ENGINEERING

Submarine Liners

Future travel may include a trip abroad on a submarine. Subs, which are not affected by elements, foreseen as transoceanic carriers for men and material.

By HOWARD SIMONS

➤ THAT TRIP ABROAD sometime in the future may be taken aboard a submarine, that is, if you do not mind missing a chance to sit in a deck chair.

A fond hope of submarine builders from the earliest days of undersea craft, shipment by sub of both passengers and goods has become more and more a possibility in the minds of several transportation experts. Nuclear power, gas turbine engines and bleach are beginning to add up to a means for shipping that may be speedier than some surface boats and surer than air traffic.

Probably the best argument for using submarines peacefully has been voiced by Sir George Paget Thomson, a Nobel Prize winner and professor at Cambridge University, England. Sir George thinks man ought to try to copy the fishes.

Subs Produce Few Waves

A submarine deep beneath the surface of the water, he says, produces practically no waves, as does its upstairs counterpart, the surface vessel. If properly designed, "its resistance need be very little more than 'skin friction'," he reports. Add this to the fact that an atomic powered submarine can probably travel along at 70 to 80 knots an hour with considerably less horsepower per ton than an Atlantic liner and the prospects seem promising.

"The economic speed for carrying goods," Sir George says, "is a matter of delicate balance. Increased speed requires more power, that is more expensive engines and more nuclear fuel, though this will be a minor cost. On the other hand, a fast vessel can make more trips in a year, or in a month, and so earn more. A short transit-time saves interest on the value of a cargo, and for certain cargoes early delivery may be important. It also reduces the cost of wages for the trip."

Sir George cautions in his submarine transport thinking, contained in his book, "The Foreseeable Future," that whether passengers would prefer the greater comfort of a large undersea liner to the greater speed of an airplane is "a question of psychology."

What makes the submarine as a mover of man and material so interesting during peacetime is the fact that it is rarely, if ever, affected by the weather. Unlike surface ships and airplanes, a submarine could adhere to a very tight schedule, mindless of typhoons, storm warnings, snow, icebergs and the other hazards of transoceanic travel.

A war-minded development, the atomic submarine, has opened the way to peaceful uses for it. The Nautilus, the U. S. Navy's first atomic-powered undersea vessel, has already proved its metal. It has stayed below the surface longer than any other submarine. It has traveled farther underwater than any other submarine. It has traveled faster than any other submarine. And it has proven to be safe for its crew members, who are well protected against the lethal radiation of nuclear fuel.

For the Navy, the Nautilus and the Sea Wolf are just the beginning. Three more atomic subs are already under construction. Fifteen are planned, including what may well be the world's largest. Seven of the planned subs, Rear Adm. Herman Rickover, mentor of atomic submarines, says, will be faster than the Nautilus. The last of the 15, he reports, will have two atomic reactors and will displace 5,000 tons.

For transport planners this is only the beginning, too. Designers are already busily wedding the atomic engine to the gas turbine. This would, in effect, be a marriage between the engine of the future and the fuel of the future.

Dr. J. J. McMullen, chief of the office of ship construction and repair of the U. S. Maritime Administration, has said, "gas turbines now appear to be the ideal power take-off for the nuclear reactor and they seem to be married to each other, the atomic reactor supplying fuel and the gas turbine supplying mechanical power."

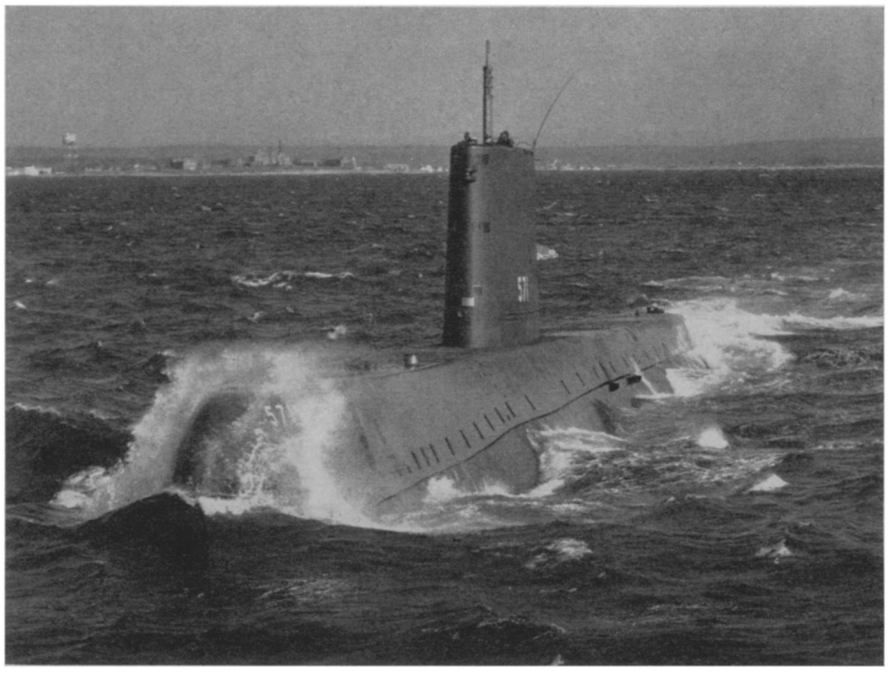
As a small power package, many experts think this combination would be ideal for submarine utilization.

