and the Assistant Secretary of Defense for Command, Control, Communications and Intelligence, Duane Andrews. Andrews was directed to prepare an assessment of the future threat to American interests. The Under Secretary of Defense for Acquisition, Donald Yockey, was charged with the responsibility of looking at the capacity in the public and private shipyards for overhaul, repair, missile conversion and refueling in order to make recommendations for achieving increased efficiency. In addition to determining the number of submarines needed and their operational uses, the Joint Staff was tasked to pull together all of the other reports into a comprehensive plan."

The Industrial Base

• Inside the Navy of October 26, 1992 reported on the projected closures of naval shipyards. In their lead article, the paper said "The Navy and the Defense Department reportedly are considering closing four naval shipyards during the next round of base closures in 1993." It continued to state that "...the Defense Department recently has been seeking comments from the House Armed Services Committee on the possible closures of the naval shipyards at Portsmouth, NH, Charleston, SC, Long Beach, CA, and Mare Island, CA, an industry source said."

In highlighting the effect on the submarine service, the paper commented that "In his March report on preserving the U.S. nuclear capability, Adm. Bruce DeMars, the Director of naval nuclear propulsion programs, warned that there were more naval shipyards than were needed due to a lack of submarine work. 'There is currently enough planned work to sustain the equivalent of five of the six nuclear-qualified naval shipyards,' he said. 'Inactivating rather than refueling the early SSN 688s through 1998 reduces annual workload by the equivalent of an additional naval shipyard.' Mare Island, Portsmouth and Charleston are nuclear-qualified shipyards. That leaves Pearl

Harbor, Puget Sound, WA, and Norfolk, VA. DeMars said in his report that there was an 'absolute requirement' for the shipyards at Norfolk and Puget Sound' because of their large dry dock capacity and special facilities.'"

Foreign Submarines

• Jane's Defence Weekly of May 30, 1992 reported that Israel plans to renew the search for a submarine lost at sea almost twenty five years ago. The magazine piece stated that "The Israel Defence Force plans to renew the search for the DAKAR diesel electric patrol submarine, lost in January 1968. DAKAR disappeared during delivery from the UK to Israel with the loss of 69 Israeli crew.

"The Israeli Navy has drawn up a plan that will include the use of numerous naval craft following a scientific study carried out by Israel and other specialists on the possible whereabouts of the boat.

"A previous search for the DAKAR five years ago concentrated on areas near the Egyptian coast. No trace of the submarine was found."

• Washington Times of June 2, 1992 reported from Stockholm about Sweden's reaction to submarine incursions by the Soviets. "The Cold War may have ended, but the Swedes are still waiting for an explanation from the Kremlin for all those rogue Soviet submarines that were creeping around Swedish shores last year.

"The last incident--the 40th incursion since 1985--occurred in September, when a Swedish Navy underwater hydrophone picked up the sounds of a minisubmarine inching toward Sweden's shore. The submarine ran away when the Navy sent torpedo boats to hunt it down.

"In March, Sweden's military commander, Gen. Bengt Gustafsson, issued orders for the Navy to fire at will with new homing torpedoes if the submarines return, but none have shown up. It means ship captains won't have to ask Stockholm for permission to fire if they find a rogue sub in Swedish waters."

• Baltimore Sun of July 9, 1992, in a report from Oslo also commented on submarine activity from the east. "The number of Norwegian sightings of submarines from the former Soviet Union has fallen dramatically with the end of the Cold War,

Norway's Defense Command said yesterday.

"There have been no sightings reported so far this year,' said Brig. Gen. Per Boethun. Seven 'possible' or 'probable' foreign submarines were seen in Norwegian waters in 1991 and 1990, down from 70 in 1987.

"The collapse of the Soviet Union, lack of fuel for Russian's northern fleet and the relaxation of Norwegian surveillance all contributed to the decline, he said."

• Washington Times of July 8, 1992 headlined a news item with "Nuclear submarines mean jobs for Britain". The piece related the announcement of the fourth Trident submarine order. It went on to state that "Defense Minister Malcolm Rifkind, answering a question in Parliament, said the submarine would be built by the VSEL Consortium at Barrow-in-Furness, England. The order would secure 1,500 jobs at VSEL and help maintain thousands of other jobs throughout the defense industry, he said."

• Washington Post of October 30, 1992 commented on the U.S. government reaction to the sale of Russian submarines to Iran with "The Bush administration was so alarmed earlier this year by the prospective sale of Russian attack submarines to Iran that it tried to interest Saudi Arabia in paying Russia to abandon the transaction, according to U.S. and British officials. The gambit failed, as did direct U.S. diplomatic entreaties to Moscow."

The article updated the situation with "Administration officials now say the arrival of the first Iranian submarine in the Persian Gulf, expected by mid-November, will augur a new strategic challenge in the Strait of Hormuz. About 20 percent of the world's oil flows through the strait each year, and no gulf nation has had attack submarines until now." It continued the update with "After much haggling, the Iranians have agreed to pay $600 million to the United Admiralty Sudomekh shipyard in St. Petersburg for two Kilo-class submarines, with an option to buy a third, according to a U.S. intelligence estimate."

