

# Forum

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## Heaving The Lead

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Inspired by Professor Kemp's historical article on the use of soundings in navigation, this contribution provides useful information on the use of leadlines in commercial fishing and the Royal Navy in the mid-20<sup>th</sup> Century.

### KEY WORDS

1. Depth soundings.
2. Leadlines.

**1. INTRODUCTION.** John Kemp's piece on the use of soundings for navigation in the mid-20<sup>th</sup> Century (Kemp, 2008) is a strong reminder that navigation is not an exact science and that those of us who actually push ships about through wind and wave see navigation as a craft; and that we are craftsmen, not scientists. I am glad the RIN is not losing sight of older navigational practices, though *The Journal* and the *Navigation News* are largely devoted to innovation in milliamps. This contribution adds my input to the experiences related by John Kemp and his co-authors.

**2. BOYHOOD BACKGROUND.** My experience of the practice of heaving the lead and navigation goes back to 1937. My father was a North Sea fishing skipper and I was the eight year old son who was obsessed with navigation. My bedtime reading was Tait's Home Trade Guide, and I knew the Colregs, Morse code and flag meanings off by heart. That year I was allowed for the first time to go on a trawling trip with my father.

Navigation at that time consisted almost entirely of sounding by armed lead. The ship would be stopped and the 16-pound lead cast. The depth was noted, and the state of bottom examined closely, and tasted by the skipper and mate. I tasted it too. It was foul. This was done several times at hourly intervals until suddenly, and for no good reason that I could discern, the trawl was shot with the traditional order "*Shoot the nets in the name of the Lord.*"

Soundings were taken at half-hourly intervals while trawling. And then after hauling, the whole ritual was repeated. We had been trawling on a NNW course, and before shooting again, we had moved some six miles to the westward. This procedure

was repeated several times until my father decided to return to the home port of Lowestoft. No attempt had been made to fix the position during the 72 hours. It seems that the bottom of the North Sea has a fan-shaped pattern of low ridges which do not appear on navigational charts. It is in the valleys between these ridges that the best flat-fish are found. It is the fan-shaped nature of the ridges that make them ideal for navigation, for the distance between the ridges gives the latitude accurately enough.

As the trawl was hove in on the derrick out at sea, my father himself cast the lead, tasted it, and then ordered something like west-south-west and a half west and off we steamed. The lead was cast at hourly intervals without stopping the ship. It was swung overhead three times before being slipped and only the depth noticed. Perhaps the course would have been corrected by half a point. Otherwise we went straight at the Holm buoy.

Note that the chart was never consulted. My father's collection of blue-back charts was kept tightly rolled in black japanned-cases closed with a padlock. Only he (and I) looked at them. They had originally been his grandfather's and were never used for navigation. Certain sea areas were covered with minute marks and symbols entered at the end of each trip by mapping pen. They represented details of catches and abnormalities of the seabed.

3. NAVAL TRAINING. The war came and I went off to boarding school on a scholarship, and had nothing to do with the sea for the duration. I won a scholarship to Cambridge in 1945 but turned it down to go to Dartmouth as a Midshipman, where I had to learn formal navigation in its elementary form. We also went down to the jetty to be taught how to heave a lead, but did not do so in anger.

My first ship was the training cruiser *HMS Frobisher*, 11,000 tons. She had no echo-sounder. Here, the chains were manned by a cadet or midshipman on both sides whenever the ship entered harbour. Warships hardly ever take a pilot and we were told we leadsmen were an essential tool of navigation. (The chains were grating platforms hung either side of the forecastle outside the guardrails, about 100 feet from the stem.) One leant outboard over a loose chain at waist height, wearing a leather apron.

Generally the ship approached the port at about 8 knots and this required a long reach heave. One held the 16-pound lead with the line over the palm of the hand and allowed as much scope as one judged adequate for the ship's speed. One started the horizontal swing by holding the arm as far aft as one could stretch and bringing it sharply forward, and then repeating. One might take three swings to get the line to the horizontal and one would not take one's arm or the lead above the horizontal because of the possibility of the line going slack, which would mean starting all over again. The fourth swing would then be urged above the horizontal with some force, but before the line could go slack, one brought the arm as sharply as possible back to the shoulder and the lead would complete the circle overhead. After three such overhead swings, the lead was moving very fast and when one let go just before it reached the horizontal on its way up, it would travel a very long way forward, which it obviously needed to do if the ship was making much way. The first time one had to do this was quite nerve-wracking. We were told that the most dangerous thing was to

be nervous and not give the lead the full force. In that case it would not quite get over the top and could fall on the leadsman.

