A Vessel`s Capacity to Trade ahead.

When a traditional swim-ended Thames barge is adrift in a wind it develops headway in addition to leeway. This is known locally as trading-ahead.

Apprenticed to my father in 1935 as a waterman and lighterman I soon learned that barges which were set adrift in a dock responded by turning until they had the wind broadside then stayed like that and developed headway as well as leeway. I wondered why they turned and why they gathered headway. I asked around and had a few answers, none of them satisfactory. On one occasion I docked a barge at Victoria Dock when the wind was blowing straight down the dock (a westerly) and the freeman I was with explained why he and other freemen were taking the trouble to ensure that they started their drift down the dock with wind on a "desirable" side. Barges destined for ships on the north quay needed wind on their port side while barges destined for the south quay need it on starboard.

Under-oars with a barge in the tideway I found that when a wind blew on her port quarter she wanted to turn to port (she wanted to do the same when wind was on starboard bow) and, if the wind was not too strong, one could keep rowing at the port bow and maintain a straight course. After six months afloat I was a boat-boy in charge of a traditional waterman`s skiff. Licensed to carry eight passengers, twenty one foot long. Identical to the one in The Docklands Museum. Without her allowed eight passengers her after end was higher in the water than most rowing boats.. When the wind was on her starboard bow or port quarter she turned to port and when wind was on the port bow or starboard quarter she turned to starboard. Often I was joined in the boat by a freeman much stronger than I and I soon knew which side to choose to have an easier ride. Sometimes the freeman was an ex boat-boy likely to say "No, I will have that one sonny".

The traditional Thames barge has a swim at each end and below the after swim is attached a triangular plate partly immersed (called a budget). It has a steadying effect much the same as the flight on a dart. Military bridging pontoons have a swim at one end and a transom at the other. Joined together at the transom they form a pontoon pier (which of course is symmetrical). Two pontoon piers held apart by a section of roadway form a raft. A number of rafts joined together form the floating part of a bridge. Pontoon piers turned broadside in a wind but drifted downwind without trading ahead..

During the thirties barges were navigated under oars every day. A barge of fifty tons capacity could be navigated lawfully by one licensed man. A barge of up to one hundred and fifty tons required a licensed man and one other (often an unlicensed apprentice). Engaged in this work apprentices gained knowledge of the way vessels responded to handling (the essence of watermanship).

After two years afloat an apprentice's skills would be measured at Watermen's Hall and hopefully rewarded with an Apprentices License which would allow him to be under-oars alone. I was warned of a variety of questions about the set of the tide at different places and was told that studying the appearance of the shore at low water time would give many clues. My mentor afloat was a freeman named George Roche who had a habit of saying "Easy, (stop rowing) and let her go where she wants to go". "Allow wind and tide to do it all and you will learn what you have to do to stop her running into trouble". On occasions we were under oars in winds so strong that we could not turn her round to bring the wind onto her other beam, (known as 'Winding Her, rhymes with sin-bin). The last thirty degrees to bring her head into wind was the most difficult and sometimes quite impossible. I did not know that the strong wind eddies around her lee bow were the cause of our difficulty. When turning was impossible we resorted to fetching up alongside a barge roads and then allowing the tide to do the turning for us. When I asked him why craft behaved this way he avoided the question by saying "Do your homework and you will surely find out and what you discover for yourself you will remember for all time".

As a corporal in the Royal Engineers in 1940 I attended a course on Aircraft Recognition and learned that a wing was lifted by a reduction of upper pressure. Back at my Field Company I discussed with my RSM the matter of "stalling aircraft" and this led to discussing the behavior of pontoon piers in a wind. He explained that when a vessel is initially cast adrift there would inevitably be a bit more wind on one bow than the other. Wind eddies swirling round her lee bow would be "sucking" (his expression) her head further to leeward while there would be no similar eddies at the after end. On my course I had learned that maximum lift on a wing occurred when the angle of attack was twenty three degrees, this explained why winding a barge into wind became especially difficult when there was thirty degrees to go.

It follows that when a barge is left to its own devices and the wind is on the starboard bow there will be strong eddies round her port bow. Attacking at an acute angle eddies are very strong. Her head will blow quickly downwind until she is broadside when the angle of the approaching wind is ninety degrees both forward and aft. Pontoons would stay broadside while barges (with a budget would resist sideways movement more successfully aft. Her head turns downwind a few degrees more than her stern. Those few degrees do not increase because the wind eddies aft are now stronger than those for'ard. Also the water eddies on the windward bow (acute angle) are stronger than those aft. Now the wind is no longer abeam it is just abaft abeam, a fair wind (just). The barge is now charging through the water at an angle and so develops headway.

I have often found that under oars in a strong wind it took all of my strength just to hold the blade of my oar in the water when I was rowing at the stern. At these times I have wished that I had a plank of wood to put down as a dagger-board deep in the water lashed at the leeward quarter to give me a rest. Indeed I have demonstrated this to students and they have been amazed at the increase in the resultant "trading ahead".