The Post stated that "The first Iranian-owned Kilo, still flying the Russian naval ensign and accompanied by the Russian hydrographic ship PLUTON, was yesterday steaming southward at three knots on the surface of the Red Sea, according to a Naval official with access to current intelligence. Its crew,

according to another officer is 'still speaking Russian on the radio,' and the Iranians are not yet capable of operating the boat on their own.

"U.S. intelligence specialists expect the Kilos to make port temporarily in Bandar Abbas, then move southward to facilities under construction in Chahbar."

• The Washington Post of November 4, 1992 published a report from Reuters that "A U.S. nuclear-powered submarine has entered the Persian Gulf just days before the expected arrival of a submarine Iran bought from Russia, U.S. Navy sources said today. The TOPEKA, with anti-submarine warfare capability, is the first U.S. nuclear submarine to enter the strategic gulf that is the conduit for most of the world's oil trade. The first of two diesel-powered submarines Iran bought from Russia is due to arrive at Iran's port of Bandar Abbas in a week or two."

Miscellaneous

• WAVES of September/October 1992 reported on a special salvage operation getting underway in Scotland. "A special project team of historians, maritime archaeologists, conservators and divers has been formed to conduct a search for a ferry containing the belongings of Charles I that sank on July 10, 1663 off the Fife coast in Scotland. The vessel sank while sailing from Burntisland to Leith during the Royal Progress made by Charles I after his spectacular Scottish Coronation. It is believed to have contained the royal silver plate and lavish gifts, such as basins of gold coins, newly bestowed on the King."

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BOOK REVIEW

THUNDER BELOW!
The USS BARB Revolutionizes Submarine Warfare in World War II

by Eugene B. Fluckey, Rear Admiral, USN (Ret)
University of Illinois Press
Urbana and Chicago, 1992
ISBN 0-252-01925-3

Reviewed by CDR Bruce B. Engelhardt, USN

[Ed. Note: CDR Engelhardt is currently serving in N-872, OPNAV's directorate for Attack Submarines. His previous tour was as CO USS DRUM (SSN 677), during which he was awarded the Distinguished Service Medal.]

Thunder Below! is more than a fascinating account of the submarine war fought in the Pacific during World War II. It is also an engrossing adventure story and a compelling history, full of relevant lessons learned. Admiral Fluckey's vivid personal recollections of "my BARB", as he calls her, and his impassioned descriptions of the shared bond between a Captain and his crew make Thunder Below! required reading for those who have had command at sea and for those who aspire to it.

Thunder Below! is the history of USS BARB during the last fifteen months of World War II. The United States submarine service had tightened its grip on the Japanese Empire. The action takes place over the span of BARB's eighth through twelfth war patrols. In the eleventh patrol, Admiral Fluckey and his crew made a daring surface raid into shallow (less than 10 fathoms) Namkwan Harbor, China. They sank four Japanese ships and damaged three others, escaping unscathed. For this daring action Admiral Fluckey was awarded the Congressional Medal of Honor. The author's extensive research for the book took ten years and included interviews with crewmembers and civilian eyewitnesses, factfinding missions to China and Japan, detailed reviews of U.S. and Japanese war records and a BARB torpedoman's personal war diary. This research served to highlight BARB's accomplishments: one of the highest tonnage totals sunk by a U.S. submarine (Admiral Fluckey states that "Totals sunk in Japanese Empire waters by the BARB from all factual sources so far uncovered are as follows: 29⅓ ships sunk; 146,808 tons sunk." - Appendix B), the Presidential Unit

Citation, shore bombardments, 74 trawlers and sampans destroyed by gunfire, and one trawler destroyed by ramming.

Thunder Below! is fun to read. Admiral Fluckey used an action packed writing style with large doses of crisp dialogue to describe his five war patrols in command of BARB. The result was a hard-to-put-down tale that became intensely real for me. The following description of depth chargings after an unsuccessful torpedo attack on two frigates is illustrative of the action:

> **Time 0415.** "Sonar reports short scale. Screws to port. First charge hit the water. All ahead flank speed. Maneuvering room, give her every ampere she'll take. Rudder amidships." After a series of click-bangs, we felt like we were a pin in a bowling alley. Men were knocked flat...The BARB was pushed sideways and deeper. All lights went out. The thunder below was enough to jar our fillings loose. The charges were so close we could hear the click of the detonators before the explosion.

