

# THE SUBMARINE REVIEW

OCTOBER, 1983

ARTICLES	PAGE
Pirate Submarines and Non-Intervention	3
When is a "Small Submersible" A "What?"	11
Admiral Rickover's Chosen Course of Excellence	18
Musashi and Submarine Antiship Missiles	26
Weapons and Submarines in Anti-Submarine Warfare	35
Submarine Officer Career Opportunities (Isn't There A Better Way?)	39
Naval Policy Between Wars	45
DISCUSSIONS	
After SUBACS?	49
Logistic Support Submarines	52
Time to Diversify?	55
Conventional Submarines In the Falklands War	58
IN THE NEWS	59
PERSONNEL NOTES	62
LETTERS	63
BOOK REVIEWS	
Admiral Rickover And The Cult Of Personality	66
The Underwater War 1939-1945	71

THE SUBMARINE REVIEW IS A PUBLICATION  
OF  
THE NAVAL SUBMARINE LEAGUE  
COPYRIGHT 1983

**OFFICERS OF THE SUBMARINE LEAGUE**

President: VADM Shannon D. Cramer, USN  
(Ret)  
Vice President: RADM William D. Pugh, USN  
(Ret)  
Treasurer: CAPT Jason Law, USN (Ret)  
Counsel: CAPT Louis T. Urbanczyk, USN (Ret)  
Secretary: RADM Albert L. Kelln, USN (Ret)

**BOARD OF DIRECTORS OF THE SUBMARINE LEAGUE**

ADMIRAL A.J. Whittle, USN (Ret) - Chairman  
VADM Shannon D. Cramer, USN (Ret)  
VADM Charles D. Griffiths, USN (Ret)  
VADM Lawson P. Ramage, USN (Ret)  
RADM Albert L. Kelln, USN (Ret)  
CAPT James P. Keane, USN (Ret)  
CAPT Sanford N. Levey, USN (Ret)  
Mr. Forest P. Ramsey, Jr.

**STAFF OF THE SUBMARINE REVIEW**

Editor: CAPT W.J. Ruhe, USN (Ret)  
Publisher: RADM James Murray, USN (Ret)  
Production: CAPT Bradford Granum, USN (Ret)

**CORPORATE AFFAIRS:** VADM Charles Griffiths, USN  
(Ret)

**MEMBERSHIP:** CAPT Sanford N. Levey, USN (Ret)

**RESERVE AFFAIRS:** RADM Whit Hansen, USNR (Ret)

## From the President

In the belief that the Submarine Review will be of considerable value to those dealing in submarine matters and in furthering the art of submarining, we of the Naval Submarine League are conducting a Corporate Benefactor program to ensure the necessary funds to give the Review wide distribution -- even beyond League membership. The Review is being distributed to all NROTC units, to many military libraries, and to each submarine unit. Also, to insure that newcomers to the submarine service take part in the dialogue generated by the Submarine Review, one year memberships in the Submarine League are being given to all those who will graduate from the Officer Basic Submarine School. Additionally, other League sponsored projects are being contemplated which will need funding beyond that of membership dues.

To give impetus to the Corporate Benefactor program, Al Whittle and I are co-hosting a briefing meeting for Corporate Benefactors on 14 October 1983. Admiral White, Chief of Naval Material and Vice Admiral Thunman, DCNO for submarines, will update attendees on recent submarine matters and answer questions regarding submarine programs, etc. It is intended that this meeting be the first of an annually held event to recognize the interest of corporations in today's submarine problems, as well as to enlist their aid in achieving Submarine League goals.

The recent bringing aboard of RAdm. Whit Hansen to be Chairman of the League's Reserve Affairs Committee is a big step towards having our submarine reservists closely integrated with the League's mission and goals.

Our membership reached 1,000 on 27 August 1983. A year ago there were less than a dozen members. The League's growth has been very good and I remain confident that with your support we will reach our goal of 1984 by 1984.

The quality and content of the Submarine Review appears to be improving with each issue and highly favorable comments on it are being received. But more articles expanding the areas of interests and concerns are needed to make the dialogue being generated of more value to all of us. We'll increase the size of the Review accordingly. The contribution of mid-grade officers would be particularly appreciated to get a better feeling of the pulse of today's submarine community.

Shannon

---

#### Editor's Notes

There is presently a surge of interest in many countries directed toward acquiring submarines, as indicated by D.E.K.'s item on the Falklands War. The greater the numbers of submarines in the hands of many countries the greater the chances of their being used in piratical fashion. Dr. Boyes' article gives this some historical perspective. Captain Taussig's article on small submersibles -- "submarines" -- forces a recognition that the submarine community today should have an interest in pursuing their development for war related tasks. In WWII the tiny submarines had some striking successes. But their history was also marked by operational problems which could have been reduced with better pre-war planning and understanding of their worth. Admiral Watkins' profound remarks at the RICKOVER launching emphasize what Admiral Rickover demanded from those who worked for him -- the pursuit of excellence. One immediately recognizes how this resulted in the superb, reliable submarines which the Navy has today. Yet Admiral Watkins' theme was for the pursuit of excellence in all Navy activities. This might include a perfecting of "the Way (of strategy)"

in the manner of Musashi's thoughts relative to the use of submarine weapons? Or, A.J. Perry's article which suggests that some basic questions should be asked about the excellence being displayed in submarine officer career management? Musashi's "Way" for the two swords of the samurai warrior also suggests a need for a special type of short sword for "close" fighting -- the "melee", where two opposing submarines discover each other at close range. J.S.L.'s feel for the weapons of the melee in antisubmarine warfare bring this relatively new element of ASW to the fore. Excellence in strategic thinking seems unlikely without a dialogue. This is an area where the Submarine Review should play a major role. F.C.L.'s Naval Policy Between Wars indicates a broad area of strategic thought which needs to be argued. All of these "notes" might be incomprehensible until you have read the articles which follow. Perhaps they should have been placed at the end of the issue?

---

THE NYON ARRANGEMENT - 1937  
for  
PIRATE SUBMARINES AND NON-INTERVENTION

On a hot and uneasy day -- July 18, 1936 -- civil war erupted in Spain.

What began as a military coup d'etat by Spanish military officers against the government of Spain turned into one of the most ferocious and bitter civil wars of this modern age. It was a war between the landed and landless; church against laity; democracy against facism.

Classically, Europe took sides: the Germans and the Italians supported the Spanish military rebels and the Soviets backed the Spanish government. France and Britain's leaders, Blum and Chamberlain, both with timid and uncertain

and uncertain leadership, fueled the flames of strife with ambivalence.

German and Italian intervention in the Spanish Civil War was almost immediate: about 8,000 German aviation personnel and technicians, and eventually over 60,000 Italian troops swung in behind the Spanish rebels under Franco. These two countries shipped vast amounts of munitions, supplies and hospital goods, and also provided occasional direct intervention in the form of German and Italian planes and ships on behalf of the Spaniards.

For the other side, the Spanish Government, the Soviets furnished supplies with approximately thirty to forty Russian ships traveling to Spain each month for a period of 18 months. None of the ships carried war material exclusively, because legitimate cargo was necessary to disguise the arms and because Spain needed other supplies in addition to war materials. Half or more of each shipload was food, clothing, medicines, fuel oil or transport trucks. The remainder consisted of ammunition, arms, tanks and planes. Of major importance was the Soviet inspired International Brigade formed of volunteers and army unit leaders from countries around the world. The Soviet Union formally took no other direct part in the war.

By International Law, the government of Spain held the right to buy arms and military supplies from the world market. On the other hand, the rebels -- being against a legally-constituted government -- had no such right. Despite this situation, twenty-five nations subscribed to a policy of non-intervention in this civil war. However, neither the Germans nor the Italians paid any attention to the law or the non-intervention policy. Both nations openly delivered materials to the rebels. In August 1936, the Non-Intervention Committee (NIC) was formed as an instrument to permit intervention in the name of non-intervention, thus avoiding a

confrontation for which no country was ready. For some months, the NIC discussed a neutral land/sea patrol. They initiated an international blockade of Spain in April 1937 whereby the German and Italian navies would patrol (as "neutrals") the Republican coast. British observers were also stationed on the French and Portuguese land frontiers.

### Unidentified Submarines

Beginning in late 1936, and continuing through most of 1937, "unidentified submarines" torpedoed neutral merchantmen in the coastal waters of Spain, in the Western Mediterranean and as far east as the Aegean Sea.<sup>1</sup> In the course of April and May alone, approximately thirty-five neutral ships of British, Greek, Danish and other nationalities were torpedoed and sunk.

In December 1936, the Soviet merchantman "Komosomol" was sunk in the Mediterranean by a torpedo. Later that year, two more Soviet ships were torpedoed and sunk: the merchantman "Tuniyaev" at Algiers on its way to Port Said on August 30th; and the Russia steamer "Blagaev," sunk off Skyros on September 1st.<sup>2</sup> The Soviet Union reacted quickly to the loss of its shipping. A formal protest was sent to the Great Powers of Europe accusing the Italians of using their submarines against neutral shipping.

At that time, it was difficult to place blame because the sinkings were made by submarines or by unmarked airplanes, but it is now known that the attacks were carried out by the Nationalists and Italians to cut down shipments to Republican Spain and to stop Russia from sending aid.<sup>3</sup>

The submarine attacks had the desired effects. Foreign trade was reduced considerably, and the Soviets became more and more fearful of losing their none too plentiful merchant marines and of becoming too deeply involved in a crisis over the sinkings of their ships.

The British Government, despite the losses in shipping, was unwilling to initiate positive actions to stop the destruction of its own merchantmen, let alone those of its allies. It is important to remember that the British Empire at this time possessed a most formidable navy.

The only time the British Government was stirred to take action to stop the brazen attacks by Italian submarines and bombers against British and other ships in the Mediterranean came in September 1937. British Charge d'Affaires, Anthony Eden, forced the reluctant Chamberlain government to take a determined position in this matter. The British Cabinet decided it was necessary to reinforce their naval forces in the Mediterranean. At the same time, French Foreign Minister, Yvon Delbos suggested all the Powers bordering on the Mediterranean hold a conference in Nyon, Switzerland to take joint action to ensure the safety of ships from such attacks. When the invitations went out on September 6th, twelve countries had been invited to attend. The countries invited were the six Mediterranean countries of France, Italy, Yugoslavia, Albania, Greece, and Egypt, along with Great Britain, Germany, Rumania, Bulgaria, Russia and Turkey.

#### Nyon Arrangement

From that conference which began on September 9, 1937 came the Nyon Arrangement, an "international agreement for collective measures against piratical attacks in the Mediterranean by submarines."<sup>4</sup> This was one of many agreements since World War I directed at the control of submarines in times of peace and war. The main features of the plan were designed to solve the problem of "piracy" by destroying any submarine found attacking shipping, or even suspected of such an attack if found in the vicinity of a torpedoed ship. Under the arrangement, Great Britain and France were to cooperate in patrolling the sea lanes from the Dardanelles and Suez to Gibraltar and from North Africa to

France. Second, the participating Mediterranean countries, with the exception of France, would patrol their own territorial waters and would aid each other, England and France if called upon. Third, it was agreed that Russia would not participate in the Mediterranean patrol. (This aspect of the arrangement was welcomed by Russia at the time because the Soviets had just embarked on their naval rearmament plan and were in no position to provide any great number of ships for the patrol.) Fourth, it was agreed Italy was to be invited to join in the patrol of the Mediterranean. Fifth, if piracy ever spread into the Black Sea, then the Powers bordering that sea would carry the responsibility of cooperating among themselves to stop it. In addition to these features, the plan also called for a surface ship to accompany each submarine entering Mediterranean waters.

By September 17, the Nyon Arrangement had been accepted and Italy was considering adoption of the plan. Following brief negotiations between the Charge d'Affaires from England and France with Italy's Foreign Minister Ciano, Italy agreed to accept the Nyon proposal, and consequently, the Italians sought to share in these Anglo-French anti-submarine patrols in their "mare nostrum." "Pirate" submarine attacks ended.

Other than being an interesting historical incident, why is the Nyon Arrangement important to naval leaders, particularly to those responsible for submarine operations? One reason is that this treaty marked the beginning of naval cooperation and communications between countries such as France and Great Britain. Another significant fact is that Nyon is one of a train of agreements and protocols which over the past 45 years has been directed specifically at the control of submarines in the performance of their assigned tasks.

Such international restrictions will continue to develop over the years ahead, especially as the

control of the seabeds moves toward reality, and as at-sea tactical and strategic nuclear weapons become increasingly important and prevalent. Indeed, as nuclear cruise missiles go to sea and their targets are over the horizon or land-based, it would appear that the attention of nations will begin to concentrate on past and newly legislated international law, agreements and protocols to inhibit weapon use from submarine platforms.

In summary, the Nyon Arrangement was a minor agreement alongside other treaties of that time. But, it is significant that the Nyon Arrangement forms one link in a chain of agreements binding the use of submarines. With that in mind, submarine leaders must carefully assess in times of peace their planning and tactical schema in the grand strategy of crisis and war, lest the submarine sword remain sheathed when most needed.

