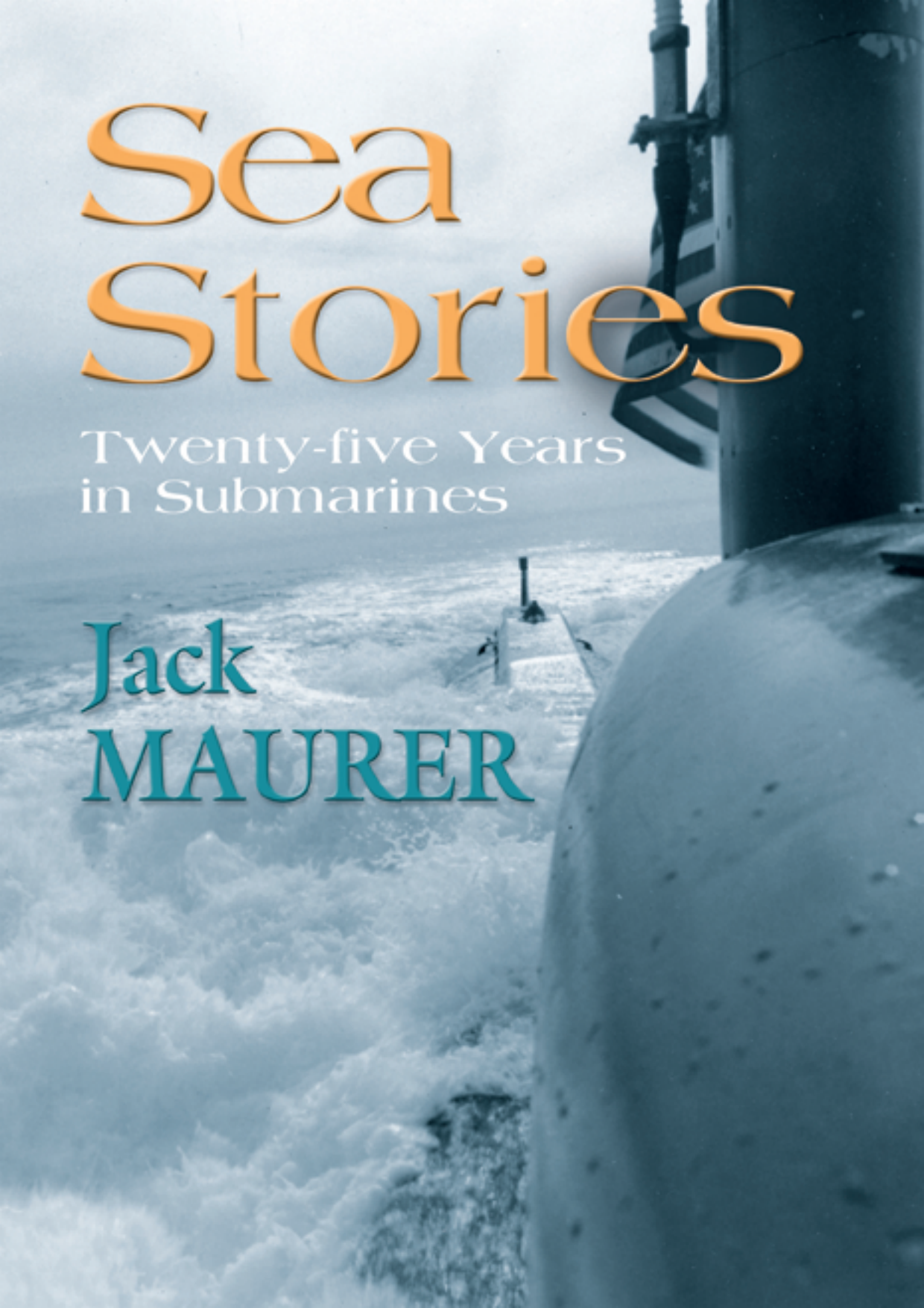
The anecdotes in this book represent events that occurred during a Naval career that spanned twenty-five years and five nuclear submarines. Tales of Admiral Rickover and King Hussein (of Jordan) are included. Some stories are hilarious; some are poignant. Some are technical; most are not. All are true. Many will be familiar to mariners anywhere; others are unique to the author. All are enjoyable.

