

# Huge S.S. Manhattan Nears Completion for Ice Voyage

PHILADELPHIA, July 20—The six-month conversion of the S. S. Manhattan, largest merchant ship under the American flag, to an experimental ice breaking tanker capable of challenging the Arctic ice fields is almost complete.

When welders at the Sun Ship Building and Dry Dock Company yard finish attaching the Manhattan's new bow this week, they will have been part of "a ship-building effort that hasn't been seen since World War II," says Sun's project engineer.

Toward the end of July a specially trained crew from Humble Oil & Refining Company will take the vessel from here on a mission that could lead to construction of giant ice breaking supertankers carrying some of Alaska's North Slope oil through the Northwest Passage to U. S. East Coast refineries—at 60 cents per barrel less than other means of transport.

To equip the ship for its task, Humble had it converted into the world's largest icebreaker weighing 151,000 tons.

Much of the ship's effectiveness hinges on this new bow which has been designed to break thick ice faster. Set at a sharp eighteen-degree angle to the water surface, rather than at the thirty-degree angle of traditional icebreaker bows, the new bow protrudes farther out over the ice.

Armed with this hard-nosed prow, the Manhattan's captain will be going against every seaman's instinct as he rams the vessel into ice varying from several feet thick to pressure ridges sometimes as much as 100 feet deep.

But Humble's crew doesn't expect the Manhattan to get through extremely thick, tough ice; their job is to find out how to build 250,000 deadweight ton ships that will crush through a

100-foot pressure ridge in the Arctic Ocean with ease.

So the Manhattan was designed to be at once the world's toughest and most sensitive ship. Hundreds of tiny pressure gauges along the hull will tell engineers what forces were at work when the ship pushed into various types of ice at varying speeds.

At the same time, technicians will be flown by helicopter back to marked locations along the route to take core samples of the ice for analysis on ship. Then all of this information will be analyzed in small computers on the Manhattan and stored for later study at Humble's headquarters in Houston, Texas.

Engineers and marine experts then can begin to answer the big question: How much engine power and steel is required to get a ship through the worst possible ice conditions and still have room left for carrying oil?