Dr. Jon L. Boyes, Vice Admiral, USN (Ret)

#### Footnotes

1. Gabriel Jackson, The Spanish Republic and the Civil War, 1931-1936 (Princeton, New Jersey: Princeton University Press, 1965), p. 424.
2. Hugh Thomas, The Spanish Civil War (New York, New York: Harper & Brothers, 1961), p. 475.
3. "Two of those Italian submarines were formally transferred and paid for, to Spain, with the names of 'General Mola' and 'General Sanjurjo,' and sailed under the Spanish National Flag with Spanish Commanding officers and crews cooperating in the blockade of the Republican coast." In a letter from CPT Jose L. Fauste, Spanish Navy, Embassy of Spain, Washington, D.C., 11 August 1983.
4. "The Nyon Arrangement," League of Nations Treaties Series, 181 (1937), 135-140, 149-153.

LEGAL COMMENTS ON "PIRATE SUBMARINES  
AND NON-INTERVENTION"

Some brief comments on particular aspects of ocean law raised in the article might be of interest to the reader.

The word "piracy" in popular usage covers a great variety of activities. Its use in the period of the Spanish Civil War, moreover, reflected that tendency. But in fact and in law, piracy is restricted to illegal acts of violence committed for private ends of the crew or passengers of a private ship against another ship on the high seas. In the Spanish Civil War, the submarines in question were unquestionably not privately owned or privately operated nor did they conduct their attacks for private ends such as the obtaining of wealth, etc. Thus, the torpedoing of ships during the Spanish Civil War were not acts of piracy but acts of war committed by the submarines of a belligerent against the merchant ships of other states.

To sink a ship, with torpedoes or otherwise, is an act of war. If such a ship is not flying the flag of a belligerent, it still has however a right to react in self-defense. The right of self-defense was obvious when British, Greek, Danish or Soviet merchantmen were sunk. In exercising that right, non-belligerents may respond on the high seas where the act or threat to the security of the flag state takes place. It follows then that any of the above mentioned states could have responded to the torpedoing of their ships by using force against the offending submarines, while maintaining their neutral status, since they would have met the two tests of (1) whether the act was a threat to their security and (2) whether the measures to be taken to repel the threat were reasonable and not beyond the limits of the threat being dealt with.

In regard to the conduct of submarine warfare, submarines are entitled to take full advantage of

their ability to strike warships without warning using stealthy, submerged approaches. The sinking of commercial ships, however, raises some difficult questions.

Although maritime warfare directed against commerce is legal, certain means of pursuing it are illegal. In particular, Germany's practice in both world wars of setting up large operational zones and then making submarine attacks without warning on all vessels neutral or otherwise found in those zones was widely condemned. In the Nuremberg war crimes trials, Admirals Erich Raeder and Karl Doenitz were convicted of violating International Law in this respect. On the other hand, the unrestricted submarine warfare against an enemy's merchant marine, practiced by the Axis and Allies alike in World War II, as a violation of International Law, is still an unsettled point. This practice was complicated by the fact that merchant vessels were armed, convoyed, and ordered to fire upon or ram submarines on sight. Furthermore, almost all nations integrated merchant vessels into the warning net of naval intelligence. These acts seemingly caused merchant vessels to be treated as warships and made them liable to attack without warning.

The new Law of the Sea Treaty of 1982 might also hold some implications for the operation of submarines under the high seas. Although the US is not a signer of this Treaty, 118 nations are. The force of this consensus could then possibly affect submarine operations particularly in the established exclusive economic zone (EEZ) 200 miles off the shores of coastal countries. In this zone, coastal states, while recognizing freedom of navigation might attempt to control the movement of foreign submarines as a pollution control measure to prevent damage to their economic resources within the zone. Similarly, coastal states might worry about damage to fish nets -- threatening their fishing industry, (an

economic resource). Although, no specific example of coastal state control of submarine movement in the EEZ has been evidenced to date, the possibilities generated by the Law of the Sea Treaty should be contemplated and appropriate counter actions readied.

---

ADDITIONS TO THE 1983 NAVAL SUBMARINE LEAGUE  
HONOR ROLL

Founders: Capt. L.H. Neeb, USN (Ret)

Skippers: LCDR Dural Browning, USN (Ret)  
Capt. George Martin, USN (Ret)  
VAdm. F.J. Harlfinger, USN (Ret)  
RAdm. F.B. Warder, USN (Ret)

Advisors: LCDR David R. Banner, USNR (R)  
Cdr. David A. Brown, USNR (R)

Associates: LCDR P.J. Keuhlen, USN

---

WHEN IS A "SMALL SUBMERSIBLE" A "WHAT?"

Having grown up as a Navy Junior, I cannot remember the first time I saw a submarine. It might have been an "S" Boat or an "O" or "R" Boat. All I knew was that I lacked the fortitude, guts and/or courage to even entertain the thought of

being a Submarine Officer. Fortuitously, my pre-mind-set may well have saved me from the embarrassment of being turned down or out of Submarine School.

Fate has a way of dealing with both semantics and cowards, for it turned out in later life that I would become intimately involved in "small submersibles," and worse, in the semantics of the words "small submersibles" vis-a-vis "submarines."

The first small submersible (in my definition of the term) I ever saw was operating in an abandoned quarry at Halldown, West Virginia. It was early 1963 -- now over twenty years ago. Bell Aerospace Corporation, my client, had bought the small submersible as part of an acquisition package.

In 1963 "oceanography" was becoming a "new kid on the block," and large companies were revving up to capitalize on this phenomena. Having a mind totally uninhabited by technical dogma (skills, aptitude, knowledge, ability, training and/or education; less gentle descriptors used by engineers and scientists to describe my degree of technical expertise), I had been forced to rely on attaining a reputation as a "doer." My approach was sort of "show me what you've got, and I'll figure out how to use it." Bell Aerospace, in their infinite wisdom, retained me to help exploit what they had.

One of the things Bell had was the first truly practical "cruising" small submersible, built by John Perry of Palm Beach, Florida and sold to the Bell subsidiary for \$18,000. It was not "small" in the sense an SSN is "small" compared to the SSBN "Ohio" class; or an old "S" boat to an SSN or the X-1 to an "S" boat. It was small -- 19 feet overall and weighing in at something around 1,300 pounds.

But, like a "submarine," it had a submersible hull, an engine (Sears-Roebuck), diving planes,

ballast tanks fore and aft and trim tanks fore and aft. Like the pre-guppies, it ran on batteries and had no snorkel.

Unlike a "submarine," it was a logistician's dream. It was conventionally transported over the ground on a small boat trailer, and at sea, on an "A" frame on the stern of a 40' trawler (or simply towed). The support requirements consisted of an air compressor and a battery charger. The latter has a very versatile piece of equipment which could plug into a 110 or 220 volt circuit or run on its own engine and cost, as I recall, \$189. These "rode" in the flat bed of the truck hauling the trailer.

It was also unlike a "submarine" in that the two man crew, riding in tandem, could see 360° around them and form a professional judgment as to what they saw. It happened that at Halltown, a flood light had been fitted to the bow (Perry built the boat with eighteen through-hull fittings -- a wealth of redundancy). It also had a television camera. Inside, a TV monitor had been mounted above the driver's head.

The Halltown Quarry varies in depth from 35' to 75' and was full of sudden drops and sudden rises (depending on one's course). A 2" thick cable had been laid helter skelter under the water, and the exercise was to determine whether the small submersible could trace the cable and inspect it foot by foot. A hard hat diver would have had a tough time doing that. The "Cubmarine" as the craft was called had no problems. Sure, they barrelled head-on into a couple of sudden rises, but a "roll bar" protected the light and camera. The third day, the learning curve between the passenger (who watched the TV monitor and conned the craft from the rear seat) and the driver was down to a rather consistent 70' to 90' per minute examination of the cable.

Then, of course, the "nay sayers" got in the act. They'd never been in the Cubmarine and yet knew all the reasons it was "just a toy," was

inherently "unsafe," and "had no practical use." Hell, I would guess the salaries of all these people could have bought fifty Cubmarines a year.

I cannot claim any credit for originality since John Perry and his employees as well as the Bell employees had fine, sound imaginations. They knew the limitations of the Cubmarine. They were only interested in its capabilities, and zealously in its safety. To this end, they had hired a totally professional "seaman" -- a DD skipper who had grown up "on deck" with cranes, hoists, compressors, battery chargers and a deep understanding of the unforgiving sea environment. To assure his attention to detail, he was always in the Cubmarine when it operated and always personally "put it in the water."

He knew the rules of free ascent. But he also knew his craft was pretty useless (save for a few meaningless exotic "instrumentation" experiments) unless he could see. If he couldn't see the bottom -- be there a well head, a cable, a practice mine, a sunken vessel, a geological discontinuity, a habitat, a lost torpedo or missile or whatever -- he wouldn't consider the job.

He was also "not tied only to the boat." If he thought it wise, he would work from a tether. Conventionally, he towed an antenna buoy so he could send and receive.

In short, he had a tool, more analogous to a two dimensional small work boat than a "ship," and only analogous to a "submarine" in that it could go underwater.

In our classic way of military analysis, the Cubmarine was as useless as teats on a bull. (Having never seen anyone analyze "small boats," the situation is clear).

Unfortunately, the Navy couldn't "Wilbur and Orville" Wright this kind of breakthrough.

Engineers unborn when the Wright Brothers flew at Kitty Hawk were incapable of setting their sights lower (in analogy) to a 747. "Push the state-of-the-art to its utmost!", is their creed.

So, the Navy has never learned what this kind of easily handled, easily supported small submersible could do. Instead of learning to crawl first, the Navy set its sights on the DSRVs in order to break the pole vault record. If it can't go to 3,000', 15,000', 25,000' or whatever, it isn't worth fooling with. Yet, 99 percent of the sea bottom -- tens of thousands of square miles -- at 100' have never been seen by man. It is a lead pipe cinch that it is orders of magnitude cheaper to look at sea bottom at 100' than at even 1,000'.

And that's exactly what John Perry did. Before he finally gave up on the Navy, he had built seven small submersibles that "went operational at a profit." I have no idea how many he has built since.

My "mind set" was "military." Hence, we operated with UDT swimmers, towing them faster underwater than they could hold on (so we slowed down); feeding them air from the air banks; "yelling at them" from inside the Cubmarine (they couldn't talk back, but could obey the instructions); and giving them electricity from the batteries to warm them.

The nay sayers said "nay."

We ran the mine detection and identification course at Panama City with 100 percent accuracy and in 1/8th of the "normal time."

The nay sayers said "nay." The hull was steel. Why not build one of aluminum?

We picked up torpedoes at 600' in Dabob Bay.

The nay sayers said "we must go the the Tongue of the Ocean."

We took NAVOCEANO employees and let them look at the broken AUTEK cables laid on a "slope" equal to the aperture angle of their fathometers, but really an over-hung cliff.

This shook the nay sayers so badly, they issued an order forbidding Navy personnel from riding in a Cubmarine on the grounds "it wasn't safe."

My reclama as to what depth was safe -- 100', 50', 10', or 6' was answered by "no depth is safe, period."

When Jon Lindberg swam out and then swam back into one of the first four-man submersibles at 1,400', the naysayers insisted that even 6' was not safe.

The "hang ups" were classical. First, not enough money was involved to titillate a GS-11 on his drive to fame and fortune. Second, the operating forces had no funds to experiment or learn the ropes. This left the idea to scientists and engineers dedicated to climbing Mount Everest and by-passing the foothills. Third, there of course was no "Operational Requirement" articulated in OPNAV; and hence, no "sponsor" to obtain money for a "claimancy" to spend. Fourth, there were the nay sayers who totally lacked the imagination to extrapolate capabilities in an orderly learning curve, and hence, unable to approve anything that didn't promise to be all things to all men.

The Navy did use a 600'-depth Cubmarine to help search for the H-Bomb off Palomares. The Task Force Commander gave it very high marks, and the logisticians were pleased that it was trailered out of its home plant in Florida to a C-130 cargo plane and delivered shoreside in less than two days from the opening request. Meanwhile, the Alvin and Aluminaut, the other two small submersibles available had to be readied for a long trip in an LSD. On site, the TF Commander thought it would take a cruiser to

handle the Cubmarine. A minesweeper did the trick. Operating from the shore to 600', the Cubmarine picked up several pieces of the aircraft, confirming the course during the crash phase. It did fail in one respect. For two of the days, it could not operate because of rough seas. The nay sayers were delighted.

It has been many years since I have had any contact with John Perry. However, his company is operational in several undersea product lines and services, mainly because the oil companies are "productivity oriented," and use what is available and assist in bringing new systems along.

Cowardly me had no problems riding a Cubmarine. As a reasonably good swimmer, I was not afraid of the risks from 0' to 100'. Observing the full scale pressure tank tests, I was confident that as long as the craft did not exceed 75 percent of its actual test depth, that it was reasonably safe. When the insurance companies, recognized that the craft never operated in waters exceeding the 75 percent test depth figure, they wrote very modest premiums for the Cubmarine and another confidence factor fell into place. Unlike a large submarine, the Cubmarine never operated in waters as deep as its crush depth.

Under the Navy's present RDT&E; Sponsor/Claimancy; and budgetary systems, I see no way the Navy will ever "learn by doing," with small submersibles. The support and costs of operating the highly sophisticated DSRVs are prohibitive, and they are, by definition, highly "mission oriented."