# SEA STORIES: TWENTY-FIVE YEARS IN SUBMARINES


Sea Stories
Twenty-five Years in Submarines
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ISBN 978-1-61434-272-4



Printed in the United States of America.

BookLocker.com, Inc.
2011

First Edition

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# Introduction

Sea stories. Every sailor has them. Little anecdotes that relate special memories. Some are humorous; some are exciting. Some recall a person worth remembering; some recall an event that we cannot forget. All of them are special, in some way, to the sailor who saves them.

They open conversations. "Remember when …?" They come up over a beer and pretzels. Some are competitive. "Can you top this ….?" Almost always they are unique to the story-teller, and almost always they are truthful, or mostly so. They usually put the teller in a good light.

These stories are no different. They represent events I participated in and people I knew over three decades and in five submarines, with a couple of shore-side stories thrown in for good measure. They are not connected. There is no thread running through them, and I have not tried to include a theme. Each is to be enjoyed, maybe even believed, on its own merits.

I have worked from memory. No notes or references, so the facts may be shaky. Any dialogue, of course, is reconstructed years after the words were actually spoken. Although the flavor of a conversation is as accurate as I can make it, the exact words were probably a little different.

Classified material has been scrupulously avoided. I do not think I have included any material that could jeopardize national security. It's a shame: some stories would really catch your attention: "Try and top

this …!" To that end, some details have been omitted and some have been disguised. None of these changes (and there are not many) affects the telling of the story.

I have not included discussions of my mistakes (and I've made some doozies). Maybe the memory erases these, or maybe I'm just avoiding painful recollections.

Some of the tales are technical. Mine has been a technical business. Submarines are marvelous machines, and the equipment and systems they comprise are complex and sophisticated. I have tried to simplify the discussions when it will not detract from the story, and I have occasionally suggested that the reader can skip ahead when the going gets a little difficult. For the most part, the details are rigorously correct, if a little allowance is made for narrative convenience (and a fuzzy memory!).

These stories have been written down primarily for my family, so that they can share the events and people that have been so memorable to me. I hope you enjoy them also.

# Plush or Berber?

A new kind of sound absorbent material

The Electric Boat Company was in a bind. The shipbuilding contract for **SUBMARINE NR-1** included, by reference, the U.S. Navy's "General Specifications for Building Ships." These requirements covered everything from lighting to lifelines. Shipbuilders were familiar with these specifications, and they had long since incorporated them in their designs and procedures. Compliance was guaranteed by a formal testing program, and the prospective crew of a ship being built had to agree that a given requirement had been met satisfactorily.

We on the **NR-1** crew had long been lobbying for the provision of carpet on the ship's deck forward of the engine room. It would add a nice touch to our otherwise Spartan living conditions. But such carpeting was not included in the building specifications, general or otherwise, and we were politely told to pound sand.

One of the "General Specifications" addressed ambient noise in ship's operating spaces. Obviously, it would not do to have loud machinery in spaces where people needed to be able to communicate. One evening, the shipbuilder's test personnel arrived with sound level instrumentation, and announced that they had come to verify compliance with the noise specification. **NR-1** had little machinery outside of the engine room, and the engineers anticipated few problems. They set up their instrumentation and prepared to record our sound levels.

What these engineers did not realize, is that the operating philosophy for **NR-1** specified that our search sonars would be turned *on*, and their speakers would be playing in the background. When a contact returned a signal, the musical chirp would be heard by the pilot, and he would call for assistance. The ambient noise level test was required to be run in the ship's "normal operating condition" and this was our "normal".

I went around the space, turning *on* all the sonar speakers, and of course we failed the test miserably. We, the ship's company, would not approve the test results as "satisfactory".

Several days later, at a regular **NR-1** progress conference, the subject of the ambient noise test arose. The shipbuilder's hands were tied. The contract required him to meet an impossible specification. The Naval Sea Systems representative (NavSea was the "customer") was understandably reluctant to propose (to Admiral Rickover, among others) that a waiver of the Navy's general shipbuilding specifications was required for **NR-1**. And we, on the ship, could obviously not accept a test that had failed.

Stalemate.

