Imants i buixolers

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**Els Cresques, tant el pare com el fill eren buixolers.. és a dir artesans constructors de búixoles..
Al segle 16, el navegant català Martí Cortès, al seu llibre L'art de la navegació, descriu la construcció d'una brúixola nàutica moderna quer és sorprenentment sofisticada per als estàndards moderns. Era de carta seca, utilitzant una tapa de suport i un pivot construït amb tires d'un aliatge de bronze-com, suportada amb cardans, és a dir, era construïda de malla, i allotjada en una caixa de fusta segellada resistent a la intempèrie amb una tapa de vidre amb frontisses.**

La brúixola nàutica descrita per en Cortés, i utilitzada pels navegants catalans per a mapejar les aigües del Nou Món, es va convertir en el principal disseny en el qual es basen totes les futures construccions e innovacions del compàs nàutic.

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By the 16th century, Spanish navigator Martin Cortes, in his book The Art of Navigation, described the construction of a contemporary marine compass that is surprisingly sophisticated by modern standards. It was a dry card type, utilizing a support cap and pivot constructed of latten, a brass-like alloy, set in gimbals, which were also built of latten, and housed in a weather-proof wooden box with a hinged and sealed glass top.

The marine compass described by Cortes, and used by Spanish navigators in charting the waters of the New World, became the principal navigational design upon which all future magnetic compass innovations would be based.

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Every marine compass in use today is a descendent of rich and varied technological developments. Most compasses retain clues of their history, such as the stylized fleur-de-lis used to indicate north and the "points" still printed on the card.

The earliest rudimentary magnetic compass, like so many of humanity's important technological breakthroughs, owes its development to the pressures and necessities brought on by warfare. Emperor Hoang-ti (2700 B.C.) used magnetic compasses constructed of suspended pieces of "wondrous" magnetic stone, mounted in frames on wagons, to accurately coordinate the advance of his army through fog-shrouded lowlands, in pursuit of enemy forces. The

emperor's army routed its foe easily: a rebel prince whose army had made a habit of harassing the emperor's troops and then retreating to a misty valley, where they hid until the next opportunity for attack. Helpless against the systematic approach of the Emperor's army, the prince's army blindly stumbled about in zero-visibility conditions, unable to regroup and offer any kind of organized resistance, as detailed in Cmdr. J.B. Hewson's 1951 book A History of the Practice of Navigation.

Lodestone, as the bluish-black to reddish mineral magnetite was known, became highly prized for its predilection, when suspended by a single thread or placed on a piece of wood floating on the surface of a bowl of water, of always presenting the same side of its mass toward the pole star. A good stone offered an additional attraction for any finder; he could expect to receive, in return for it, its equivalent weight in silver.

Some later anonymous Chinese investigator found that he could magnetize an iron wire (or needle) by touching it to a lodestone. The needle would then take on the stone's magnetic properties (albeit, only for a short time). The magnetized wire would then be slipped into a piece of straw or stuck through a piece of cork, and made to float upon a water surface to seek out north. To maintain its north-seeking properties, it was necessary to touch the needle to the lodestone frequently, and the procedure became known as "feeding the needle." (The construction of numerous early compasses is detailed in the 1994 book Latitude Hooks and Azimuth Rings by Dennis Fisher.)

Sailors in Europe may have been using crude magnetic compasses of Arab origin as early as 1000 A.D. A 13th-century writer documented French use of a marine compass when he wrote "when in cloudy weather they can no longer profit by the light of the sun, or when the world is wrapped up in darkness of the shades of night and they are ignorant to what point of the compass their ship's course is directed, they touch the magnet with a needle, which is whirled round in a circle until, when its motion ceases, its point looks direct to north."

However, floating a magnetized needle on a liquid surface was not an easy chore, especially in a rolling sea, so a pivot pin was eventually developed on which the needle could be mounted to rotate freely. This technological innovation was followed quickly in the West by the introduction of a compass "card," a piece of round parchment sized to the span of a man's hand and mounted on the needle. The card's surface was marked with the points associated with the primary wind directions: north, east, south and west, the cardinal points of the compass. These primary wind directions were subdivided into halved winds, northeast, southeast, southwest and northwest. Over time, the compass card, or "compass rose" of the West, came to have 32 points. North was traditionally indicated on the card by a fleur-de-lis, probably because of the early use of marine compasses by the seamen from the ancient Aquitaine region of France, according to Norie's Navigation, a tome published by Norie & Wilson in 1889. A "cross" symbol became the standard identifier for east, about the time of the Crusades, to indicate the direction of the Holy Land. Between the 13th and 15th centuries marine compass design continued to improve dramatically.

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