The viability of small, simple, "three dimensional whale boats" for Navy use should not remain fallow. The "art" is known and proven and can be easily "pushed" by putting seamen with basic mechanical, electrical and physics backgrounds in charge. "Let 'em play!" We built naval aviation doing just that.

Captain J.K. Taussig, Jr., USN (Ret)

Speech by  
Admiral James D. Watkins  
Chief of Naval Operations at the  
Launching Ceremony of the Hyman G. Rickover  
(SSN-709)  
27 August 1983

#### ADMIRAL RICKOVER'S CHOSEN COURSE OF EXCELLENCE

On this special day, I would like to share with you a story of an ancient philosopher who came to a city, determined to save its inhabitants from sin and wickedness. Night and day the philosopher walked streets and haunted marketplaces. He preached against greed and envy; against falsehood and indifference. At first people listened and smiled. Later they turned away; for he no longer amused them. Finally, a child asked, "Why do you go on? Do you not see it is hopeless?"

The man answered, "In the beginning, I thought I would change men. If I still shout, it is to prevent men from changing me."

This is a story that Admiral Rickover tells -- and has used in many speeches. It is the timeless story of a visionary man who perseveres, who does what he knows is right; story of a teacher, who desires to impart his knowledge to others; a story of courage, the search for excellence, the use of every skill and god-given capability that one man possesses; it is the Admiral Rickover story.

I speak from personal experience, for I am one of his students. And there are others here today who have come to share the honor of observing this historical event. Military and civilian -- active duty and retired -- these students of Admiral Rickover come from the ranks of the former Atomic Energy Commission, Naval Reactors Directorate, both Houses of congress, and from the nation's scientific and engineering

communities. While their backgrounds are varied, they share one thing in common -- they are all better human beings because he taught them to strive for excellence and not settle for mediocrity. They know, because he taught them; intellectual integrity, technical honesty, sound analysis, and courageous decisions are essential ingredients in managing the development of technology.

These are the qualities often overlooked by the sensationalist or gossip who watches the Admiral from afar -- who has no direct linkage; who speaks of personal-interview folklore; who feeds on and reproduces rumor ever more exaggerated with each one-sided source input. These people miss the mark. They do not begin to understand the depth of this brilliant American, his dedication to American ideals, his quest for excellence in himself and others, his undaunted spirit.

Even biographical summaries found in the libraries of the world only tell part of the Admiral Rickover story. While properly crediting Admiral Rickover as the father of the nuclear submarine, these accounts still miss the mark. An engineer, educator, patriot and critic, Admiral Rickover's range of interests and knowledgeable teachings have run from conservation of our natural resources to the study of ethics and morality.

Admiral Rickover has said that "One must learn to reach out, not to struggle for that which is just beyond, but to grasp at results which seem almost infinite."

Reaching for the infinite -- that aptly describes much of Admiral Rickover's work as a teacher. Thirty years ago, the Admiral reached for the infinite when he envisioned the warfighting potential of the nuclear submarine. Because of his perseverance, and despite many others who were doubting and narrow-in-vision, our Navy is the world's foremost source of

knowledge in design, construction and safe, efficient operation of nuclear power plants.

Last month I had the chance to visit USS Nautilus, now readied at Mare Island naval shipyard for delivery to her memorial home in Groton. As I walked through that submarine, I was reminded of how revolutionary she was back in 1954. With Nautilus, we slipped the confines of having to surface frequently to recharge our batteries and refresh our air supply. We were able to stay submerged and run at high speeds almost indefinitely. That marked a watershed in submarine development and the beginning of a revolution in strategy and tactics. USS Nautilus was the first true submarine.

This success story goes back even further, to the 1940s when few were enthusiastic about nuclear power and many thought it outright impossible. So it took a visionary to circumvent the ever-present naysayers and get this program going. Against all odds, Admiral Rickover proved that nuclear power could be safely used, both in shipboard propulsion and civilian power-generation applications.

Admiral Rickover knew that investments in proper design, quality control in manufacturing, and excellence in training were prerequisites for safety and success. He recognized that if you pay now for quality assurance and environmental protection, you avoid paying later in potential environmental damage, tragic loss of life and prohibitive remedial costs. While others looked for short cuts, Admiral Rickover insisted upon establishing his standards of performance -- with checks and balances, concern and quality, and extra care that have become the hall mark of our navy's nuclear power program.

From the very beginning, Admiral Rickover was particularly concerned about safety -- it was a fundamental consideration in every facet of his program. The Admiral has testified repeatedly,

"Where radiation is involved, we are dealing not just with the lives of present-day individuals, but with the genetic future of mankind." From the beginning he designed each nuclear ship with the thought that his own son would be a member of the crew.

Long before environmental impact statements were even thought of, Admiral Rickover was concerned about man's ability to properly use new technologies, hailed as advancements, and what long-range effect they might have on our environment and our children's children.

The teacher also knew that the vital link in any technological advancement was the human element -- could people be trained to safely operate and use what scientists and engineers produced?

Many others failed to understand what Admiral Rickover already knew -- it is the quality of people that makes the difference. An engineering system could be designed perfectly, but still it could be made to fail, if those required to operate it did not understand and respect every theoretical and practical aspect of what they were doing.

Because the Admiral understood human significance in the equation, he did not produce technocrats alone. Instead he developed the Navy's nuclear power program around a solid core of dedicated individuals who showed the same care, understanding and quest for excellence. The crew that stands aboard the ship we launch today is a legacy of that philosophy.

This philosophy led the Admiral's searching mind to question the very capability of our national education system to give him the raw material he needed to successfully operate the nuclear power program. When he saw just how weak our nation's educational standards were, he put his energy and drive toward correcting the

discovered inadequacies. Not only did he build his own schools and trainers in the navy to do what had to be done, he embarked on a one-man campaign to improve the educational system throughout the country.

Let me quote Admiral Rickover: We need "To develop to the utmost our human resources -- the minds of our young people. They will need far more highly trained minds than the ones we now get by with in order to cope with the poorer and more crowded world we are bequeathing to them."

That was written by the Admiral over twenty years ago. Yet it still encapsulates a driving motivation in his life which may well surpass all others in intensity -- the proper education and training of our young people.

Admiral Rickover also wanted each of his students to make full use of their God-given talents to do the job right. He knew that all too often the mediocre and status quo were the world's standards of performance -- not the exceptional and the excellent. He acknowledged that success was only possible with hard work and heavy sweat, reminding his students that the hard-fought is the sweetest victory of all.

Individual responsibility for excellence is a central philosophy of his life. He incorporated this belief into the very organization of the naval reactors directorate which he founded. When the rest of the navy -- and government -- were rushing off to reorganize and build large bureaucracies, he fenced off his own organization to insure against obfuscation of individual responsibility and accountability. He has always been fully accountable for his actions, first and foremost, to himself -- the toughest judge of all.

He also championed the cause of not cheating the taxpayer out his his tax dollar, long before

"fraud, waste and abuse" became Washington buzz-words. He was concerned not only with blatant subterfuge and outright evasion of the law by industry, appointed officials and government employees, but also with attempts to circumvent established practices of responsible behavior. He did not subscribe to the Roman maxim caveat emptor, let the buyer beware, but believed that everyone had a moral and technical responsibility to provide a quality product -- whether it was a piece of equipment from a manufacturer or the day-to-day performance of an employee, nobody should cheat the taxpayer.

His efforts in this area were recognized early by some of the military's toughest critics, like Senator William Proxmire, who has said that Admiral Rickover is a "National Treasure" because of his tireless protection "of the taxpayer."

Admiral Rickover's visionary teachings and leadership have set tone and pace for a wide variety of vital initiatives, which improved the quality of our Navy's overall warfighting capabilities. Many of the Admiral's doctrines, first strongly opposed, are now accepted standards throughout the navy. Why? Because they work and they're the right thing to do.

The legacy of superb performance continues today. Since Nautilus first put to sea in 1955, our nuclear-powered ships have steamed over 55 million miles and have accumulated over 2,600 reactor-years of operation. Further, in the 30 years since the Nautilus land prototype first operated -- and with 127 nuclear submarines, 4 nuclear carriers, 9 nuclear cruisers, a total of 170 reactors in operation today -- there has never been an accident involving a nuclear reactor, nor has there been any release of radioactivity which has had a significant effect on our environment. To date, almost 60 thousand officers and enlisted men have been trained in this program, all striving to meet that Rickover mark of personal excellence.

The Admiral often talks about the proper utilization of our limited national resources -- human, financial and natural. It is appropriate then, to name this submarine after the Admiral, for his teachings of properly using our resources to the fullest are embodied in this submarine and her sisters. This is today's most quiet -- most "stealthy" -- most sophisticated submarine; this submarine is the result of applied knowledge, which produced solid, well-designed and tested engineering systems; this submarine has the Admiral's concern for system reliability, redundancy and simplicity, built in as standard equipment, not as options; and the crew of this submarine will reflect the Admiral's reliance upon well-trained people who use their full potential.

This submarine and the fine crew that will take her to sea are symbolic of a much larger group of submarines that already bear that unique mark of Rickover excellence. They will be the principal determinant of victory during any protracted war at sea.

It is difficult to properly honor Admiral Rickover for what he has accomplished. This same problem confronted the Admiral's headquarters staff at Naval Reactors. They wondered, "What type of recognition do you give a man whose service performance has transcended all others? How do you honor a man after 64 years of active duty service who already has 15 honorary degrees? Who has won over 60 different awards, including a Presidential Medal of Freedom and a Congressional gold medal?

What you give him is a special, very personal gift that shows your respect for the man. To do that, they chose to support Eleanore Rickover's work as a member of the Board of Hospice of Northern Virginia. Eleanore, our lovely sponsor, is not only a hospice board member, but is also an active volunteer, caring for the terminally ill in the hospice as well as in their own homes.

The staff raised over five thousand dollars for the hospice. This loyalty, commitment and compassion in his staff tells more about Admiral Rickover and his life's accomplishments than any other biographical footnote. This honors him and his wife better than any other type of special award or recognition.

It is an "Admiral Rickover Story" such as this, which best tells about the man and his life. This is a story about undaunted spirit, Diogenes-like intellect, an untiring man who is seeking excellence and takes individual responsibility for each and every action. It is the story of a patriot; the story of a winner who values the proper development and education of our young people because he knows that each American can only be a full partner in citizenship, if he or she has the knowledge and determination to seek such a partnership. That is the real Admiral H.G. Rickover this new submarine represents.

So this is an important day, not only for Admiral and Mrs. Rickover, not only for our nation and navy, but for the many students of the teacher who have come to know the true Admiral Rickover story -- and this submarine will serve as a constant reminder of that story.

It was the Admiral's demanding leadership; his technical wisdom and engineering foresight; his frank and knowledgeable discussions with our nation's elected leaders; and his consuming pursuit of a strict adherence to standards of excellence, that has given this nation a nuclear navy second to none. Without this man's contributions, Nautilus' famous "Underway on Nuclear Power" would probably still be an unfulfilled Jules Verne vision.

Thank you for coming today and helping this talented navy crew take the initial step, on their long journey, into the deep. God Bless.

## MUSASHI AND SUBMARINE ANTISHIP MISSILES

In reading "A Book of Five Rings" by Miyamoto Musashi, a seventeenth century Japanese samurai, it seems apparent that his strategy for the use of weapons has application to today's submarine launched antiship missiles.

Musashi noted that despite several thousand years of armed combat and changing weaponry:

"There should be no such thing as 'this is the modern way to do it'."

In effect, he said that his techniques for fighting were as applicable to our times as they were for the warrior of his day -- armed with two swords, a long and a short. "Know the advantage of both swords", he emphasized. As translated for today's warriors:

"The long sword (missile) should be used broadly, the companion sword (torpedo) closely."

Moreover, Musashi argued that:

"The long sword is the basis of strategy and masters of the long sword are called strategists, those who reach out."

At the same time, he wrote that:

"The best use of the companion sword is in a confined space."

Today's long sword -- the antiship missile -- would be worrisome to Musashi for its great complexity and its high cost with a consequent shortage in supply for war. However, he would be pleased with its great standoff range, its stealth and its capability to home on an enemy target and to counter the enemy's efforts to avoid being hit.

Since submarine antiship missiles have yet to be used in conflict, the strategy for their use can only be gleaned from writings about the various missiles available. Some of the unclassified descriptions of probable missile employment may be in error but still there seem to be certain techniques which Musashi, if he were living today, would red-flag. And there would probably be some recommendations he would make to optimize their effectiveness.

### Trajectory

The sea-hugging flight path of the antiship missile and its very small frontal radar cross-section -- "which gives a radar return of little more than that from a wet bird" -- provide the missile with great stealth. Its closeness to the sea makes it difficult for a target's fire control radars to dig the missile's echos out of sea return. Hence, defensive measures are not likely to be activated in time to prevent the missile from hitting. Additionally, the missile by using frequency-agility in its terminal homing radar tends to provide a counter for enemy efforts to jam or spoof the missile's radar.