After comments bounced back and forth, I proposed that sound-absorbent material be installed on the plane surfaces in the compartment. There appeared to be no other way. The shipbuilder's representatives grimaced, having visions of the difficulties they would face trying to build sound-absorbing covers for dozens of installations.

"Of course", I said, "the largest plane surface in the space is the deck. And carpet absorbs sound pretty well …."

The carpet was installed, and the test re-run. The test still failed, but we accepted it with an asterisk that probably never saw the light of day. Everyone was happy: the shipbuilder's test program was intact, the NavSea representative did not have to face the Admiral, and we got our carpet.

We even got to choose the color.

# Dark and Quiet

A drill that turned out to be much more

During an operational mission, submarines seldom conduct complex engineering drills. The requirements for stealth and plant reliability are paramount. Drills are noisy, and the reliability posture of the plant is obviously reduced when we deliberately impose even simulated casualties.[33] Training goes forward, of course, but the training is often limited to lectures, seminars, quiet walk-throughs and practice evolutions that are the foundations of a successful training program.

Once a mission is completed and the submarine returns to waters closer to home, however, the gloves come off. On **PARCHE**, we usually scheduled a series of dedicated engineering training days near the end of each mission. The syllabus for the period gradually progressed from simple "warm-up" drills to complicated situations that demanded response from the entire crew.

The schedule itself was unusual. Normally, the **PARCHE** (like most US submarines) mans six-hour watches. Most of the crew prefers them, even though four watches a day require that a three-section watch bill rotate. When we scheduled a dedicated training period, we split each day into three four-hour drill periods and two six-hour rest periods. There were three watch sections. At any given time, one

[33] We often heard, "It ain't a drill no more, when the rods hit the bottom." The "rods" are the reactor control rods, and the saying refers to "scramming" - shutting down the reactor.

section would be on watch, one would have just gone off, and the third (scheduled for the next watch) was designated to assist the on-duty section in the event of a casualty.

Having five watch periods in a day makes for a complex rotation, but over a three day period, everything evens out, and each section has the same number of watches in the same time slots. (You can work this out on paper!) The sequence was fatiguing, and after three days we would all be ready for a rest, but the crew actually enjoyed the change from the daily routine and I think they enjoyed the challenges of the drills.

Conducting a drill was an evolution in itself. We used a system of colored ball caps to identify the drill team. Blue hats were worn by the drill initiators, who would impose the simulated casualty. These were the men who would (for example) trip a breaker or shut a valve to initiate a drill. Red hats were worn by the safety monitors, who would guarantee that a certain plant parameter was not exceeded, or that a particular action was (or was not) taken. They would only step in if necessary – as far as the on-watch section was concerned, they were "not there". Finally, the "Yellow–Hats" were the drill monitors with clipboards who recorded the section's response for review and discussion later.

Each drill was briefed beforehand, normally in the wardroom. The method of initiation was discussed, safety observers were given their assignments, and the drill monitors decided what to watch for. Mistakes we had made on the same drill in the past were discussed in detail – hopefully we had learned and the mistakes would not be repeated. When all was in readiness, we would head into the engineering spaces, where the on-watch section would try to estimate

the complexity of the coming drill by the number of red hats observed among the drill team.

The day of this story was the last day of a three-day sequence. We were on the last watch section, and this was to be their last drill. As I mentioned, the drills got progressively more complex and demanding as we worked through the sequence, so everyone knew that this last drill was going to be a big one. Little did we know …

For complex evolutions where the entire ship was likely to be involved, my Executive Officer, Archie Clemins,[34] and I would normally arrange to be in different places. One of us would be in the Control Room, forward, and the other was usually in the Maneuvering Room, aft. This was simply a safety precaution. We each knew "what was coming", and we could easily step in if necessary. The Engineer Officer, Frank Stewart, was usually in Maneuvering also, though he could position himself anywhere in the engineering plant if the "action" was to be somewhere else.

At this point, it is helpful to discuss a little submarine design philosophy. Modern submarines are complex installations, with many separate pieces of equipment and machinery. Almost all components require alternating current (AC) electrical power, and this electricity is usually generated by steam-driven turbine generators powered by the reactor. A diesel generator can supply a limited amount of power in an emergency.

