THE INNOVATORS.

When they sailed outward they did not know where they were going to, when they arrived they did not know where they were and, when they got back, they did not know where they had been.

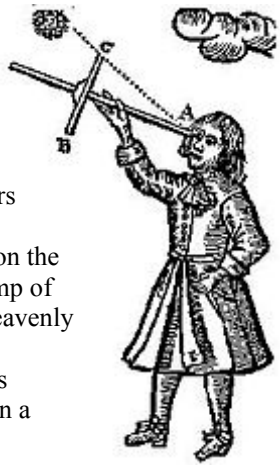
The Age of Discovery, an era of geographical research by seafaring adventurers from various European countries, commenced in the 15th. Century with the discovery of Africa and a sea route to the East by the Portuguese, the American Continent by Spain and numerous exploratory meanderings by other nationals.

Lacking any worthwhile navigational equipment, they depended to a large degree on “Portalon Charts”. The name comes from the Portuguese for “Sailing Directions” and they were drawn up some two centuries earlier by the Italians, Spanish and Portuguese. Their information was based on “Deduced Reckoning” using an estimate of speed and distance travelled in a “known” direction.

Speed was ascertained by throwing a lump of wood (a "log") overboard from the forecastle and timing its passing the stern (a known distance) and the direction travelled was ascertained by floating a lump of lodestone on a small wooden raft in a large container of water and noting the angle from “North”.

It all bears a passing resemblance to the present day expression “Dead Reckoning”.

Undoubtedly, the Portalon charts were surprisingly accurate and their accuracy steadily improved as many Shipmasters contributed to the sailing directions and attached sketches of the landmasses encountered. Indeed a historian of the time marvelled at the detail in the diaries and records kept by these intrepid travellers and wondered why those who explored the Globe by sea maintained such detailed accounts but those who explored on land seldom did so. This was the era of competitive trading and many countries were not prepared to share their navigational information with their rivals from other countries and, indeed, some passed laws preventing the promulgation of such information.



The passing years saw a steady improvement in shipboard navigational equipment and both logs and compasses became more reliable and these advances, coupled with the ability to ascertain an approximate “latitude” – the distance from the Equator using calculations based on the angular height of the noon Sun or Pole star (or other bodies at their zenith) – gave the voyagers more assurance.

Latitude was ascertained by using a cross staff or an astrolabe and the latter is described in Google as “A very ancient astronomical computer for solving problems relating to time and the position of Sun and stars in the sky” – and, although a computer it most certainly was NOT, I think I will leave it at that!

Additional navigational aids – back staffs, cross staffs, kamals, quadrants and octants soon appeared on the scene and all served to contribute to a greater accuracy in seafaring navigation. A kamal is described as a lump of wood or bone to which is attached a length of knotted rope – and it is used for determining the altitude of heavenly bodies!

Ascertaining Longitude with any worthwhile degree of accuracy still posed many problems and it was commonplace to use the Portalon chart to steer North or South and then turn 90 degrees left or right, maintain a sharp lookout, heave to during the hours of darkness- and hope for the best.

The Portuguese and the Spanish seafarers were undoubted leaders in the production of navigational almanacs and their “Pole Star Tables” and “Regiment of the Sun” – a record of the Sun’s declination in various Latitudes – contributed massively to the use of use of mathematics to solve navigational problems and seamen started to talk about “Plane Sailing” –making no allowance for the curvature of the Globe, Mercator Sailing which did and even “Great Circle Sailing”. Compass variation had been recognised and tables drawn up – but, an accurate method of determining Longitude was lacking.

Those with an interest in the subject recognised that time and Longitude were closely related but the problem WAS –how could one keep accurate time aboard a ship heaving and tossing in humid and hot conditions. An accurate clock and one not dependent on a pendulum had to be found and, spurred on by the offer of a huge sum of money from the Government to anyone who could solve the problem, many seafarers, astronomers and mathematicians set about finding one. The inventions – and they were many and varied – were submitted to the Board of Longitude but none was found to meet the desired criterion.

Many years passed and then a young carpenter from Yorkshire, John Harrison, presented the board with a chronometer that was accurate to the desired standard and he walked off with the huge prize of £20,000 – although it took him some years to screw the money from HMG!

Once he knew he was on the right track Harrison spent many years perfecting his invention and soon it was possible for ships to maintain a truly accurate record of Greenwich Mean Time – the essential component in ascertaining Longitude.

Were I to proceed further with an explanation of the relationship between GMT and the calculation of Longitude it would, I fear, offend many of our erudite readers so I will move on.

Harrison was not the only person to build an accurate timepiece and one that would withstand the rigours of shipboard life and a Frenchman quickly came up with a replica. Soon marine chronometers were reasonably plentiful and with the publication by the Astronomer Royal of a comprehensive and more accurate Nautical Almanac in the late 1700’s and the invention of the sextant by an Englishman, navigational accuracy was almost assured. Later again the chronometer error check by radio made timekeeping even more reliable and the chronometer “error book” was an essential part of every chartroom.

Today, it is all very different and no longer must the Second Officer await the arrival of the Admiralty Chart Correction data and then spend long hours correcting an abundance of charts, the majority of which the ship was never likely to need.

The relatively recent introduction of ECDIS (Electronic Chart Display & Information System) is an IMO approved computerised navigational system producing Electronic Navigational Charts or Digital Nautical Charts and these are replacing “paper” charts although there have been incidents involving the grounding of vessels when the underwater obstruction has not been “charted”. It is claimed that “e-navigation” will bring about increased navigational safety through better organisation of data on ships and ashore. Only time will tell if this claim is valid.

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