These qualities, in Musashi terms, should provide "an attack without warning where the enemy is not expecting it". Yet a published diagram of the trajectory of this sea-hugging weapon seems to believe this. The missile has a flight path "only a few meters above the waves", until it is at a distance just beyond the range of acquisition of the target's radar. At this point the missile is shown to pop up for a "look" at the target in order to obtain a range. The missile then goes back down for a low run-in until several miles from its target, when it again pops up in order to dive into the target at a sharp angle.

Musashi insists upon "attack in an unsuspected manner". He would strongly reject standing up and peering around -- in view of the enemy. He would also reject a later dashing out of his cover

while still a goodly distance from the enemy. That would subject him to a shower of arrows and a barrage of spears.

Why then are today's antiship missiles programmed as described above?

### Weapon Lethality

The argument for the pop-ups is to give the weapon a means to supposedly maximize the destructive effect of its warhead. By diving into the target, the missile's armor piercing, high explosive warhead with its delayed action fuze, explodes deep inside its target. This seems to be consistent with Musashi's, "Be intent solely upon killing the enemy". But Musashi's philosophy for use of the long sword calls for "cutting the enemy to kill him". Only when the enemy is overcome does he recommend the thrust -- a stab at the heart. He eschews directing the long sword towards an enemy's vital organ in order to destroy him outright. Rather, Musashi prefers the use of simple sword cuts directed at wide areas of the body where contact causes his enemy to be incapacitated and bleed to death. This sword strategy appears to be confirmed by the Exocet sinking of two ships in the Falklands War by the fires created. The Battle of Midway also reinforces the lethality of fire as against explosive damage. Whereas the U.S. sank four Japanese carriers with fragmentation bombs that barely penetrated their flight decks, the fires created caused their destruction. On the other hand, although the Japanese obtained as many bomb hits in U.S. carriers they found that their armor piercing fuze-delayed bombs while exploding deep in the vitals of the carriers, did not prove fatal. (A U.S. carrier eventually went down, but it was sunk by submarine torpedoes.)

Since the lethality of the warhead in today's missiles is considered questionable, damage resulting in a "mission abort" as opposed to a sinking is, in some quarters, considered

acceptable. But to Musashi who stressed killing his opponents, this would be unacceptable. The proposal to have the missile enter the water short of its target and explode just under the ship's keel to insure a sinking would also probably be rejected by Musashi, who stated that:

"The great virtue is simplicity."

(It should be noted that the effectiveness of an explosion under the keel of a ship is critically dependent on placing the warhead within a space of only a few feet below the ship's bottom. Since submarine skippers in World War II were off by a margin of over 50% in their guesses as to the size of ships when viewed through the periscope, estimates of ship drafts and hence depths for today's missile warheads to explode, would likely be too far off to get desired results.)

### Targeting

Targeting of antiship missiles against distant ships is a primary concern of submariners today. On the one hand they see a peacetime need for keeping track of a vast number of ship targets by means of a multi-faceted ocean surveillance system so as to be able to attack specific enemy ships if war is pre-empted -- or to counterfire if put under missile attack. On the other hand, in ongoing war it is felt that much of the ocean surveillance system would likely be destroyed or neutralized quickly. Submariners would then be either forced to rely on solely onboard sensors for targeting their missiles -- or have external sources (aircraft, satellites, SOSUS, etc.) provide targeting data on a piecemeal, far less reliable basis.

Outlaw Shark equipment has been developed for the peacetime data handling and display of the positions of potential enemy ships as well as other ships whose positions must be known so that they are not inadvertently attacked when missile fire is commenced. But Outlaw Shark is designed

for pre-empting a conflict, not to respond to an enemy's pre-emption. Firing missiles back at a fully alert pre-empting distant enemy is seemingly a sure way to waste weapons. Thus if the U.S. doesn't contemplate pre-empting a big war at sea, then Outlaw Shark is apparently overdesigned for submarine needs. Moreover, the described method for targeting a submarine missile in war presumes such a sparsity of target information -- which is likely to be an order of magnitude less than in peacetime -- as to question the need for a system as complex as Outlaw Shark.

Targeting consists of an enemy ship located by a single observation at the time of missile launch. This causes the target to be merely a point on the seas with its course and speed usually unknown -- and with a high probability that both could change very quickly. The launched missile is directed towards the located point where the enemy ship was observed, not where it is likely to be on arrival of the missile. This is occurring while the area of uncertainty in target position, created by the assumption that the target could be on any course and at top speed, is growing proportionally with flight time. Even the wide-angle sweeping seeker in the missile's nose quickly fails to cover all possible positions of the assumed freely-maneuvering ship. If the combat range to such a target is 25 miles, the missile's seeker should pick it up, but at about 100 miles the area to be terminally scanned is already over 500 miles square, for a submarine missile of .9 mach speed. Thus, against a freely evading "point target", when the combat range is over 100 miles, it is considered necessary to program a missile to commence a broad area search pattern as it nears the located point, in order to "find" its target.

Submariners who have known combat recognize that all targets fired at were tracked targets. Several observations were invariably used to determine the course and speed of each target. Even stopped targets were so verified with

several observations. Targeting was no instantaneous matter, and could stretch out over a period of days. Why then must the long range firing of missiles be a hurry-up affair? Musashi says:

"If you try to wield the long sword quickly, you will mistake the Way (of strategy). If you try to cut quickly, you will not actually cut even a little."

Equally incomprehensible is the use of a firing solution which is so vague that the missile is forced to use a search pattern which tends to alert its target and cause the costly weapon to be wasted. By so using the missile, efficient salvo fire seems also precluded. This denies the principle of "massing" to overcome a strong enemy. In Musashi's terms:

"The essence of strategy is to fall upon the enemy in large numbers."

The point being made is that for long range targeting of missiles, several observations should be used to establish the track of an unalerted target and permit a directing of the missile towards a point of interception. In the case of a group of ships, Musashi's advice applies:

"It is difficult for large numbers of men to change positions, so their movements can be predicted."

### Identification

Another oddity described in the use of antiship missiles is the need for positive identification of any target being fired at.

Positive identification of a target in war from a single observation, such as a radar satellite's contact on a target emitting an identifiable radar signature or an infra-red imaging and ranging

(I<sup>2</sup>R) detection by an aircraft would only be tenuous at best. A visual sighting by a submarine stands a better chance, but World War II submarine experience showed how difficult it was to positively identify a ship target even when observed closely from short range and over a considerable period of time. Musashi in battle would have the same sort of problem in identifying his enemies.

What do these concerns suggest?

The warrior recognizes that certain problems are endemic to battle -- identification of the enemy, lethality of weapons, sparseness of targeting data, disruption of communications, inadequate response to surprise attack, etc. Hence there should tend to be no absolute weapon solutions which are designed for or practiced. All that Musashi can recommend is:

"You must practice diligently in order to understand how to win."

Unfortunately, the high cost and short supply of the long range missile precludes very much operational practice, but other means have to be used for training.

Perhaps of greatest concern to submariners is the frittering away of the element of surprise inherent to the antiship missile through overly complex tactics. An electronics-dependent weapon is highly susceptible to being countered by EW measures, hence surprise in missile attack is at a premium. The great covertness of present day submarines should not blind its submariners to the need for covertness in his weapons as well. Lacking surprise in missile attack, there should be a saturating of enemy defenses through the use of massed weapon power. Salvoes of considerable numbers of missiles arriving near simultaneously provide this.

The submarine antiship missile is a superb weapon with wide flexibility in its use. Musashi would relish it. He would also seek to perfect the strategy for its employment. But how, seems to require further thought -- and exercises, to determine a best "Way."

R.R.R.F.

---

### THE U.S.S. BOWFIN MEMORIAL

The dedication and fervor of submariners in providing a memorial to the submarines and submariners lost in World War II is no better illustrated than at Pearl Harbor. There, the Pacific Fleet Submarine Memorial Association sponsors the USS BOWFIN Submarine exhibit and the adjacent BOWFIN Park. Both are close to the Arizona Memorial Visitor Center and enjoy its patronage.

Since April of 1981 over 400,000 visitors have viewed the U.S.S. BOWFIN Memorial, with a present flow of over 12,000 per month. Proceeds from admissions to the submarine are used by the Association for restoration and maintenance of the BOWFIN as well as landscaping and beautification of the BOWFIN Park alongside.

The BOWFIN was well chosen to represent the U.S. submarines that fought against the Japanese. Its war record was the envy of all submariners fighting in the far Pacific and particularly those who operated out of Freemantle. We would bid the BOWFIN "good hunting" as she headed out on patrol, and then we'd see her return with a new string of battleflags, even before our submarines had completed their refit. Admiral Ralph Christie

(now appropriately on the Advisory Group of the Association), then in charge of the Fremantle based submarine force, recognized the amazing capability of the BOWFIN's skipper, Walt Griffith, to find ships quickly and get rid of all of his torpedoes, and he wanted the experience of being "at the front" and seeing what it was like. So he boarded the BOWFIN at Darwin after she'd returned there from her 3rd patrol for a quick reload. That was after only 14 days on patrol. Admiral Christie figured he could make a quick run with BOWFIN and be back at his desk before his boss, Admiral Kinkaid, was aware that his underling had abandoned his headquarters in Perth. Out the BOWFIN went for a 4th Patrol from Darwin, and nine days later dropped the Admiral off at Exmouth Gulf for a quick flight back to Perth. All 16 reload torpedoes had been fired and two big ships had been sunk. Admiral Christie was reportedly shaken by the violence of the surface actions, the last of which had the escorting Japanese ships firing at BOWFIN with all the guns which they could bring to bear. The Admiral admitted he was glad to "clear the bridge" and leave Griffith up there alone to conn BOWFIN out of the melee.

Rear Admiral Jack Barrett, USN (Ret) the Senior Vice President of the Association, reports that their capital debt has been reduced to \$135,500 as of 28 February 1983 and that it is being reduced at a rate of almost \$9,000 per month. But, he notes, there will be a need to accomplish major work in the future with an attendant significant cost and loss of daily visitor revenues. Barrett offers his personal assistance during visits to Hawaii for any members of the Submarine League. He adds an aloha from the Hawaiian submariners to the officers and directors of the Submarine League.

## WEAPONS AND SUBMARINES IN ANTI-SUBMARINE WARFARE

Every weapon system experiences a natural rhythm in development. Military historian J.F.C. Fuller in his Armaments and History refers to this phenomenon as the Constant Tactical Factor which is described as follows:

"Every improvement in weapon-power has aimed at lessening the danger on one side by increasing it on the other. Therefore, every improvement in weapons has eventually been met by a counter-improvement which has rendered the improvement obsolete, the evolutionary pendulum of weapon-power, slowly or rapidly, swinging from the offensive to the protective and back again in harmony with the pace of civil progress, with each swing in a measurable degree eliminating danger."

Our post-World War II decision to redirect attack submarine development to the anti-submarine warfare task represented a major step toward reducing the danger of the submarine in the hands of an opponent. This development cycle was kicked off more than thirty-five years ago. If our future decisions with respect to submarine weapon systems and tactical development are to continue to yield reduced danger, it is essential that we sense the rhythm of development and counter-development.

Before launching off into the specific development rhythm associated with the ASW submarine weapon system, it is essential that we establish a working vocabulary which may be used in discussing weapon systems. J.F.C. Fuller helps us through this step as well. He finds that the bulk of all weapons may be classified as "shock" weapons or "missiles". These two classes are distinguished by their roles. Shock weapons are used for in-fighting, while missiles are used for out-fighting. Early examples of shock weapons

include the club, mace, spear, lance, sword, axe, pike, and bayonet. Early missiles include the pebble, javelin, arrow, bolt, ball, bullet, bomb, and shell. Today, the complementary roles of in-fighting and out-fighting remain; however, the weapons employed include short range missiles and long range missiles. For the purposes of this discussion, we will refer to the complementary nature of in-fighting and out-fighting weapons rather than shock weapons and missiles.

Fuller considers the powers and limitations of individual weapons in terms of the following:

"(1) Range of Action; (2) Striking Power; (3) Accuracy of Aim; (4) Volume of Fire; and (5) Portability."

From his analysis he has concluded that range of action is the dominant characteristic. In his words:

"The dominant weapon is not necessarily the more powerful, the more accurate, the more blow-dealing, or the more portable; it is the weapon which, on account of its superior range, can be brought into action first, and under the protective cover of which all other weapons, according to their respective powers and limitations, can be brought into play."

In reflecting upon the past thirty-five plus years of submarine weapon development, the pattern is quite clear. The United States has concentrated on establishing and retaining an effective out-fighting capability. This requires the possession of a weapon of superior range, the dominant weapon. The foundation for such superiority lies in a sonar figure of merit advantage which can translate into first detection, first target classification, and first attack. In the family of conventional (non-nuclear) weapons, the dominant weapon today is

the acoustic homing torpedo. The acoustic homing torpedo is amenable to extended range delivery with an added missile stage.

Applying the concept of the Constant Tactical Factor, it would be safe to assume that any submarine force responding to U.S. developments would establish the following priorities: (1) deny the U.S. an effective out-fighting capability by defeating the acoustic homing torpedo; (2) prepare to excel at in-fighting; and (3) explore options to improve an out-fighting capability. The first two are of special interest.