Hydrogen Peroxide as Fuel

Another interesting development in submarine propulsion is the fact that scientists both here and in England are experimenting with hydrogen peroxide, most commonly thought of as bleach for blondes.

Britain's latest experimental undersea craft, the Explorer, for example, is powered by hydrogen peroxide. It is thought to be the first stable ocean-going vessel to use bleach as a fuel. The Germans have been credited with building five peroxide-powered subs, during World War II, but never got around to using them.

A big advantage in using peroxide, the British have found, is that no bubbles escape to reach the surface as tell-tale markers. Aboard the Explorer, the peroxide propul-



ATOMIC-POWERED SUBMARINE—The Nautilus, The U. S. Navy's first atomic-powered submarine, may be a forerunner of civilian subs, designed to carry tourists and cargo underwater to ports of call. As the weather is no problem to the submarines, they would always leave on time.

sion system, coupled with a conventional diesel, is used for added bursts of speed.

At Massachusetts Institute of Technology, scientists, sponsored by the U. S. Navy, have found peroxide to be potentially useful as a propellant for submarines, torpedoes, rockets, and assisted take-offs for aircraft.

Submarines, now thought to hold great potential as a peaceful means of communication and transportation, have most often been associated with the world's navies and warfare. Historically, credit for building the first submarine goes to a Dutch inventor, Cornelius van Drebel, who in 1620, built a vessel which is said to have navigated the Thames River in England at a depth of from 12 to 15 feet. Propulsion of van Drebel's undersea vessel was provided by 12 rowers, a far cry from nuclear and peroxide power of today.

Van Drebel's sub, as well as many of the others built before the American Revolution, were designed and used experimentally for peaceful uses. Not until 1776 was a submarine used for war purposes and it was an American undersea raider called the "Turtle." Designed by David Bushnell, the "Turtle" unsuccessfully tried to blow up an English ship anchored off New York.

But man's earlier submarine dreams were for a new means of travel and transport, and now it appears that the dream may become a reality.

At the rate undersea travel is being speeded up and refined by scientists the world over, it may not be too far in the future when the average citizen boards a submarine at dockside, hears the familiar "all ashore that's going ashore," takes his von boyage basket and goes down a conning tower to begin his trip across the ocean. Atomic-powered passenger submarines are just below the horizon.

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ASTRONOMY

Report Recovery of Returning Comet

➤ A COMET that returns to the sun's vicinity about every five years has been spotted by the Japanese astronomer Tomita of Tokyo Observatory, Harvard College Observatory reports. Known as Grigg-Skjellerup Comet, its magnitude is 14, too faint to be seen without a large telescope.

Science News Letter, January 19, 1957

● RADIO

Saturday, Jan. 26, 1957, 1:45-2:00 p.m., EST

"Adventures in Science" with Watson Davis, Director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Max A. Woodbury, research professor of mathematics, New York University College of Engineering, New York, N. Y., will discuss "Engineering Use of Mathematics."

BIOPHYSICS

Government Looking for Old and Full Tin Cans

➤ WANTED: unopened tin cans of food 11 or more years old. Needed by the U. S. Food and Drug Administration. The can you saved may save your life.

This could be the advertisement for a survey now being conducted by the Food and Drug Administration to determine how much radioactivity gets into the staple foods we eat.

A nationwide search for authentic samples of canned foods packed prior to 1945 is the first step in the survey, FDA Commissioner George P. Larrick has announced.

The year 1945, Commissioner Larrick explained, is regarded as the "year one" of the atomic age and such foods will be of particular value in determining the base for future radiation measurements.

In addition to collecting pe-1945 samples, the FDA is also collecting samples of recently packed products for comparison. The objective of the program is to determine the naturally occurring "background radioactivity" in foods from different areas of the country, Commissioner Larrick said.

These foods will then be monitored for any changes in radioactivity which might be caused by weapons testing or other applications of atomic energy.

The FDA Commissioner stated emphatically that there is no evidence to date of any significant radioactivity in the nation's food supply.

Science News Letter, January 19, 1957