

WATER SYMBOLIZATION IN FIFTEENTH AND SIXTEENTH CENTURY MAPS

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Research in the history of cartography has been dominated by a single theme: documenting and dating locational accuracy in maps. Underlying this approach is a straight-line evolutionary paradigm from primitive maps to precise scientific cartography, with technological innovations in map production and reproduction as major breakthroughs. Cartographic symbolization, on the other hand, is often taken for granted by geographers. Yet evolution in the graphic language of maps reveal the influences of tradition and environmental perception as well as technological development. Blakemore and Harley (1980) found this subliminal, Darwinian theme in many cartographic histories supporting the idea that "as civilization improves so map-making also progresses". While changing methods have decidedly influenced the making of maps, they contend "advances in communication and cognition are markedly different from those of technical development"(Blakemore and Harley, 1980, p. 23).

The idea of using cartographic imagery and symbolism as cultural artifact provides a new, rich and controversial direction. Why has this approach been previously bypassed? There are three major reasons: 1) It requires a broader view than determining methods of spatial cognition or assessing memory recall trees, questioning what graphic symbols mean in a cultural context; 2) It demands a deeper, cultural interpretation of the understanding of message transfer between map-maker and map user, a area that has generated much research, and many metaphors within the cartographic community; and 3) It needs precise verbal terms to describe an essential visual medium. It is only recently that the translation of Jacques Bertin's Seminology of Graphics (1983) has precisely defined key elements in the graphic language.

The scientific approach of identifying the factors complicating the message is much easier than the historical search for contemporary meaning or practice. Meaningful symbols are embedded in a specific time and culture. The emphasis of one feature at the expense of another may reveal

contemporary artistic practice, importance, the precise use of perspective, or graphic design (Arnheim, 1974). The lack of contemporary evidence has fostered some myths in assessing the use and meaning of symbols, for little has been written and that is traditionally set within the framework of documenting the progress paradigm. Searching for the contemporary understanding of symbols requires a more eclectic approach, drawing on such diverse fields as biblical sources and contemporary art, as well as later writings about woodcut and engraving practice.

This paper will examine briefly two elements of water representation in terms of color symbolism and figure-ground balance, tracing developments in the fifteenth and sixteenth centuries, a period that spans manuscript T-in-O maps and portolan charts, and the printed maps of the sixteenth century. Color conventions originated as symbols with deep meaning. Figure-ground balance provides a valuable clue to the image of the ocean as first a boundary, and then the focus of the map.

By the fifteenth century the "moralized geography" of mappaemundi, illustrating biblical dogma, had persisted for a thousand years. The simple T-in-O type with the known world divided into three continents and surrounded by a world ocean, came from the Genesis (i,9) passage that stated that waters encompasseth the earth: "And God said, Let the waters under heaven be gathered together unto one place and let the dry land appear." The circular T-in-O maps also took several variant forms, including a fourth continent and a rectangular or an oval shape. By the mid-fourteenth century these maps had begun to incorporate the discoveries of the explorers and a more locationally accurate Mediterranean, making this a transitional type between schematic mappaemundi and portolan charts (Woodward, 1987). Fifteenth century mappaemundi included not only biblical traditions but also secular legends and travelers' itineraries, in a blend of history and geography that must not be interpreted as illustrating a moment in time.

Portolan charts appeared by 1300, durable navigational aids that were drawn on single sheepskins. A sharp contrast to the biblical mappaemundi, they depicted accurately the coast of the Mediterranean Sea, often extending from the Baltic to the west coast of Africa. Prominent features are the place names at right angles to the coast, and directional sailing lines or rhumbs which enabled sailors to cross the open sea with the use of

a lodestone, and later a compass, rather than hugging the coast. Extant examples were made for kings and nobles, richly embellished, for no shipboard versions have survived. There were two major types, representing the Italian and Catalan schools. The Italianate charts were often restricted to the coastline and are more restrained in decoration, while Catalan examples also included inland rivers, mountains and vignettes of cities and rulers. Since by the fourteenth century there was considerable movement by skilled artisans between the two countries, there are some mixed versions, supporting the idea of schools rather than a purely nationalistic distinction. Portolan charts continued to be produced into the seventeenth century.