The first priority of an opponent responding to U.S. ASW forces in general and U.S. submarines in particular is seen to lie in the defeat of the acoustic torpedo. The acoustic torpedo is fundamentally an intelligent, complex, and slow weapon. It is complex because it must replicate the functions of a submarine combat system in a compact, automated package. Low speed is consistent with the need to collect target intelligence in a high drag medium - water. One might seek to counter this dominant system by neutralizing its warhead, the weapon, and/or its launcher. Clearly, actions taken to neutralize the warhead would appear to be measures of the last resort; however, most mature weapons systems allocate resources for precisely this function; i.e., armor protection in one or more forms. This adds to the burden placed on the weapon to transport more explosive and/or to place the warhead more selectively. The name of the defensive game is to shift the burden back through the weapon to the launching submarine.

The burden placed on the weapon itself can be further extended by passive and active counter measures embodied in the target submarine. The passive measures would focus on minimizing the detectables sought by a homing weapon. These measures would include quieting and the reduction of active target strength. Should the target submarine be alerted by an incoming weapon, it

may deploy its counter-measures and judiciously select speed, depth, and maneuvers, for evasion all within the context of the local operational environment. The net result of such steps may lie in forcing the attack submarine to place the weapon more precisely at closer range and/or to launch more weapons.

At this point, the attack submarine, which wishes to remain a specialist in out-fighting, must use its existing combat system with great skill. It also needs continuing advances in target detection, classification, and tracking. In this case, the attack submarine faces two opponents: the target submarine and the environment. Additional target quieting and the inherent constraints of the underseas environment may bring this first evolutionary swing in the submarine ASW development cycle to an end.

If this hypothetical discussion of the swing of the ASW pendulum reflects anything close to the facts, the merging goal for the U.S. attack submarine forces must become the mastery of ASW in-fighting. The priorities in mastering ASW In-fighting are as follows: (1) the definition and development of an in-fighting weapon and supporting combat subsystem, and (2) consideration of those submarine characteristics most appropriate to in-fighting. It is only reasonable that changes in weapons should take place prior to change in ships. Once the properties of in-fighting weapons are better understood a more solid basis for adapting ship characteristics will emerge.

A swing in the development pendulum with respect to roles also signals a potential reversal in weapon and ship characteristics. For example, during our emphasis on the out-fighting role the dominant weapon evolved into an intelligent, complex, and slow weapon. There is good reason to forecast that the emerging in-fighting weapon will be fast, dumb, and simple.

The environment for in-fighting will be that of a "melee" wherein fast reaction time is fundamental; dumb weapons would not be distracted by extraneous activities, and weapon usage could be high.

While we can forecast the properties of an in-fighting weapon, anticipating the properties of a submarine effective at in-fighting is, without study, a matter of speculation. Certainly, effectiveness implies an ability to hit decisively, to avoid being hit by an opponent, and the ability to absorb a hit with minimal effect on performance. A submarine with low detectables remains desirable. However, from that point, there are a number of possible options. On one hand, one could envision a medium to large size submarine with a substantial fraction of its displacement dedicated to the protection of vital systems a la the battleship; or perhaps a small, highly agile vessel which would represent an illusive target in the spirit of the old torpedo boat. There are other possible approaches. While it is uncertain which option offers the most appropriate set of characteristics, it is certain that when the pendulum swings, in peace or in war, the Constant Tactical Factor will demand change. A specialist in out-fighting is not likely to emerge a winner if his opponent catches him up against the ropes.

J.S.L.

---

**SUBMARINE OFFICER CAREER OPPORTUNITIES  
(ISN'T THERE A BETTER WAY?)**

Many of today's top naval leaders are submariners. They entered the Navy during the decade following WWII and spent most of their first 20 years serving in and commanding submarines. Before entering the submarine service

they probably served in surface combatants. Then, following submarine command, they were eligible to serve in and command major surface units and forces. Indeed, our CNO--Admiral Jim Watkins--served as XO of cruiser following submarine command, and as a flotilla commander after achieving flag rank. Current and future generations of submariners, however, may not have this same career experience, owing to changes in personnel policies during the past 3 decades. For this reason and because of other fundamental changes in the Navy since WWII, it is likely that less future top-ranking naval leaders will have "cut their eye teeth" in submarines.

Avenues of opportunity leading to flag level command of combatant forces have been cut off. This change, along with the many demands on submarine officers and their continued shortage, will limit the opportunities for today's submariners to become the CINCs and CNOs of tomorrow. Whether this is in the best interest of the submarine force, the Navy, or the nation is a question deserving attention by our Navy's leaders as well as every naval officer who aspires to command at sea beyond submarines.

Submariners of the U.S. Navy have a proud tradition of outstanding service. Their reputation of excellence, established prior to and during World War II, remains solid today. This excellence is reflected in their philosophy of command, as in all other areas of submarining. It follows that the Navy and the nation would be well served to tap this reserve of top notch talent for use in the broader areanas of naval operations, strategy, and policy. Developments since World War II, however, will probably limit the opportunities for current and future submariners to qualify and compete for command-at-sea or top level policy making assignments outside of the submarine arena.

The major developments in submarining have been the transition from diesel to nuclear power

and the advent of sea based strategic nuclear weapons forces. Other significant developments cover a broad range of technological and tactical developments -- from much more capable combat systems to improved tactics for independent submarine operations, and a new concept of coordinated ASW operation with other naval forces. But the most significant developments have been technological in origin. Great emphasis has been placed on operations, training, and the management of personnel and material essential to maintaining the high standards of performance and conditions established for these programs.

The demands of these developments have been met. Today's submarine force is still the best, if not the biggest. And it carries a larger share of the national defense burden than it did three decades ago. During that time, however, other changes have occurred in and out of the Navy that will have a lasting impact on post submarine command opportunities. Among the more significant of these are: 1) the reorganization of the national defense establishment, with the creation of OSD, JCS, and the unified and specified commands; 2) the overall reduction in the naval force levels in the early 1970's, and 3) the creation of a surface warfare specialty in the mid-1970's.

The impact of the first of these changes has been to create new opportunities for naval officers in defense policy and management, plus joint and combined operations and planning. The impact of the second was to greatly reduce the nation's naval capability, and with it, the opportunity for command-at-sea. It should be noted that, while personnel reductions accompanied force reductions, the number of naval officers eligible and qualified for command-at-sea was not substantially reduced. The third and most significant change for submariners, however, was the decision to subdivide the surface-subsurface major command selection according to warfare specialty. This action precludes submariners from

competing for many major command assignments unless they change their warfare specialties.

Today's submariner has little opportunity to broaden his naval education and experience prior to his first command tour. He has even less opportunity than his predecessors for pursuing further command at sea assignments afterwards. This combination of developments and actions is made even more significant by the recent trend towards more and more coordinated naval, joint and combined operations. Also, submariners in the relatively few major command billets open to them, are occupied more with training and readiness or material management than with the exercise of operational or tactical command of naval forces. Under the system which has evolved, few, if any submariners will command naval battle groups -- the centerpiece of U.S. naval strategy for this decade. So the fundamental question is whether, and how, any of today's submariners can, or will become tomorrow's force, fleet, and theatre commanders.

This leads to a number of related questions which warrant consideration by today's top Navy leadership:

- o What is the feasibility, acceptability and suitability of assigning submariner officers to other duties at various stages of their careers?

- o Is the current policy of not allowing submariners to compete for major surface commands in the best interest of the US Navy?

- o Without a surface command, will command of Navy battle groups, numbered fleets, and major fleets be available for submarine officers?

- o Will continuation of the present (separate community) system produce the top leadership needed for warfighting effectiveness of coordinated naval operations in the years ahead?

Or, would a "one Navy" approach to qualifications and more open competition for major combatant commands better suit our nation's naval leadership needs?

o How should the submariner's invaluable expertise in areas of anti-submarine warfare and ship operations be utilized in the future for greatest overall benefit?

From the standpoint of professional development and future opportunity, the group of naval officers most immediately concerned with the answers to these questions include those officers who are approaching, or are in submarine command today. For these officers the pertinent questions are:

o What are the likely post-command options and opportunities?

o Which of these options allow a submariner to effectively compete for successive "command-at-sea" assignments?

o Will the Navy's top leadership consider the foregoing questions soon enough to affect those in command today?

Junior officers in submarines are little affected by this exclusion policy, but are apt to be influenced by its negative aspects. Navy leaders should thus consider the impact of current policy on this group, which has three basic options under the present system:

o For those officers who are qualified and so motivated, submarine command is the first choice. It should continue to be, provided that it is seen as leading to even greater opportunities in the future. Current limitations however, on these future opportunities can be a negative motivation factor for these high caliber officers who ought to be among the leaders of the Navy of the future.

o For those who are contemplating the possibility of a civilian career after completion of obligated service, it is possible that the relative lack of career experience and limited command-at-sea opportunity may be an important factor in influencing this decision.

o Some junior officers will choose to continue a naval career, but will opt out of submarines. The lack of opportunity for a broadening of naval experience as well as the limitations beyond submarine command could well be a deciding factor for these individuals.

Regardless of current policies and whether or not they are changed, submariners will undoubtedly continue to maintain their reputation for excellence. Because of these recent developments, however, their energies will increasingly be focused on submarines and submarining. After submarine command, current Navy policy limits opportunities for command-at-sea outside of the submarine arena -- reserving these posts for others. Thus, submariners will command and control independent submarine operations, as they have in the past. But the command of coordinated task group operations, and the higher level of fleet and theater command become more and more "of limits." Similarly, the availability of top level command or policy assignments is being reduced even though the submariner's potential for these jobs remains.

Isn't there a better way -- for submariners, and for the Navy?

A.J. Perry

---

Overheard Remarks  
by  
PCO Approach Officers in the Attack Teacher  
at the Sub Base, New London

o "I see the target ... the angle on the bow is port or starboard something."

o "When the target passed overhead, we began to get a handle on the range."

o "We've got to get this guy pretty quick -- it's nearly lunchtime."

o Assistant Approach Officer -- "Take an observation." Approach Officer -- "Not on your life."

o "Maneuvering, Conn ... Make turns for 40 feet."

o "I intend to turn around and shoot another unit at the weapon."

o "I can only see the target from the waterline up."

o "They the enemy ... Not we, the other enemy."

o "All thru the problem I had a lingering desire to go to the head."

o "I came right because I wanted to come left."

o "What's the bearing to the guy at 130°?"

o "Angle on the bow ... zero port."

o "I have two contacts, one to the right and one to the left."

---

#### NAVAL POLICY BETWEEN WARS

Recently I was asked by a person new to the town if I knew of a good dentist. I told him of

a dentist that we had been using for twenty-five years. "Well", he replied, is he any good.?"

I was surprised that he would think that I used a dentist I considered to be "no good". But, on reflection, I realized that he was asking if this was the best dentist in the area. I then admitted to myself that I really didn't know. I had been satisfied with him: in fact I had become committed to him. It was my POLICY. I had no reason to find out if he was, indeed, the best.

The debate over nuclear vs. non-nuclear submarines reminded me of this story. For some twenty five years Naval Policy has dictated a preference for the nuclear submarine. Its performance has been satisfactory. Indeed, it has been spectacular. Tasks and missions have been developed to make best use of its characteristics and technology has been focused on making improvements which were found to be needed by those tasks and missions. And, again, the reported results have been spectacular.

Advocates of the nuclear submarine, mindful of this POLICY and its spectacular success, are committed to POLICY. They argue that the nuclear submarine is the best that technology can produce for the performance of the tasks and missions assigned to it.

However this argument seems unconcerned with these obvious caveats: -- its performance is measured while performing those tasks which were designed to take advantage of that performance. -- the performance of competing systems is based on an outdated technological base.

There is nothing wrong in being committed to a POLICY. In fact if the members of an organization are not committed to its POLICY of that organization, the organization becomes sterile. But, on the other hand, if that POLICY

is not continuously questioned and tested it, too, becomes sterile along with the organization.

Stephan Roskill, in his *Naval Policy Between the Wars*, observed that "not one exercise in the protection of a slow convoy took place between 1929 and 1939". He was describing the British experience, but the American experience was the same.

"The reason for this astonishing omission", Roskill explains. "May be found in the obsession with fleet action in the belief that the Asdic (i.e., active sonar) had mastered the submarine ...". Again, the American obsessions were the same. POLICY dictated the war at sea would be won or lost in battleship actions. Therefore it was POLICY that all other forces (including carriers and submarines) be designed and trained for that purpose.

Unfortunately, our enemies in WW II did not operate with the same POLICIES. Nor, in fact, did we. It was not only policy, but also a national commitment secured by treaties, that we would not conduct unrestricted submarine warfare. Less than 24 hours after Pearl Harbor that policy was changed. And with it went all the scenarios upon which were based the training and preparations of our submarines for war.

It was obvious that active sonar was superior to passive in the noisy background of battleship action, hence technology was focused on improving it. Practically no effort was made to improve passive sonar. What did it matter if our submarines were noisy? If active sonar was the best for us, why wouldn't it be used by our enemy?

Noisy submarines! It was a memorable experience to be in a boat that was heavy overall and each time the pump was started, or the speed of the boat increased, a depth charge attack could be expected. It was made even more memorable if

depth charging followed an attack in which the torpedoes had not been particularly cooperative.

