SEAWOLF *(Continued)*

Author James Conniff and his son, Gregory, aboard U. S. S. Seawolf.

big—somewhat bigger than the *Nautilus,* though not nearly as big as our recently launched twin-reactor picket sub *Triton,* the largest in our fleet. *Seawolf* displaces about 3,200 tons. She is some 330 feet long, with an unmistakable whale-like swelling at her bow for a tremendous amount of classified sonar equipment.

Yet with all the wonders of navigation, propulsion, and armament crammed into her, she is 27 feet wide at her widest point and in the crew's mess, for example, you *know* she's roomy. Headroom? Plenty. On this record trip she carried a handful of 6-foot-6-inch Texans, real giants, not one of whom whacked his skull on piping or got a crick in his neck from ducking. The only commonly used tight spot is the oval-on-end aperture through the half-dozen or so bulkheads dividing the sub into water- and airtight compartments. There, even a child has to duck a little *and* climb over the threshold.

Crew's quarters consist of tiered bunks divided by a narrow aisle in "staterooms" just behind the torpedo room at the bow. Eight to ten men share such units. Each bunk has its own overhead reading light. With 116 aboard for the 60-day submergence, the *Seawolf* ran a bit short of sleeping facilities but solved it with the "hot bunk" technique: if you have only two bunks for every three men, remember that at all times one of the three will be on watch, so all you *need* is two bunks—in constant use.

I rolled into one of those bunks to check the myth that you can't turn over without jamming into the bunk above. It's strictly a myth. Only Gargantua would have any problem. Those mattresses, by the way, are four-inch foam rubber, zipped into heavy plastic protective covers when not in use. Very comfortable.

A-subs are air-conditioned throughout and maintain an even 70 degrees temperature with around 46 percent relative humidity, an ideal combination seldom achieved back home. In the reactor room and among the turbines driven by its steam, things get warmer but never enough to overwhelm the blowers or the men on watch there.

I spent some time in that reactor room. Before going aboard *Seawolf,* I'd felt a fleeting uneasiness, irrational but very real, about snooping around that close to what is, in effect, a controlled atomic bomb. Yet there beside the awesome thing itself, rising to knee-level through the thickly lead-shielded deck, I felt only a profound respect for the men who devised and installed this liquid sodium SIR (Submarine Intermediate Reactor) Mark B, and for the men who make her go.

Nearby, a radiation counter's needle flickered with the infinitesimal milliroentgens of gamma-ray exposure we were getting. Its green cat's-eye winked steadily on and off. The ever-present whine of the blowers filled our ears. Off-center atop the reactor's main lucite shield, directly over the uranium core, a gleaming brass Buddha grinned its eternal grin.

The Buddha gleams because nobody goes through the reactor room without rubbing it for luck. At first *Seawolf* had some trouble with its reactor. When that was licked, the Buddha was installed, more as a charm than anything else. For 21 months now the reactor has run smoothly, and one gets the definite impression that those aboard *Seawolf* give the Buddha more than a little credit for what their own engineering has accomplished.

The Navy will soon rip out this prized sodium reactor and standardize the *Seawolf* to pressurized water reactors, which scientists have decided are best. Price tag for the conversion is in the neighborhood of $20 million, or two-thirds the cost of a new atomic submarine.

Why convert? For one thing, sodium is a tricky metal which explodes on contact with water. It is devilishly hard to install, and equally hard to confine in the system without developing leaks. Too, it freezes at 280 degrees Fahrenheit, which presents a problem in keeping the ship ready for sea duty. Regardless, the *Seawolf's* crew remains convinced it's the best reactor going.

ANY A-SUB'S REACTOR, whatever kind, is basically only a heat source. Liquid sodium or pressurized water absorbs the heat generated by nuclear reaction and circulates through a heat exchanger. There water picks up the heat and turns to steam. The steam turns the turbines which drive the A-sub's propellers.

How fast? Well, the Navy isn't talking about that, any more than it is about how deep nuclear submarines can go—the *Seawolf's* depth gauges were all carefully screw-covered against even loyal visitors' eyes. But some close figuring by those who know their math supports the belief that engines of war like *Nautilus, Seawolf, Skate, Skipjack, Scorpion, Sea Dragon, Triton, Swordfish,* and about 21 other nuclear subs now building or authorized are capable of 40 knots submerged, not just in spurts but for thousands of miles at a clip.