Color conventions of the manuscript T-in-O and portolan maps have at least some of their beginnings in medieval religious symbolism. The interpretation is made more complex by the problem of whether colors were original or added in subsequent copies. Further complication was added by color change through time, and by the fact that research must usually be done with reproductions of the handful of surviving manuscripts. De Dainville in Le Langue Des Geographes (1964, p. 331) reasons that in medieval maps, "The colors stem from a cosmology, for they are associated with the ancient philosophy of the four elements, evoked through the seventeenth century by the presence of their allegorical figures in the four corners of many world maps." Dainville (1964, p. 332) quotes Yves de Chartres ([†] 1115), a twelfth century monk who wrote (on Exodus 28 and 39), "The colors of the saderdotal tunic signify the four elements of nature - fine linen (white) the earth, purple the sea, blue the air and red fire." Water was either represented by symbolic purple, or a more natural blue or green. Dainville felt symbolism also might explain why even some early printed Ptolemys use purple rather than blue for the sea. Blue was used sparingly on earlier medieval maps, and associated with heaven, the air or royalty. On portolan charts blue is also used for the interiors of the tents of royal figures. In a rare example of writing about artisan practice first published around 1700, John Smith describes the preparation and use of colors on maps (Brown, 1950). Smith advises coloring the seashore, waves and all the lakes, with thin indigo, while spires and pinnacles should be colored blue.

Apart from the anomalous Red Sea, discussed later, there are many examples of more naturalistic colors in depicting water, particularly in later mappaemundi. Anna von den Bricken analyzed fifteen mappaemundi with unfaded colors and found twelve used blue or green for water, and eight of these distinguished between seas and rivers by coloring one blue and the other green (Woodward, 1987). The four fifteenth century examples include Andreas Walsberger (1448) who explained his color scheme on the map "the earth is indeed white, the seas of a green color, the rivers blue, the mountains variegated." Giovanni Leardo's 1452 map used blue for the seas and grey for the rivers, similar to the 1457 Genoese map. Fra Mauro's 1459 map, which Bagrow called the "summit of church cartography" uses blue for both (Bagrow, 1985).

Occasionally, color symbolism was carried over from Y-in-O maps as conventions on the more locationally accurate portolan charts. The outstanding example is in the depiction of the Red Sea. From early mappaemundi to late portolan charts, the Red Sea is colored either solid red or filled with wavy red lines. Often, a thin strip of land marked the passage of the escaping Israelites. In a few later portolan charts, the red is confined to the shores, or fades to a buff pink. However, it remains an enduring tradition, with classical roots. The Greeks called it Erythra Thalassa (Red Sea), but the Hebrew name Jam Suf translates more exactly to the Reed sea. Strabo (c63BC-25AD) had ascribed the name to the Egyptians and cited old sources including the red color of the water being acquired from rainwater running down hillslopes to the sea, while Homer described it as being rosy colored from the dawn (Ehrensverd, 1986). Since the sea is specifically named in the bible as Red in the story of the drowning of Pharoah's army, the tradition was strengthened. Red was also understood as being connected with hell-fire.

Portolan chart makers seem to have struggled with the convention, adding explanatory notes. On the 1375 Catalan Atlas the color is described by mapmaker Abraham Creques as coming from the sea bed. In Petrus Rosselli's 1465 portolan a legend described the Red Sea: "This sea is called the Red Sea. Note the sea is not red, but the cotton is of this color" (Winter, 1952). The portuguese navigator, Juan de Castro, writing in 1540 on a voyage from Portugal to Goa, commented in a perplexed way on this convention. Reciting earlier explanations, Castro, whose scientific

observations and locational measurements were remarkable accurate, could find nothing that justified the name. Despite frequent duststorms, the clouds remained black rather than red, and he could observe only narrow areas of red sand, for the vast majority of beaches were white. In the strait between Soukim and Kossier he found areas of coral, some of which were red, and when the water was calm these could be seen clearly. Castro finds this the only place where the name might have come from, for the Red Sea water was the same color as all the other water he had seen (Kammerer, 1947).