For someone who has lived through - sweated out is more descriptive - fighting with noisy submarines and poor torpedoes, the arguments supporting the nuclear submarines are disturbing. There is a touch of arrogance in those arguments which is not unlike the arrogance in the battleship and ordnance debates before WW II.

Peacetime POLICIES are the first casualties in war. In peacetime, POLICIES determine operational PRACTICES. But when the guns start firing operational PRACTICES are forged in the heat of combat. Advantage in combat lies in the hands of he who has the fewer changes to make in his PRACTICES.

The combat environment is determined by the aggressor. This demands of the non-aggressor an awareness of the enemies' POLICIES so that he might be better prepared to counter his PRACTICES in combat.

Non-nuclear submarines may not be needed by the U.S. Navy, but are we equally confident that the Soviets have no need for them? And if they do have a need, do we have the capability to counter whatever it might be that they have in mind?

Could it be that Soviet technology has not been completely dedicated to nuclear submarines, thus permitting them to get beyond the 1940's in their non-nuclear submarine technology?

Do we have any experimental data which would indicate that we have a capability to defeat an advanced Soviet non-nuclear submarine while it is performing the wartime mission for which it was designed?

A forum such as the SUBMARINE REVIEW is of value insofar as it can "combat test" POLICIES

through reflection and debate. There are many of us who regret that there was no such forum in the 1930s.

F.C.L.

---

## DISCUSSIONS

### AFTER SUBACS?

With only minor editing and exchange of a few buzz words, the article SUBACS - The Submarine Advanced Combat System, in the July Submarine Review, would have served perfectly as a sales pitch for the FCS-MK 117/AN/BQQ-5 submarine combat suite of the 1970s.

To the developers of Submarine Combat Systems of the late '60s, having run the gauntlet of headaches (and career aches) of integrating the MK48 Torpedo and its 19 plus presets into at least five garden-variety analog fire control systems (all strangers to the new fangled term "configuration management"), it was apparent that drastic measures were required. What could be better than a clean start? What could be more effective than a "general purpose" digital computer to do all the processing and display necessary to keep the operator abreast of what was going on? The complex hardware mods to analog integrators and resolvers would then be achieved by a very simple matter of programming; SMOP became a major, new buzz word.

Tracking through the SUBACS article, lets see what arguments the author used which we used for the 117/BQQ-5.

Central processing could make a total system out of any conglomeration of subsystems. All we

had to do was hook the subsystem to the central processor and - SMOP, it was integrated. This was even better than designing a total system. It permitted the addition of new systems and deletion of old ones as they became obsolete.

New weapons, sensors, improved threat and new missions lent themselves beautifully to SMOP-ing. Required additional computer capacity could be accommodated through doubling the density of existing memory modules and adding more.

As the amount of information increased and threatened to overload operators, this was resolved through the use of a continuous mode which did everything needed to the data as it showed up and an operator selected mode enabled him to deal with the problems one by one in his own set priority. Another miracle of SMOP. And so it went; 117/BQQ-5 occupies a fraction of the footprint of its predecessors. Removing the complexities of analog systems would make reliability soar. Removing displays, computers and a remarkable new buzz word "graceful degradation" would overkill combat system availability requirements. And there was absolutely no later technology available. Life cycle costs would obviously be lower as SMOP not only alerted the operator/maintainer to a problem automatically, but also showed him what to do about it. A widespread conviction grew that training facilities would not be required and that adequate training could be achieved on the job -- but cooler heads prevailed. Commonality, modularity of software, simplicity of power supply, standardization and orders of magnitude in cabling reduction hung over 117/BQQ-5 like halos over a newly canonized saint. And it was standardized -- even to using the surface fleet's AN/UYSK-7. There it was, a wholesale replacement for older submarine combat systems with features that would overcome all predecessor problems and an open-ended accommodation for new requirements. But what went wrong?

Scarcely twelve years later the 117/BQQ-5 requires a wholesale replacement by SUBACS with features that will overcome all predecessor problems and an open-ended accommodation for new requirements. Was SMOP the villain? Or perhaps it was something else. The more naive among us believed that the 117/BQQ-5 would provide a new tool that would exploit the full operational capabilities inherent in SSN637s, and 688s against any mission in real time.

Realizing the submarine community's hesitation to do business with a new and untried system, an iterative approach was selected. The first of three phases called for a digital system, side by side with the old analog hardware under the nomenclature of FCS MK113-10. The second phase would integrate the interface with AN/BQQ-5 at a central computer complex. The third would see elimination of the analog position keeper with an additional digital driven display substituted. This insured an all digital attack center.

It appeared, at least in the author's view, that emergent SSN higher speeds, greater depths, multi-weapons and high rates of vast volumes of data would drive submarines toward automation. This has not been the case. Manual processing of combat data, with all its time late and proneness for operator error, continues to be the mainstay. The analog line of sight display on the face of the MK75 console (Position-Keeper) was to be the attack center's focal point, but it became overly complicated by a strobe, tangent to a time-bearing curve, in order to get "bearing rate"--a similar job being performed by one of the troopers with a grease pencil and fifty dollars worth of clear plastic. The 117/BQQ-5 was not permitted to absorb the combat data processing load so it had target motion analyses techniques added to it which for the most part paralleled the number of manual plots already in existence. Upon learning that the MK75 Position Keeper display would be replaced by a digital driven display, a cry went

up for software that would restore the old timer in video. At the initial 117/BBQ-5 installation review, in the SSN 700 class mockup at Newport News, but for knock-down, drag-out arguments by members of the Navy Material Command, TRIDENT's attack center would have very much resembled the one in GEORGE WASHINGTON.

Impetus for 117/BBQ-5 did not originate with the operators. This was reflected in the lack of confidence shown in the equipment when it was deployed. The operators had scarcely the time to remain proficient in existant SSN combat techniques much less to adjust to the "digital revolution."

So what then of SUBACS? Is the operational community aware of its benefits? Is there a clear understanding of how things will be done more efficiently with this new investment; longer detections, better ranges, bearings, courses and speeds, quicker solutions -- along with absorption of a bulk of the tactical load plus incorporation of clear imagination into how this equipment can best exploit SSN capabilities in their missions? Without these things, the khaki-clad wearers of the bearing-rate amulet must be expected to continue their principal preoccupation with the exchange of memos in the attack center and by the mid 90's SUBACS will face "wholesale replacement by yet another system with features to overcome predecessor problems and open ended accommodation for new requirements."

Capt. D.M. Ulmer, USN (Ret)

---

#### LOGISTIC SUPPORT SUBMARINES

The logistic support submarine -- a dedicated cargo carrier -- would fit into the Rapid

Deployment Force mission as a gap-filler. It would be a compromise between the C-5 cargo aircraft with its speedy delivery of miniscule quantities of supplies and the slow, surface cargo ship with its delivery of great quantities of overseas support "sometime next year."

Cargo submarines are not new. The German DEUTCHLAND of WWI vintage was a successful commercial "blockade runner". The U.S. Navy's first venture into the realm of cargo carrying submarines was the conversion of Bass, Barracuda, and Bonita during WWII. This program grew from efforts at evacuation and re-supply of Philippine forces at the beginning of the war. While never carrying any actual cargo, the "B" boats pointed the way to success as well as some of the pitfalls which had to be "designed around".

Until the advent of nuclear power, the attempts at development of submarines for logistic support were based on their ability to remain undetected - - so as to make surreptitious landings of personnel and material possible. With the advent of nuclear power, the picture changed. By designing a cargo carrier submarine with speed in mind while ignoring armament and detection devices, speeds in excess of 40 knots for displacements of 8,000 tons have been indicated by studies. The advantage of the extremely high speed submarine cargo carrier then lies in the rapid delivery of rather large amounts of re-supply, rather than in its covertness -- although the latter is also inherent to any submersible to some degree.

Consider for example a delivery time from Seattle to Diego Garcia at 40 knots. This would be about one fourth the time required for an average cargo ship if weather was also taken into account. Additionally, the 40 knot sub would alleviate somewhat costly inventories stockpiled at a strategic point at the expense of other points by rapid delivery of large amounts of cargo from central points. The high speed cargo

submarine thus seems to be an ideal gap filler and supplement to rapid deployment units.

So what are the problems facing this solution to rapid delivery? There are initially two large ones -- cargo density, and cargo access.

As an example of the first problem, let's look at the cargo "hold" arrangement of the "B" boats. To form cargo compartments, all torpedo gear and tubes were removed from the forward and after compartments, and two of the four main engines were also removed. The three altered compartments were then made into cargo rooms by installing compartmented tanks -- the largest number being in the former engine room. The idea was that a mix of cargo in some tanks and water in others would allow maintenance of trim for the particular cargo density involved. This resulted in a "cargo efficiency" of 100% if all cargo space was used for small arms ammunition. But if the cargo were hospital supplies the efficiency was less than 10%. The cargo submarine thus was designed with a large variable ballast capacity. Since such compartmented tanks would be partially filled under various conditions of loading, single hull construction seemed desirable.

As to the second problem, a member of the Bass cargo board once asked, "Why are all submarine hatches round and all cargo packages square?" This summed up the situation rather succinctly. A new cargo boat could have a form of clamshell door to take aboard large units like the Bradley Fighting Vehicle. The "B" boat system of combination cargo/ballast tanks would be replaced by a system of "reverse saddle tanks" inside the pressure hull and outboard of cargo spaces. This arrangement would then enhance the "roll on-roll off" capability of a cargo submarine so designed.

Off-loading at sites unprepared for cargo handling requires that handling equipment be integral to the carrier submarine. Thanks to the U.S. space program, the state of the art in

articulated arms allows "a" tightly packaged crane and davit type gear. Using a clamshell door, ramps can also be extended for discharge of rolling stock. Loading at a prepared site should then present little problem.

Other configurations would include the liquid "tanker" carrier which would differ from the bulk cargo and heavy equipment types because of the ease in designing variable ballast systems for a tanker. If the submarine carrier is faced with a single cargo density like oil more space can be allotted to cargo at the expense of variable ballast. The increased effectiveness of a non-nuclear carrier task group which could be fueled by a nuclear submarine tanker in any weather and on any course should be extraordinary. An idea for further study would also be the "train" concept with unpowered submersibles being towed by a nuclear tug or another nuclear powered cargo sub. For such a train of towed submersibles, a tonnage/speed tradeoff would be necessary to define an economical design.

While the arguments between "nukes" and the diesel-electric aficionados frequently boils down to the limits on "submarine money", in the case of the submarine high speed cargo carrier there might be additional funding for the mission of rapid deployment. This would, at least, be a step toward true rapid deployment as contrasted to forward strategic stockpiling of material and supplies.

CDR Rue O'Neill, USN (Ret)

---

#### TIME TO DIVERSIFY?

The principle of diversification is followed in many fields of human endeavor. For example, wise

investment managers and the heads of large corporations diversify in order not to be totally dependent on one investment or a single product, while sociobiologists attribute the very survival of the human species to the diversity provided by sexual reproduction.

Thus it is not surprising that in the era of iron, steam and fossil fuel, when surface-ship navies ruled the seas, the major naval powers of the world applied diversification to their fleets. The battleship, which reached its greatest potential in the Dreadnought type, was the ultimate weapon, followed in descending order by heavy cruisers, light cruisers, and destroyers. Some navies went even further and built battle cruisers, which were not as heavily armored as battleships but were faster. Again, the motivation behind this diversification was survival.

Along came the submarine, or submersible as it should be termed due to its limited underwater endurance, and naval planners treated it as just another type of ship -- there being little variation within the category in either capabilities or purposes, (excepting "some" oddities such as the French Surcouf).

Although the fact was not admitted for many years, the arrival on the scene of modern aircraft and true submarines radically changed the survival potential of surface ships. The impact of aircraft on naval warfare is in itself a monumental study. It is not the subject of this paper. What concerns us is the true submarine, with its unlimited underwater endurance, high speed, and low detectability.

Beginning with Nautilus the U.S. Navy, probably because of long-established habit, continued to look upon the nuclear-powered submarine as just another type of ship -- a more capable submersible, that is. While there were periodic advances in hull and power plant

designs, SSN's continued to be general-purpose ships armed with the same weapons and built to carry out the same missions. It was not until the introduction of the Polaris missile that a different type of submarine designed for a specific new mission came into being. SSBN's represented the first step in the U.S. Navy's diversification of its submarine fleet.

But since the advent of the SSBN neither the introduction of new weapons nor the requirement to conduct new and expanded missions has resulted in further diversification of U.S. Navy submarines. This is particularly interesting because, from published reports, it is apparent that the Soviet Navy has accomplished a considerable diversification of submarine types in recent years. At the very least, this should give U.S. Navy planners pause to study new weapons and the relative importance of expanded roles and missions in order to evaluate the advantages of taking a further step toward submarine diversification -- keeping in mind that it will require ten years or more of development and acquisition before that decision can be made operational.

What, then, would be the advantages of diversification? First, it would provide new options to submarine force commanders; and, secondly, it would present new and difficult problems to opposing forces. And what are the problems in achieving these ends? Primarily, they are those involved with examining new concepts, selecting the most attractive ones and developing these into a submarine designed for optimum performance of a selected mission (or very few missions).