Does this warrant study? I am sure that it does. In 1947 Thor Heyerdahl put himself and his crew at considerable risk when he drifted three thousand miles across the Pacific to land on an island in surf which had travelled the same distance. When his raft broke up his luck held and no one was injured. His raft aimed to copy those used in ancient times and followed sketches which showed six dagger boards placed two for'ard two aft and two amidships. He believed that the dagger boards may have been used as an aid to navigation but did not pursue the matter. A tug towed them fifty miles clear of shipping lanes and they were released to drift with the aid of a primitive square sail and a steering oar. One man on the oar aft was often not enough to keep her stern onto wind. Sometimes even two men were unable to achieve it. The dagger boards were left unchanged.. After about eighty days one of his dagger board freed itself and stayed athwart the rest. It was retrieved, and he wrote afterwards that when it was replaced the raft altered course a few degrees. He was then convinced that dagger boards aided navigation.

A sailing barge skipper will tell you that when he raises his leeboards halfway he needs less rudder to bear away. The barge builder knows that if leeboards are placed too far aft she will be "head-heavy" and when placed too far forward she will be "arse-heavy".
I have advised my students to introduce themselves to the Sailing Centre in Victoria Dock and ask permission to set adrift two sailing dinghies with their centerboards halfway up, one with wind on port and the other with wind on starboard. The amazing result would be long remembered.

Long after his epic voyage Thor Heyerdahl discovered the use to which dagger boards may be put. When two of his crew found difficulty in keeping Kon Tiki stern-on he could have removed the two for'ard boards and placed them right aft. They could then all adjourn to the cabin and chat about the reduction of effort and the wonderful increase in speed. By using the boards when approaching the island they could have chosen a course to steer to beach without surf and without risk. There was a brief time in our naval history when dagger boards were a feature of our "wooden-walls".

As a lecturer in Navigation and Watermanship at City College in London I was Apprentice Course Tutor and on one occasion had six apprentices on a punt (a fifty ton barge) called Whippet. The only punt I have known which was approved by HM Board of Customs. Unladen she lay deeper in the water than a normal punt. The immersed part of her budget was greater than the norm. The wind was so strong that all our efforts to "wind" her failed. We were in danger of running foul of a two thousand ton flat-iron collier piloted by Waterman Bobby Holland. Recognizing our difficulty he obligingly altered course to give us a friendly knock which turned us round beautifully. As he passed he shouted "Did you a favour there Teddy boy". I knew when I had been beaten and decided to leave the punt at Wandsworth for that day On another occasion I shared a class of twelve with another freeman tutor. My colleague had the Whippet while I had a waterman`s motorboat. The wind was blowing hard up Chelsea Reach. We had got underway a little too early, just after high water. As the punt approached Albert Bridge, which in those days had no plinth in midstream, she was successfully rowed head down into wind, but under the bridge wind speed almost doubled. The punt caught the wind on her starboard bow and quickly turned ninety degrees to port and then turned a few degrees more. The result surprised me, for she stayed under the bridge and traded ahead so fast that she could

not be stopped until she hit the wall on the north bank. We had to bring the motor boat to pull her clear.

One day in 1939 I had to tow with a 250 ton barge from Harland & Wolff`s at North Woolwich on the flood tide. Just downstream was the entrance to King George V Dock so I swung her head down and pulled her towards the pier-head which stood out from the shore. Wanting not to delay the tug I began to work my way to the outer end of the pier-head when I saw our tug leaving barges at Albert Dock Entrance nearby. My lassoing was below standard that day and soon I was adrift, but it did not matter as my tug was close-by. I was wrong. The tug was on her way down to Fords at Dagenham for more barges. The wind was South-Westerly, that is downstream and off the south shore. Where do you think I finished-up ??? - One mile upstream on the south shore at South Woolwich Pier at Woolwich Dockyard. A layman would consider that impossible the way the wind was.

Was it an inevitable result?

At the moment of becoming adrift she had the wind on her starboard quarter just abaft abeam maintaining a heading of South East which was the attitude one would adopt when rowing straight across the river. Her leeway was not enough to overcome the incoming tide so she drifted upstream rather slowly while making progress towards the south shore. She finished close to South Woolwich Pier at Woolwich dockyard where a friendly policeman stood waiting to take my line to prevent my carrying away the brow of his pier. I rang my employer who told me to put her alongside the pier and not to leave her for any reason. The tug came 24 hours later.

I was a fifth year apprentice who had learned another lesson.

Finally: If I entered Whippet for the Barge Race today I would prepare her by ballasting her fore-peak. This would raise her budget a little and reduce her capacity to trade ahead but would make her far more manoeuvrable than I found her fifty years ago.