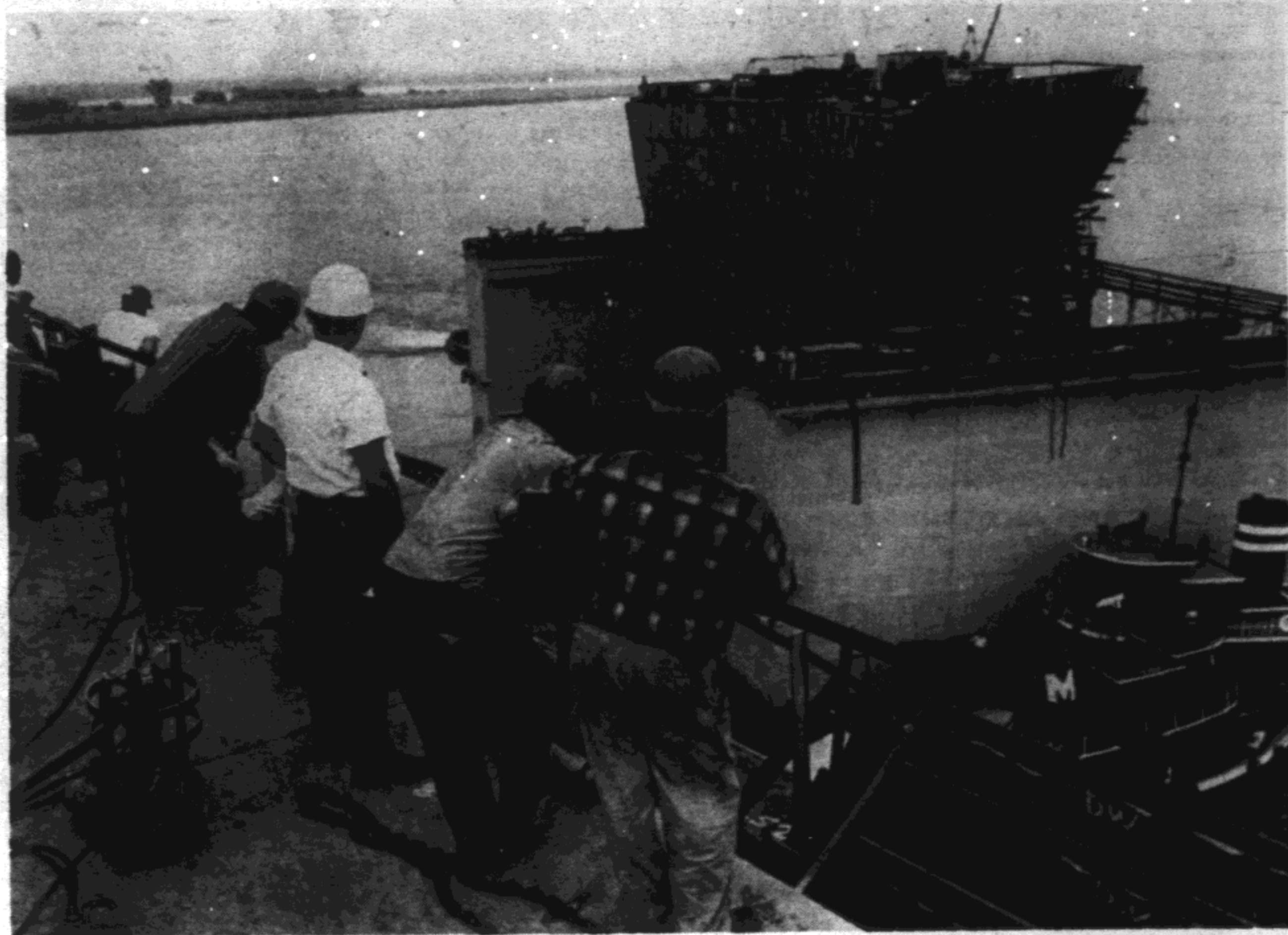
The success of the Manhattan's maiden voyage through the Northwest Passage depends on its returning with a shipload of information, not oil.

But the information had to be available to oil transportation planners by the late fall of 1969. The Manhattan, selected by Humble as the best equipped ship in the world for Arctic testing because of its high ratio of power to weight, had to be cut into four pieces so modification could be done simultaneously in yards from Bath, Maine to Mobile, Alabama.

In January, Sun's shipbuilders sliced the Manhattan into four sections—bow, forward, midship and stern—and farmed out the parts to their own yard and yards in three other states.

Midship and forward sections were towed much like any barge to yards at Mobile, Alabama and Newport News, Virginia respectively.

In Chester, Sun worked on the



**ICE BREAKING BOW**—Workmen at Sun Shipyard wait for tugs to bring the after-bow section of the S.S. Manhattan's experimental ice breaking bow into position for welding. The huge oil tanker is slated to sail her way through Arctic ice across the Northwest Passage sometime in September.

stern of the 115,000 deadweight ton tanker, strengthening the hull and installing new high strength propellers and tailshafts.

Construction of a new ice-breaking bow was divided between Sun and Bath Iron Works near Portland, Maine. Thus, five sections had to be rejoined before the ship was ready for her task.

During June and July, all of the Manhattan's converted sections—shielded with a wide, steel "ice belt," among other alterations—were returned to the Chester yard and assembled.

At one point in June, Sun reported that all four shipyards were devoting more than 10,000 workers to the conversion of the Manhattan.

The ship's round trip through the Passage will take about 100 days. After it arrives off Prudhoe Bay—near the recently discovered oil—it will continue to Anchorage, Alaska, and then return through the Passage continuing its data collection mission.

It is scheduled to reach the East Coast again on Nov. 10, carrying a small amount of crude oil.