It would seem that, because antisubmarine warfare is considered the most demanding and important of all attack submarine missions, ASW would be the most likely area to examine for possible diversification. Of course, the idea could be aborted immediately by lack of an innovative approach, and later by inadequate

development. But with the emphasis demanded by such an important program, a submarine designed for optimum ASW performance would not be the lower half of a high-low mix. Rather, it would be supreme for its selected role -- in all geographical areas, including Arctic, shallow and restricted waters.

On the other hand, superiority in missions other than ASW would be conceded to the general-purpose attack submarine, the capital ship of the Navy, which would retain its own excellent ASW capability. The overall result would be an increase and improvement in the total ASW capability of the submarine force and the U.S. Navy.

Nimrod

---

#### CONVENTIONAL SUBMARINES IN THE FALKLANDS WAR

Submarine lessons of the Falklands War, in the April Submarine Review, would hardly explain the present resurgence of interest and demand for conventional submarines throughout the world. The unsuccessful Argentine experience with their 1200-ton, German 209 diesel-electrics in the Falklands War last year should have seemingly cooled world interest in the non-nuclear submarine. But the opposite seems to be the case. While the 209s sank no British ships, they tended to establish some important points which favor the use of conventional submarines in many of today's Navies and have probably generated this renewed interest.

When the British established that the Argentine conventional subs were out of port, the ubiquitous nature of a submarine went into effect. British ASW forces assumed they might be

anywhere or everywhere in the theater of naval operations -- vigorously pursuing and evidently attacking every detection made with their ASW sensors which might possibly be a submarine. False contacts were apparently so much in profusion in this relatively small ocean battle area that even the recognizably efficient British ASW forces expended large quantities of ASW ordnance -- including some of their new homing torpedoes -- without damaging a 209. With much of the theater of operations across a continental shelf -- which stretched out beyond the Falkland Islands -- British ASW forces were faced with "shallow water" operations, which seem to favor the characteristics of the conventional submarine. In fact, although five British nuclear submarines were reported to have operated extensively in this shallow shelf area their failure to make contact with the 209s might also be considered. And significantly, although the 209s ostensibly fired several German electric SUT torpedoes at British targets, the torpedoes were apparently so quiet that, although they missed, they did not alert British ASW forces to the presence of the 209. But perhaps the best feature of the 209s in the Falklands War was that they couldn't be harmed by Exocets. Nor do any kind of submarine need defenses for such antiship weapons.

So, rather than viewing the conventional submarine as being inadequate in a respectable level of sea war, the Falkland Islands War seemed to demonstrate its viability -- particularly in an environment where long range missiles assumed an important role.

D.E.K.

---

#### IN THE NEWS

o The Submarine Veterans of World War II had their 29th reunion in Scottsdale, Arizona, the

week of 29 August - 3 September. Over 1400 submariners were on hand with some of the top skippers of WWII adding to the nostalgia and great camaraderie which marks these annual affairs. Fearless Freddie Warder appeared to be the senior vet, with Moon Chapple able to get out of his wheelchair -- and looking like a good bet for the reunion next year in Chicago, and the following year in Seattle. Other skippers on the scene who played an important part in submarine history were: Slade Cutter, Tom Hogan, Arne Schade, Rosie Kinsella, Eric Barr, Pop Gunn, J.J. Flachsenhar, and B.R. Van Buskirk. A new president, Carl Pace, formerly of the Atule, relieved Bob Moore of the Angler and Porpoise, for a year's duty. Art Rawson, head of the Sub Vets scholarship program, reported that they'd awarded 52 scholarships of \$600 each to the children of submariners, for the college of their choice.

- o USS Pigeon, a catamaran type submarine rescue vessel, conducted two open ocean 850 foot saturation dives off the coast of California in '83. The two dives conducted in June and July lasted about 15 days each. 9 days were spent decompressing from 850 foot depths where two dive teams performed experiments for Scripps Oceanographic Institute. The dives were the deepest performed by any operational U.S. Navy unit, to date.

- o The latest newsletter from the Naval Underseas Warfare Museum Foundation reports that the Foundation has received \$1,006,000 towards their \$4.5M goal, from 18 major companies. And that a \$200,000 grant was received from the Murdock Charitable Trust of Vancouver, "conditional upon construction (at Keyport, Washington) starting by July 31, 1985." Mention is also made of the availability of an excellent 15-minute film on undersea warfare and the Museum Project to help the Navy obtain a suitable facility for the museum.

- o The Supreme Court in a unanimous decision in June ruled that military personnel may not

bring damage suits against superior officers for alleged constitutional violations. Chief Justice Warren E. Burger wrote that the effect of exposing officers to personal liability at the hands of those they are charged to command would be to undermine both the "unhesitating and decisive action" required of those officers and an "equally disciplined response by enlisted personnel".

o A recent report written by David E. Kaplan on nuclear accidents stemming from naval reactors claims that there have been some 37 serious accidents to date. Kaplan says that substantial amounts of radiation have been released into the environment as a result of these accidents. But the Navy has subsequently prepared comprehensive comments on each one of Kaplan's allegations which tend to show that Kaplan's evaluation of such incidents if not exaggerated at least improperly show the relationship of released radiation to its effect on the environment. With the Navy operating 163 reactors -- more than twice as many as those operated by America's utility companies, it would seem that the low incidence of reported nuclear accidents and the low key of such reports have been their own best arguments to support the Navy's contention that there has been no release of radioactivity which has had any significant effect on individuals or the environment.

o In July it was reported that China had launched its first nuclear-powered ballistic missile submarine, last year. They plan to commission seven more, according to an article in the Japanese daily Asahi, which quotes Captain John Moore, the Editor of Janes Fighting Ships. It was also reported that the Chinese had test-fired a ballistic missile from a conventional submarine in October, 1982. But making a ballistic missile operationally compatible with this new SSBN is expected to take some additional time.

o A Soviet nuclear powered submarine carrying a crew of 90 is reported to have sunk in May, in the north Pacific off the Kamchatka Peninsula.

It was further reported that the submarine hull had been raised, and that there was no evidence of radioactive contamination. Vigorous rescue activity had been noted in the area of the sinking prior to the raising of the hull.

---

### PERSONNEL NOTES

o The recruiting goals for FY '84 submarine officer accessions have been set at 675 nuclear submarine officers and 26 general, non-nuclear submarine officers. The quota breakdown for nuclear accessions is: USNA 220, NROTC 198, NUPOC 257.

Prior to FY '83, the best year brought in 518 nuclear submariners. In FY '83 with 666 volunteers, it was the first time that nuclear submarine officer accession goals were met. Several factors produced this result: the economy, NUPOC recruiting which achieved 103% of its goal, the \$6000 nuclear accession bonus, recruiting efforts at NROTC units and the efforts of Professors of Naval Science at 11 universities, similar recruiting efforts at the U.S. Naval Academy, summer cruise recruiting efforts by the submarine force, and improved long-range trends in sea/shore rotation, tour length, billet availability, PG school, etc.

The goal of an all-nuclear submarine force and of 11/9 sea-shore rotation remain. Increasing accessions cannot however be the sole means of getting there. Improving the retention rate of officers must also be stressed. But there is cause for cautious optimism that submarine officer career pattern goals are in range.

o A few of the important submarine flag officer changes in assignments: Rear Admiral

Jack B. Mooney, Jr., to Chief of Naval Research in October; Rear Admiral Lawrence Burkhardt, III, to Asst. Deputy CNO for Manpower, Personnel and Training, in August; Rear Admiral Austin Scott to Commander Submarine Force Pacific in June '83; Rear Admiral Bruce DeMars to Asst. Deputy CNO for Submarine Warfare; Commodore Guy Curtis to Director Strategic Submarine Division, OP-21, OPNAV in August; and Commodore Roger F. Bacon to Director Strategic and Theater Nuclear Warfare, OP-65, OPNAV in July.

o Commander Jasper Johnston, Jr., CO of the Simon Bolivar (SSBN 641) (Gold Crew) was Atlantic Fleet recipient of the 1983 Vice Admiral James B. Stockdale Award for inspirational leadership. The award is made to commissioned officers below the grade of Captain who are in command of a surface ship, air squadron, or submarine at the time of their nomination by their peers, who are also eligible for the award.

---

#### LETTERS

o "Congratulations on The Submarine Review! It's just great. I thought to bring it to the attention of our young submariners here (there are, sadly, not very many). But they seem to be getting it already, and that's good."

Wayne P. Hughes  
Department of Operations Research  
PG School Monterey

o "The inaugural copy of The Submarine Review fell quite accidentally into my hands. I just relieved the U.S. Naval Attache, Moscow, and it was addressed to my predecessor (a surface sailor!). If there is any contribution that I

can make from my vantage point in Moscow, please let me know."

Captain Steve F. Kime, USNavy

o "I have just seen the July issue, it is interesting and useful, with some good thought on important subjects. Keep it up."

Frank Uhlig, Jr.  
Editor, Naval War College Review

o "Thank you for your thoughtfulness in sending me a copy of your fine Submarine Review. I am in the process of reading it and I am enjoying it as I go. I thought I would send my copy to my good friend and classmate, Karl Hensel, if he is not yet on your mailing list. If he is not, he should be. He has a lot of submarine stories, and I believe some of them.

"Since he is one of the most ardent submariners I know, and I know quite a few other ardent ones, he is likely already on your list."

Arleigh Burke

(Editor's note: A copy was sent to RAdm Hensel. But in so doing it seemed worthwhile to relate a "submarine story" about him. RAdm Hensel was a Division Commander at Midway in WWII when Frank Barrow aborted his patrol in Swordfish due to stern plane trouble and brought her back to Midway and asked to be relieved. Hensel had been considered a very demanding martinet at Sub School, where he taught tactics in the Attack Teacher, before the War -- and growled impatiently at students like myself who were less than perfect on our approaches. Later I heard that he was writing tough and critical endorsements on the patrol reports of the submarines in his Division. He wasn't winning

any popularity contests! And many of the skippers were muttering that if the old "old" took a boat on patrol he'd soon change his tune. But "the old" with no PCOs available to substitute for Frank Barrow, took the boat back out to sea for her 10th war patrol. The Swordfish was pretty well beat up and worn out by that time and Captain Hensel could have found a lot of excuses for taking her back to port. But he didn't! Off Tokyo, he got into a convoy and sank a big cargo ship, then took a heavy depth charge beating as he took Swordfish deep. The depth charging had wrecked Swordfish's electrical controls and Hensel almost lost his boat next morning when she dove for a submerged patrol. With no electrical power on the dive, Swordfish went down at a steep angle, was saved by blowing everything, and then lay on the surface helplessly with a Japanese patrol boat closing fast. Just in time, Hensel got Swordfish under and evaded the patrol boat. That night, when back on the surface he picked up a small merchant ship with two PT boats as escorts. He dove Swordfish for a submerged approach and then put 3 torpedoes into his target. When the ship blew up with a tremendous bang he should have suspected she was carrying a lot of ammunition. She was, as learned later, because she was Japan's first Q-ship (sent out to get the wise guy who just sank one of their very good ships) with good sonar, lots of depth charges and a well-drilled military crew. The innocent looking PT boats then gave Swordfish a severe depth charging. With plenty of torpedoes remaining, Hensel ten days later attacked a well escorted convoy and sank another cargo ship while damaging a second. On his arrival back at Midway, I was told he walked ashore to join a group of officers who were greeting Swordfish's return. His first remarks were that he'd never again criticize his skippers for their patrol results and that one patrol was plenty for him. The "old" was vindicated for being a harsh taskmaster because we all knew then that he could back up everything he preached!

## BOOK REVIEWS

ADMIRAL RICKOVER AND THE CULT OF PERSONALITY  
Norman Polmar and Thomas B. Allen, Rickover (New  
York: Simon and Schuster, 1982, \$20.75), 744  
pages.

JUL-AUG 83/dj

When Admiral Hyman G. Rickover cleared his desk and took final departure from the U.S. Navy and the Naval Reactors Branch on the last day of January 1982, it marked the end of an era. None of us can quite share the feeling, for no one else ever completed 63 years of continuous active service before heading for pasture at age 82. The Norman Polmar and Thomas B. Allen biography of that career, written without Rickover's support and published despite the threat of a lawsuit, offers a fascinating view of the spawning, growth, and maturation of the Rickover empire.

During the last hundred years, only a few names come to mind of those who have made a major impact on their navies or nation: Mahan, Fisher, Gorshkov. Rickover can join them. He changed the U.S. Navy's ship propulsion, quality control, personnel selection, and training and education, and has had far-reaching effects on the defense establishment and the civilian nuclear energy field.

The book is tremendously important for the military professional in uniform or for the Washington bureaucrat. Whatever his branch of service, Rickover raises trenchant issues. Are we seeing the first of a new breed of technocratic flag and general officers -- and possibly the last of the "characters" in uniform succumbing to the era of the organization man? Was Rickover the indispensable man whose personal drive created a nuclear navy by the force of his indomitable will over the backs of reluctant admirals refusing to be dragged into the

twentieth century; or was he an opportunist who capitalized on fate to build his own navy within the real Navy?