As I read Thunder Below! I was struck by the emphasis Admiral Fluckey placed on professional competence for himself, his officers and crew. We learn that, as a junior officer and department head on previous ships, the author developed the means to win the coveted "E" for excellence in engineering and torpedoes. We also find that he developed a way to compensate his boat's trim for drastic changes in ocean salinity by measuring the specific gravity of sea water in the officers' head. He gives most of the credit to his crew, but of course, he trained that crew. He talks of hours upon hours of drills on the way to station; crash dives in less than 70 seconds, fire drills, equipment tests and twelve-plus hour workdays while underway. Personal qualification and crew training were keys to BARB's successes. Prior to his ninth patrol Admiral Fluckey told his junior chief to be the Chief of the Boat (COB). He told his new COB, "The other chiefs understand that as Chief of the Boat you become the senior chief on board. In submarines we hang our rates on the gangway when we come aboard. It's what you can do that counts with me." He also speaks of his favorite pastime as Captain, scouring other CO's patrol reports. Admiral Fluckey reminds us that "Life is not long enough to personally garner sufficient experience for anything." He tells us we must harvest the experience of others. "Otherwise their history of errors is to be repeated." Thunder Below! gives us a lesson relearned: the first tenant of good leadership is to train ourselves and our people in the basics - engineering and weapons - to ***know the boat***. Mastering *basic submarining* is not

a new concept brought in with the advent of nuclear submarines, but a legacy from our past.

Every page in Thunder Below! seems to emphasize the teamwork and caring attitude of the BARB crew and her captain. Admiral Fluckey corresponded with his crew's wives and loved ones. He surfaced in a raging typhoon to rescue fourteen survivors of a torpedo attack on a troop transport laden with allied POWs. On BARB, the use of report chits as a leadership tool was forbidden. The Captain routinely walked his boat, visiting with the crew, checking on the injured and sick, and improving habitability. He encouraged his cooks to decorate cakes showing the results of successful battle actions. He spoke over the General Announcing System telling the crew of the War status and overall plans. His love for his men was obviously genuine and not contrived. I found Admiral Fluckey's modest description of how he achieved this relationship to be both inspiring and instructive.

BARB had style. Prior to his first war patrol as Captain, Fluckey met with Admiral Lockwood, COMSUBPAC. Knowing that Admiral Lockwood had reservations about sending such a young captain on patrol, he promised the Admiral five sinkings. He then proceeded to go out and accomplish just that. Admiral Fluckey knew how to show off the exploits of his crew. From creative battle flags, to periscope photographs showing sinking merchants, to well-written patrol reports, to the first motion picture of battle action from a submarine, BARB did it with style. **This positive style said "We don't have problems, just solutions".**

Most useful to me was the insight Thunder Below! gave me into innovation and change in the face of conventional wisdom. The man that Admiral Fluckey relieved sank no ships. He was a fatalist who after six patrols was afraid to go on patrol again. Like many of the early skippers, trained in the pre-war environment, he was cautious and ultra-conservative. The *conventional wisdom* was to remain submerged and make deep approaches from the limits of torpedo range. This severely limited the area of search and ability to pursue targets. In contrast, Admiral Fluckey believed in using speed voraciously and stealth judiciously. When telling of a particularly arduous approach he wrote, "I wished we had submarines that could travel at speeds higher than nine knots submerged. What a different ball game it would be if we had submerged speeds competitive with those of surface escorts." The tactics and methods that Admiral Fluckey helped develop included surfaced high speed approaches, night attacks, deadly accurate gunnery against small ships, and coordinated wolfpack operations. As the war progressed

and the Japanese operated their convoys closer and closer to land, he planned and conducted his famous shallow water harbor attack and escape. In executing it, he took advantage of careful planning, stealth, stupefying surprise and luck. Admiral Fluckey describes this luck as "the faculty of making fortunate and unexpected discoveries by accident. Luck is where you find it, but to find it, you've got to look for it."

Prior to his last patrol, Admiral Fluckey decided that he wanted to mount a rocket launcher forward and use it for shore bombardment. He overcame bureaucratic obstacles and accomplished this goal. He describes it thusly:

> "I decided on [sending] a letter rather than a message, because the broad staff distribution of messages might give some doubter a chance to squash the idea for reasons I was beginning to distrust...Some officers still resisted the irresistible, everlasting tide of change. I didn't want to see our request strangled to death with endless staff studies."

Subsequently, BARB became the first submarine to carry and use rockets for successful bombardment of shore targets. On that same patrol, she sent a commando raid ashore to blow up a moving train with the ship's scuttling charges. This was **the sole** landing of U.S. military on Japanese home soil during the war. **Talk about a multi-mission platform!**

The lesson for modern-day submariners is that the end of the cold war also requires us to pursue innovative new concepts and tactics. The submarine of today still possesses that unique and powerful characteristic - stealth. And with stealth, we now have the submerged speed Admiral Fluckey wished for in 1944. Thunder Below! suggests that today's submariners can use these traits to aggressively pursue multi-mission objectives - in shallow water, if required: to go where no one else dares, to launch commando raids, conduct covert shore bombardment, gather intelligence, interdict seaborne commerce/naval forces and surprise and deter the enemy. Those who see a lessened usefulness for submarines in the future are guilty of the same over-conservativeness of thought that stymied the Navy prior to and during the early years of World War II.

I enjoyed this book immensely. It is a study in history, adventure, leadership principles and innovation. Thunder Below! reminded me of our proud Submarine Force heritage and fortified me in the fight for its future.

■

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HONOR ROLL

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