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[34] Archie Clemins was perhaps the finest naval officer I ever knew. He was to become Commander in Chief of the Pacific Fleet, with the four stars of an Admiral. I was fortunate to serve with him.

A system of redundant electrical busses distributes the power to installations throughout the ship. Some equipment is run when needed (like air compressors), some is optional but normally run continuously (like ventilation blowers), and some is required all the time (like lighting, vital oil pumps, and most instrumentation). The electrical busses are designated "vital" or "non-vital" depending on the installations they power and the reliability of the busses themselves.

Automatic bus transfer switches are used in several places to transfer loads, when required, from a bus that has gone dead to one that still has power. Redundancy is piled on redundancy. No matter how complex the drill, or how severe the actual casualty, the electric distribution system is designed to guarantee that the vital loads *always* have power. Normally, this works perfectly. It is probably accurate to say that none of us, myself included, had *ever* seen a nuclear submarine without *any* AC power, whether at sea, in port, or in drydock.[35] Until,…

One last technical detail: We *never* started the reactor after an automatic shutdown without knowing what had caused the failure (and repairing it, of course). In a drill where we manually scrammed[36] the reactor, this meant that the watch section could not restart the reactor until they "found" why it had shut down. Thus, the drill initiators could impose a recovery delay simply by withholding information. The drill scenarios often dictated this to drive the watch section into complex configurations.

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[35] Even in drydock, we *always* guaranteed power to reactor instrumentation. "The reactor never sleeps …"

[36] A "scram" is a reactor shutdown where some or all control rods are rapidly inserted into the reactor core, shutting down the chain reaction.

For this drill, we had planned just such an obstacle. The watch section would not be able to initially determine the "cause of the scram", and they would have to configure the plant for a long delay in recovery. The objective of the drill was the development of skill in exactly this reconfiguration process. The watch section would have to shed electrical loads and busses until they ended up with one small, but very vital, bus.

When the Engineer decided everyone was ready, he initiated the drill. The reactor was scrammed, and propulsion power to the main engine was lost. The Diving Officer, by procedure, began coasting up to a shallower depth, perfecting his trim as the boat slowed. As expected, the watch section was unable to determine why the reactor had shut down, and they reported that "the recovery would be delayed". They began to reconfigure the electric distribution system to save power.

Every Commanding Officer and every Officer of the Deck has a set of favorite electric bus indicators somewhere in the Control Room. The indicator may be a "pump running" light on a panel, or it may be the sound of a particular ventilation fan. Using "his" indicators, an OOD can tell which busses still have power even before a formal report comes from the Engineering Officer of the Watch. I used "my" set, and I was able to follow the expected sequence of bus de-energization as the drill proceeded.

Then, the last, vital bus went dead. You didn't need a set of special indicators: <u>everything</u> was dark and quiet.

The reactor fully shut down, with all the control rods fully in. All coolant flow stopped. All the instrumentation that we used to monitor the reactor plant, and every other system on the ship, went dark.

I had seen blackness this absolute once before, when a Ranger deep in Carlsbad Caverns warned us, and then briefly turned off the lights. Throughout the Control Room, indicator and status lights, normally always energized, were dark[37]. And everything was quiet. Running motors, ventilation fans and blowers, even the little cooling fans in individual pieces of electronic equipment, all coasted to a stop.

Tension in the Control Room was high. As I have said, none of us had ever been in this situation before and I knew (if we could have seen them!) that there were some "wide eyes". I was scheduled to be relieved in a month or so, and the crew was aware of the coming change of command. I announced into the quiet darkness, "You guys are just doing this to test me, right?" The tension evaporated.

Actually, it was not completely quiet: Several electronic cabinets had small, battery-powered alarms that sounded a warning tone when normal power to the equipment was lost. Until we could find these units (in the dark!) and silence the alarms, we had to endure several high-pitched whistles coming at us from several directions.[38]

We formally secured the drill – we now had a real casualty situation on our hands. I did not know what had happened in

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[37] We quickly broke out emergency flashlights and battery-powered lanterns were turned on, so we soon had rudimentary lighting.

[38] For technical reasons, a pure, single-frequency tone is *very* difficult to locate. Our ears are badly confused by "side-lobes" that seem to be coming from a different spot. This is the same phenomenon that is involved in the design of directional antennas.