In the navy, the lead-line was made of signal halyard stuff; this was one and a quarter inch circumference, four-strand hempen rope with two strands laid up right-handed and two the opposite way. This was to minimise kinking, because the leadsman's mate had the job of hauling in the line after the cast and he did so fast, with the leadsman carefully making up his coil for the next cast as the line came in. The calls were traditional. (What wasn't in the RN?) Note that the words *By-the-Mark* or *Deep* both preceded the figure, the significant feature of the words was the number of syllables and the long-drawn out *Deeeeeeep*. Big ships of that period regarded six fathoms as a danger point. (A similar distinguishing phonetic feature is the wording of engine orders in twin-engine ships. *Port* has one syllable, *Starboard* has two, and *Both Engines* has three making confusion less likely. This rule was introduced following a collision that occurred after a misunderstanding of an engine order).

4. NAVIGATING OFFICER. A different use of the lead came with my first appointment as Navigating Officer of *HMS Loch Quoich*, a frigate sent in 1950 to patrol British possessions in the Indian Ocean. Because the Hydrographers had been required for military duties in wartime, no work had been done in the Indian Ocean for many years. Many of the charts were not merely based on early nineteenth century surveys, but had never been checked. We were asked to visit many places and report if a major survey was necessary or if only corrections were needed. If just corrections were required, I was to see to them. We carried no special surveying equipment, though we did have a Kelvin sounding machine.

Some corrections were simple. Off the Comoro Islands I found that the Sun, Moon, and Venus were all ideally placed at 1500 hours in the afternoon for a series of sights. I took nine of each and as a result the islands were moved one and a quarter miles to the eastward, to the fury of the French. But back to the lead.

There were islands where the reefs and banks had changed and I had to make surveys using a hand lead and line. I set up range poles on the beaches and in a 4-oared whaler and using a 7-pound lead, we ran lines of soundings day after day in the Andamans, Maldives, Laccadives, the Cocos-Keelings and the Chagos Archipelago. Using the lead this way we did not swing it but towed it handheld through the water so that if there were a hump we would discover it. This was all in soundings of less than 30 ft.

We used the Kelvin machine in bad weather (e.g. in a SW monsoon) when approaching low-lying banks, and I also used it when coming from Minikoi to Colombo. I didn't see the lighthouse at Minikoi and had been eight days without a sight. When a warship makes a ceremonial visit, it is essential that she should arrive at exactly the right moment so that bands can play national anthems, gun salutes fired, and dignitaries are not kept waiting. It is just not done to arrive early and heave-to off the port. This obsession with time is now ingrained and drives my wife mad.

The Kelvin gave me a 40 mile warning, but it was not that exact. More important was the track we were following. It is a normal thing to aim north (or south) of the destination in a featureless coast so that one would know which way to turn on landfall. I hadn't a clue whether we were north or south, when fortunately we passed a Blue Funnel steamer. Called by lamp she confirmed she had just left Colombo for

Aden. We steamed the reciprocal before calling the Captain and my reputation was saved.

When doing a *pre-survey* in the Persian Gulf in 1951, we had to feel our way into bays and creeks which (as far as we knew) had never been entered before by ships. Our Admiralty pattern echo sounder was useless and we could not use ASDIC because of the potential damage to the dome if we touched ground (it projected about four feet below the keel when lowered.) We approached the bay at dead slow ahead with leadsmen in the chains. Because of our slow speed it was not necessary to heave the lead overhead; a short swing was good enough in a frigate. The leadsmen made fast the line so that five fathom was at the waterline. We sounded until bottom was touched with the lead. The call was *No bottom at five, sir*, and then *By the mark five*. At this point, stop the ship and lower the whaler. The Sub Lieutenant went in the whaler with a quartermaster and a signalman and took station about half a cable ahead of the ship, sounding with a 7-pound lead. At each sounding, the signalman would display the numeral flag appropriate. If held above his head it was that figure bare. If horizontal, it was the half fathom over. We had plenty of time to stop the ship before grounding (we drew 12 feet forward and 15 aft.) Later, I would take the whaler and try to fix the 15 foot contour, marking it with empty gin bottles.

There was another occasion when the ability to use a lead was useful. During the Abadan crisis in 1951, Britain deployed two large landing ships with tanks and several hundred troops to Abadan. These were anchored at the mouth of the Shatt-al-Arab, and my ship, *HMS Loch Quoich* was the guardship. As the task force readiness notched up a point, I was commanded to survey the approach to the beach and to obtain samples so that the load-bearing capacity of the sand could be estimated. This we did during the dark of the night. The whaler was paddled in using Carley Float paddles as being quieter than oars in oarlocks and the Sub Lieutenant sounded continuously so that we could draw out the approach depths later. We took the sand sample and retreated. Thank God not a shot was fired. The information was not used, as common sense prevailed in London, a rare enough event from a naval point of view.

It is interesting that *Loch Quoich* was then anchored well inshore of the reported position of *HMS Cornwall* 50-odd years later.

#### REFERENCE

- Kemp, J. (2008). The Use of Soundings for Navigation in the Mid-20<sup>th</sup> Century. *The Journal of Navigation*, 61, 629–642.