In his naval service to midcareer, Rickover showed little promise of future greatness. He volunteered for submarine duty, rose to executive officer of the S-48 but then was not selected for command. His pattern of sea and shore assignments up to the rank of captain was unimpressive. In the fall of 1946 however he saw nuclear power "as an opportunity for the Navy". Chosen almost by chance for a four-month assignment to Oak Ridge, Tennessee, Rickover soon parlayed the opportunity into a fortuitous dual responsibility to the Atomic Energy Commission --later the Department of Energy -- and the Navy.

Proving himself a master at bureaucratic infighting, he built his empire, sensing shrewdly what few others ever realized, that congressmen prefer giving money to people rather than institutions. Going before committees as an individual and not as a Navy official, he gave a strong and convincing impression that he spoke as a man of truth and right, not necessarily to support the U.S. Navy but to support the nuclear navy. He told Congressmen: "Those of us who have an objective, a desire to get something done, cannot possibly compromise and communicate all day long with people who wallow in bureaucracy, who worship rules and ancient routines." Thanks to outstanding preparation and delivery by this truly expert witness, Rickover's flawless performances generated their own fame in the press as a folksy, down-home philosopher.

To an Armed Services Committee, he stated: "We have got somehow to drag the Navy into the Twentieth Century. From the beginning the Navy has opposed nuclear power." (Yet the authors sought in vain for any opposition or even serious question about the construction of nuclear-powered submarines.) But how else could he make himself -- and the congressional committees --

the indispensable ingredient behind the reality of the nuclear program?

Admiral Rickover's greatest contribution was neither as a technician nor manager; his real genius lay in infusing into the Navy the pursuit of excellence, the genius not of breadth of vision but of the insistence on taking infinite pains in the smallest detail in the development of nuclear energy. He set high standards of excellence as the norm and forced compliance. In the nuclear program, Special Trust and Confidence, the traditional words on a U.S. military officer's commission, had little relevance. Everything and everyone was checked, rechecked, then checked again.

Only those with superior qualifications were considered for the nuclear program. Probing the minds and attitudes of potential officers and crewmen, the Rickover stamp reached every individual in the program. Over the years the famed interview became a legend. Ordeals of harassment, verbal abuse, banishment to a broom closet, and demeaning indignities -- all sought to evaluate the individual under stress and to instill forever the conviction of who was boss.

From the early USS Nautilus days, the nuclear program was marked more and more by the growing cult of the individual. The nuclear program became the means of personal advancement. Rickover, himself, furthered both the nuclear program and his own career, carrying his own promotions beyond "the system" to the apex of four stars -- and retention on active duty far beyond normal or even legal retirement limits. His bureaucratic vendetta within the Bureau of Ships was only the background for his grand strategy: the nation must have an all nuclear navy which he would create and control.

The cult of personality produced other adverse side effects. Having achieved brilliant success with the pressurized water coolant system in the

Nautilus installation, innovation in other types of plants was given little encouragement. The USS Seawolf plant, developed in tandem with Nautilus, utilized liquid sodium as coolant, and promised much smaller and more compact reactors. Because of limitations in metallurgy, the system proved unsuccessful. The program was scrapped, and its superiorities were never again re-examined -- even after twenty years of further progress in nuclear technology. Rickover also discouraged programs generated within the Office of Naval Research and elsewhere for smaller, lightweight reactors that might reduce the enormous size and cost of nuclear-powered ships. None saw the light of day. When nuclear power was adapted to surface use for large combatants such as aircraft carriers and missile cruisers, new propulsion systems apparently were not examined. For instance, a smaller and more efficient combination of nuclear power for normal cruising plus an overdrive of conventional gas turbine plants for high speed use had been proposed but was not investigated further.

The lack of an adequate research and development program for new propulsion techniques was only one indicator of the increasing conservatism of the Rickover program. Truly it has been said, "The father of the last technological revolution is in the ideal position to stamp out the next one." Lou Roddis notes that the Soviet development of the Alfa nuclear submarine, smaller, faster, and deeper diving than any U.S. underseas craft, has no counterpart in the U.S. development.

The cult of personality and the dominance of the Rickover program tended increasingly to isolate the nuclear Navy officers from the rest of the Navy. Brilliant, carefully selected, and meticulously trained, they are superb engineers but see little of "the Navy". The Rickover system trains engineers rather than broad gauged naval officers. Through his insistence, the Naval Academy curriculum offers 80 percent of its

courses in the hard sciences, 20 percent in the liberal arts. (West Point divides it 60-40; the Air Force Academy, 50-50.) Mid-career "nucs" were screened from war college assignments -- despite the enormous influence they had to gain and to give -- and from staff duties outside the narrow limits of their specializations as nuclear engineers. Nor could they, for example, be found even on submarine staffs, where they would develop tactics and doctrine for nuclear attack and missile submarines in both offensive and defensive roles. Shore duty of any sort is limited; of 1500 billets in the Navy for nuclear specialists, only 122 are ashore.

Admiral Rickover made a great contribution to his country over an unsurpassed 63-year career of active service. Unlike most senior officers who retire in a blaze of ceremony and parades, he chose to pass up the traditional ritual and make his farewell on Capital Hill. His swan song to the combined House and Senate Joint Economic Committees found only three members present. But, a grateful Congress struck a gold medal in his honor. In the words of Senator Gary Hart on a similar occasion, "The mahogany cheered." Turning down President Reagan's invitation to serve as a consultant on civilian nuclear matters, this driven man, suddenly grown old and tired in the service, passed quietly from the scene.

Both Norman Polmar and Thomas B. Allen deserve high praise for balanced, even-handed, although controversial analysis. Polmar is an expert on naval affairs and strategic weapons. Coauthor Allen has had long editorial experience as Associate Director of National Geographic Books and is a Navy veteran of the Korean War. Since Admiral Rickover was totally hostile to the publishing of this biography, the authors were forced into an overreliance on reams of congressional testimony and interviews of both the bitter and worshipful.

Rickover is an important book on a highly significant subject. The professional officer, whatever his service affiliation, will find the study fascinating, sometimes unbelievable, but amply rewarding.

Dr. Paul R. Schratz

---

The Underwater War 1939 - 1945, by Cdr. Richard Compton-Hall MBE, RN (Ret.), Blandford Press, England 1982, distributed in U.S. by Sterling Publishing Co., 2 Park Ave., NYC 10016, 160 pages, \$19.95.

This review stems from a 1982 book, "The Underwater War 1939-1945", by Richard Compton-Hall, a British submariner. I reviewed this book for "Shipmate" in June 1983. Since several views expressed in the book needed refutation or discussion, I am limiting this article to an overview of certain important passages in order to present my differing views which seem appropriate for the stated goals of the Submarine Review.

Compton-Hall, in his book, makes the statement that "the indecision which dogged submarine development between the wars (WWI -WWII) resulted in most boats which sailed to fight World War II being little different, basically, from those which had fought the first underwater war a quarter of a century earlier". He says, the WWII boats "tended to be larger, long-legged and a little more comfortable but there had been no giant strides forward. Propulsion was virtually unchanged and maximum speeds submerged were still around 8 knots."

These statements are more true than false, but they give a wrong impression. Instead of "giant strides forward", U.S. submarines were mostly subject to an evolution. The P-boats and S-

boats that were commissioned in the middle thirties were impressive compared to the O's and R's of WWI vintage. Two small submarines, the Marlin and Mackerel, were also built in the mid-thirties. Older submariners who were in Washington in the middle thirties told of quite a debate on new submarine design and that the long-legged submarines barely won out. That was a "giant stride forward" and without it our submarines could not have performed as they did in WWII, until at least later in the War. Initially, patrols were of two month's duration; e.g., Pearl to the Japanese Empire, one month on station, then return to Midway. On one of my patrols we "steamed" 14 thousands miles.

There were other differences between WWI and WWII U.S. submarines; some that we needed, but failed to recognize. Had we known that we could get away with night surface attacks even before we had radars, we would have appreciated some means to obtain range to the target other than size of the target in binoculars. The same applied to getting a true bearing rather than shouting relative bearing down the hatch to be converted in the conning tower.

Sonar was a sad story. Between the wars the British produced ASDIC (pinging). It was so successful that the whole world believed that submarines were doomed. The U.S. tried to develop passive sonar. By the mid-30s, we had strings of microphones around the bows of destroyers and submarines to give target direction by binaural audition. It was not very successful -- so passive sonar was abandoned. But in 1942, we needed the passive sonar capability that we got much later.

Compton-Hall, in his book, also felt that U.S. submarine commanding officers were not as well grounded in tactics and periscope usage as their opposite numbers in the Royal Navy. I believe that our submarine captains before WWII were well

trained in attaining a favorable firing position and in achieving hits with the practice torpedoes. The targets were zigzagging destroyers at speeds greater than most of the ships we attacked in wartime. I agree with the author that during WWII a PCO patrol was not considered by him to be enough training for a new skipper. Most PCOs should also have spent many hours on the attack teacher. The Royal Navy's excellent "Perisher" course had some influence on the PCO school which was started at New London sometime in late 1941. But, then it was a second hat for the officer in charge of Submarine School. In the summer of 1943, however, I became the first boss of PCO school with no other duties.

The author says that when the U.S. got into WWII her submarine captains were overcautious -- and the admirals overconfident. Such conclusions were not evident to me in the Pacific during early 1942. If any of the captains were very cautious, however you measure it, there were good reasons. Before the war, submarines were used as distant scouts of the Fleet to sink some of the on-coming enemy forces. Fleet exercises seemed to prove that submarines at periscope depth were certain to be detected and destroyed by warships with ASDIC and by aircraft. It was believed they could spot submarines easily at periscope depth. Neither was true but this had to be learned after the start of WWII. Also submarine duty before WWII was not the best road to promotion. Officers qualified in submarines were not allowed to wear their dolphins when not in submarine jobs. For example, as a Naval Academy Nav Prof in 1937-39, I couldn't wear my dolphins. Moreover, there was no submarine flag officer billet in our Navy. How was the submarine voice heard?

Before World War II during the thirties, submarine officers on duty in Washington met from time to time to discuss things relating to submarines. Each member then would go back to his non-submarine job and try to sell what had been

decided at each conference. It was at one such conference that the long-legged big submarine won over the smaller boats. Members also appeared before the Ships Characteristics Board, the General Board, etc. Great debts are owed to those who saw to it that our submarines in WWII were appropriate to their tasks. The members of those conferences were officers who had served in submarines but were unlikely to have a future submarine billet. Still their interest in submarines helped to keep submarine matters on the right track. There were others who had never served in submarines but had been on desks dealing with submarine matters e.g., for torpedoes, personnel, etc. who also attended these submarine conferences. After WWII, the conferences were resumed. Attendees were, for the most part, WWII submarine captains. Of the some 100 submariners in Washington, only two had assignments which were limited to submarine matters. The flag officers who attended were not in submarine jobs. Only the great submarine esprit-de-corps helped carry the submarine force through the many years of being country cousins in the U.S. Navy.

There are many more items in Compton-Hall's "book" that would be worthy of discussion but a final one in the author's last chapter should not be passed over. The author felt we should not limit our submarine construction to what he called "Nuclear Monsters". This seems to show his lack of the full story from today's submariner's point of view.

"The Underwater War 1939-45" has a thread running through it of the superb performance of enlisted personnel aboard submarines. In a far from comfortable environment our enlisted men did keep the machinery and equipment in good working order. This performance was taken for granted -- even though without it we would have had chaos. Ultimate success was due as much to the "stokers" aft as the torpedo-men forward and

the "oilers" deserved a lot more credit than they got for successful operations.

We have all heard repeatedly that personnel are our most valuable resource, though we don't always act like we believe it. Is there time today to act as if personnel are our most valuable resource? I hope so.

The comments about this book which I made in Shipmate were certainly favorable, I would strongly recommend the reading of that submarine record of WWII by Commander Compton-Hall.



NAVAL SUBMARINE LEAGUE  
Box 240  
Mt. Vernon, Va. 22121

## MEMBERSHIP APPLICATION

Date \_\_\_\_\_

I hereby apply for membership in NAVAL SUBMARINE LEAGUE. I certify that I am a citizen of the United States.

\$10  Military Active Duty      \$20  All Others

\_\_\_\_\_  
Signature

Name \_\_\_\_\_  
*Rank Service, if applicable*

Address \_\_\_\_\_  
\_\_\_\_\_

Phone (Bus.) \_\_\_\_\_ (Res.) \_\_\_\_\_

Employer and \_\_\_\_\_  
Address \_\_\_\_\_  
*Name*

Position/Title \_\_\_\_\_

*The Naval Submarine League is a Virginia not for profit corporation. Tax exempt status has been applied for.*

### Donors/Corporate Contribution

- Founders — \$1000.00  
 Plank-Owner — \$500.00  
 Skipper — \$100.00  
 Advisor — \$50.00  
 Associate — \_\_\_\_\_

Your membership will bring you . . .

- Periodic Newsletter
- Avenue to keep current on submarine issues
- Ability to contribute to public awareness of submarine capabilities
- Association with a dedicated group of people
- Invitation to Annual Meeting
- Forum for exchange of thought on submarine matters

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

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

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

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

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

NAVAL SUBMARINE LEAGUE  
BOX 240  
MT. VERNON, VIRGINIA 22121

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