Maneuvering, but I knew the Engineer and the Executive Officer were there. I was confident they were doing what was necessary to restore power, and the *last* thing they needed was my asking, "What happened?" In the Control Room, I had other things to do.

We would have to go to periscope depth to get air to run the diesel. We needed electrical power, and it was obvious the turbine generators would not be able to supply power for some time. I needed to conserve enough hydraulic fluid to raise one periscope and ensure the area was clear.[39] My first order was, "Planes and rudder on zero, and leave them there." No sense wasting hydraulic fluid on trying to maintain course or an exact depth. We eased up to periscope depth and raised a periscope. The afternoon was bright; the ocean was clear.[40]

Within a couple of minutes, the engineers restored one vital bus, and we took advantage of power to the valve actuators to put an air bubble in the ballast tanks. This caused us to wallow on the surface, with the decks awash. More importantly, it raised the diesel induction above the surface of the sea, without having to raise the induction mast. Now, all we had to do was start the diesel, and we would have a little power.

I called our best diesel operator, a Chief Machinist's Mate, the leading petty officer of the Auxiliary Division, to the Control Room.

"Chief," I said. "We *have* to get the diesel on line. Go down to the diesel compartment, but do not take over. Let the Auxiliaryman of the

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[39] The hydraulic system "stores" a small amount of pressurized oil in a set of accumulators. The system will function, for a short while, without power.

[40] We were far at sea and not near any shipping lanes.

Watch do his job, just the way he has trained. Your role is to break out the procedure, and follow down the steps, just to make sure he doesn't forget anything. Treat it like a routine monitored evolution."

The Chief acknowledged the order and departed for the diesel compartment. The engine was started perfectly, first time.

We connected the diesel generator onto the electrical distribution system and we loaded it to about 90% of its capacity. (No sense in pushing the limit!) We now had a little bit of power, and we could begin the painstaking process of bringing the submarine back to life.

The Electrical Plant Control Panel operator who had caused the problem by opening the wrong breaker was convinced that he would be disqualified on the spot. He was one of our finest electricians, but he had made a grievous error. Instead, he was told, "You got us into this. You're staying on that panel until we get out." His grin made it clear that this was the correct order.[41]

The Engineer came forward with a new problem. Before we commenced the drill, we had had steam in all the turbines and in all the steam piping. Those components were obviously hot. Now, with no ventilation or air conditioning (the diesel generator could not carry those electrical loads), the engineering spaces were heating up. Rising temperatures would soon make the entire engineering plant uninhabitable.

We broke out the diagrams, and we found an unusual way to rearrange the ventilation dampers. By flowing air *backwards* through

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[41] This electrician later came to our critique in the Crew's Mess with a paper bag, complete with eyeholes, over his head. He had inscribed the bag, "The Unknown Electrician."

some of the lines, we could bring outside air in through the induction and dump it in the engine room. Then, we aligned the diesel to take its suction on the ship's atmosphere instead of the induction. We opened all the interior watertight doors, and dragged the (now heated) air into the diesel, where it was consumed and exhausted overboard. Temperatures in the engineering spaces started to come down.

By now, we were about an hour into the casualty. We were snorkeling on the diesel, and we had enough electrical power to get by. We had control of our depth, and there were no ship contacts in sight. The engineers were calibrating the instrumentation in preparation for starting the reactor. We were making good progress.

I turned to the Officer of the Deck and asked, "Do you have the picture?" He replied that he did.

"Fine", I said. "I'm going to bed. Call me if you have a problem."

The OOD swallowed his surprise, but he acknowledged. I went into my stateroom and lay down, but I didn't go to sleep. (!)

By eavesdropping on the sound-powered-phone circuit, and by listening to the periodic reports the Engineering Officer of the Watch would make to the Officer of the Deck over an announcing circuit, I was able to keep track of our progress, without seeming to be involved. For major steps, the OOD would come to me for permission or to report a significant accomplishment.[42] Everything proceeded smoothly. Five hours after we started the drill, we were back at full power, making flank speed.

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[42] For example, "Request permission to take the reactor critical" or "Captain, the electrical plant is in a full power lineup. Request permission to secure the diesel."

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