The Development of Navigational Instruments

In our previous Clubroom, in Queen's Terrace, two navigational instruments were displayed and were variously described as " quadrants", "octants" or "sextants" and currently both are on "permanent loan" to the HCCM, aboard HQS "Wellington" together with Terry Clark's elegant display cabinet which has been gifted to the Honorable Company. The instruments differed in size and construction and "mirrorwise" neither resembled the sextants with which we were familiar.....so, research was needed.

About 1699, Isaac Newton invented the quadrant comprising a sighting telescope,index arm,index mirror,horizon mirror and a graduated arc. The 45 degree arc was graduated in degrees,minutes and 10 seconds (one sixth of a minute of arc). It was an unwieldy instrument (the sighting telescope was some four feet in length) but, about 1730 an English mathematician, John Hadley, produced a much smaller "reflecting" quadrant which bore a striking resemblance to the sextants so familiar to us. The small telescope was mounted on one side of the frame and a large index mirror was mounted at the point of rotation of the index arm with a smaller horizon mirror mounted in the line-of-sight of the telescope. Pivoting shades were fitted to facilitate stellar observations. Hadley strove to make improvements to the instrument (and he adopted some of the features of a similar instrument designed in America by a glazier,Thomas Godfrey) and his final version incorporated two horizon mirrors, the upper one being small enough to allow the navigator to see the horizon directly ahead as well as the reflected view from the index mirror. Moving the index arm allowed the instrument to be held vertically (or horizontally) - and, for some unknown reason, it became known as "Hadley's Octant".

Later another amateur astronomer, an insurance broker called Caleb Smith produced an octant (also called an "Astroscope" or a "Sea Quadrant") incorporating a fixed prism in addition to an index mirror to provide reflective elements. To add to the confusion Smith often referred to his invention as a "quadrant" but soon the name "octant" was firmly established and its advantages became more obvious. As manufacturing techniques improved so did the accuracy of the instruments -and their size was reduced to facilitate travel.

The early octants were of wooden construction but subsequent designs incorporated components of brass and ivory. Initially, their mirrors were polished metal but as glass technology advanced these were replaced by silvered glass mirrors.

As time went on the demand for a more accurate instrument gave birth to the sextant. This instrument allowed the altitude of celestial objects to be measured relative to the horizon, rather than relative to the instrument, affording greater precision.The sextant does not require a completely steady "aim" because it measures a relative angle and, thus, was more suitable for shipboard use.

Today, despite the rapid advances in position-finding technology, many ships still carry a sextant. Its use is not dependent upon electricity or GPS satellites and thus it may be considered a very worthwhile back-up navigational tool.

Some years ago I visited a large container ship in Southampton and after a converation about the changes in Bridge equipment,the Master, having made reference to his "invaluable" sextant, made a telephone call and instructed the recipient to bring the instrument to his cabin. After some ten minutes a rather flustered female Officer appeared with the news that "It's not in the chartroom drawer, where it was". The Master said that HE would find it but. after anothet ten minutes he re-appeared to announce that "it really IS a mystery ...I know I saw it last trip". I often wonder IF it was ever found -and, if so, how many, other than the Master, had the knowledge to make use of it to ascertain the ship's position.

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