You go up a regular stairway—not a ladder—to reach the *Seawolf's* attack center. Forward of the center is the dizzyingly complex but thoroughly coordinated control room. The boat is sailed or fought from a position in the attack center called the "plot," from which skipper Richard B. Laning, newly promoted to captain, gives his commands.

About 15 feet forward are three red-leather, foam-cushioned metal seats, side by side, where the men who maneuver the vessel sit. One handles the rudder, one the forward diving planes, one the aft planes. But all three functions can be instantly and automatically turned over to one man so that he can, quite literally, fly the submarine underwater like an airplane.

If power fails, there is a three-way auxiliary hydraulic steering system. If that goes, manual controls on the back of each seat can be used.

Communication throughout the A-sub is by intercom and sound-powered telephone. The latter, for station-to-station talk, is a regular phone which you dial before lifting from its cradle. Your voice calling the station causes the phone at the other end to yelp like a puppy whose tail has been stepped on. Anyone near the other phone picks it up. From there on, sound-vibrated diaphragms permit a regular conversation.

At sea, calls to the stern of the boat usually concern the availability of the washing machine in the shower room.

During the 60-day test run, both the washer and the dryer got a workout night and day.

So did the showers, where you can use all the hot water you want at any time. Lavatory facilities are kept odorless by charcoal filters regularly renewed. Since the A-sub puts out three distinct voltages—120 and 450 AC and a 250-volt DC—use of electric razors, sun lamps, and such is no problem. Only a few used sun lamps during the long submersion, and one gave himself such a sunburn that he quit altogether.

For the first week out, the *Seawolf's* four cooks were able to feed everybody fresh vegetables, but afterward it was frozen foods all the way. The *Seawolf* converted her chill box (like a vegetable crisper) into a freezer of enormous capacity. Cook F.P. "Barney" Bongiorno told me he had enough food left for another 30 days.

Even 90-day submersions, the Navy feels, are by no means the conceivable limit for A-subs. Experimentation with dehydrated foods for indefinite-length trips is under way, with the accent on fresh taste when cooked. This time *Seawolf* crewmen tried—and enjoyed—a variant on the unpopular powdered eggs: fresh-frozen ones.

FOR THOSE WHO TAKE the A-subs to sea—and, if necessary, to war—the Navy has gone to great lengths in providing creature comforts. Is this just a discreet way of saying, "The condemned ate a hearty meal"? Are the men of the nuclear submarine fleet expendable via 1) exposure to radiation; 2) exposure to atomic accidents such as prompted the British and Danes to welcome *Nautilus* only in sparsely populated areas; or 3) exposure to a peculiarly horrible death in action?

The A-subs, if clobbered or sunk, will not kill their crews any more "horribly" than conventional subs. Escape techniques, in fact, have been vastly improved for A-sub personnel. As for atomic accidents, those aboard know how to deal with a leak in the system. If the reactor "runs away" on them, there are manual, automatic, and remote-control devices for regaining control or, if need be, for shutting power off instantly.

But what about radiation? Didn't this reporter just admit he saw evidence it was going on as he stood in the reactor room? Did he not, in fact, shorten his life or run the risk of inducing cancer or sterility by being exposed?

If you could have sat in the skipper's stateroom for an hour or so as I did, chatting with the *Seawolf's* medical officer, Lieut. Comdr. John H. Ebersole, you'd realize how wrong these common notions are.

Partially because our A-subs offer their crews an average 50 percent more living space than ordinary fleet submarines, half the crew gets *no radiation at all.* Those whose watch stations are near the reactor got an average radiation dose, during the calendar year 1957, of 120 milliroentgens. The exposure level considered safe in industry is *300 milliroentgens a week.*

Among the radiation checks Dr. Ebersole ran was to pin a film badge on the man always nearest the reactor, E. M. Curry, Jr. When Curry took his annual Navy chest X ray, he received 1,700 milliroentgens. Yet Curry, in an entire year near the *Seawolf* reactor, got a maximum dosage of only 550 milliroentgens.

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