The Red Sea convention had interesting echoes for Catalan portolan charts, and even later sixteenth century world maps extended the convention by placing wavy blue lines in the Baltic Sea, and in a rare instance, the Gulf of California appeared red on Battista Agnese's world map of 1544. The explanation might be that once a symbolic representation became a convention, its use might indicate a misunderstanding by later mapmakers or perhaps colorists who presumed gulfs should be filled in with lines or colors.

The translation into Latin of Ptolemy's *Geographia* in the early fifteenth century sharpened the contradictions between accepted scripture, classical Greek philosophy, and sailors' knowledge. Ptolemaic maps of the Mediterranean were less accurate than contemporary portolan charts, but they continued to enjoy increasing circulation as more editions were printed in several countries in the sixteenth century.

Printing revolutionized mapmaking in the late fifteenth century, replacing handdrawn and colored manuscript copies with mechanized, monochrome reproduction. While more woodcuts than copper engravings were produced in the earliest period, engraving (which enabled finer lines and more detail) became more popular for mapmaking, though both methods existed side by side in the sixteenth century. The Italians emerged as the leaders in map production by the mid-sixteenth century, specializing in elegant engraved maps. By the end of the century, they had been superceded by the Dutch, who hand-tinted their engravings.

The change in figure-ground balance underwent a dramatic shift from the fifteenth to the sixteenth centuries. The *mappaemundi's* encircling world ocean and its tributaries, imbued with deep biblical meaning and classical roots, opened up to become a navigational space in portolan

charts. In early printed maps it became a field of experimentation. The variety and experimentation in symbol techniques can be seen by comparing various editions of Ptolemy's maps, printed in several countries between 1478 and the end of the sixteenth century. Italian editions from Rome, Florence and Bologna, mostly copper plate engravings, used stipple for the sea, or hand colored the maps using indigo for oceans, seas and rivers. Sebastian Munster's 1540 uncolored woodcut Basle edition used interrupted wavy lines for the ocean, and off-shore horizontal lines to emphasize the coast. Waldseemuller's 1513 Strassberg woodcut filled the ocean with zig-zag shading, again with out-coast hatching. Woodcut and engraving techniques usually produced different types of symbols because of the characteristics of tools and the medium, but it is a mistake to classify symbol types merely by mode of production, since some (particularly zig-zag shading and outcoast hatching) were used in both.

Gastaldi, a prolific Italian cartographer who drafted over 100 maps between 1540-1565, crafted some of his own maps and also employed several engravers using a variety of styles. His 1546 world map used finely detailed curving continuous waves, emphasizing the "ocean" ground at the expense of "figure" land. Later maps, produced by his engravers, simplified ocean representation by using stipple, although the depiction of rivers and lakes went through a range of symbols--including flow lines and overlapping or zig-zag waves. Stipple, simpler to engrave, also produced a more uniform ground. It was widely used by Mercator, and in the atlases of Ortelius and De Jode which included reproductions of Gastaldi's maps. While in the portolan charts, the sea was the "figure" and land the "ground" reserved for ornament and fantasy, in early printed maps the situation was reversed. Oceans became the area for embellishment. Decorative ships and sea monsters, often set as vignettes on waves drawn on top of the underlying uniform pattern filled up the larger spaces of open ocean. Since maps were often plagiarized, these decorations frequently served as the only original contribution, and perhaps personal signature of the cartographer or artisan. Although cartography seemed to have moved away from the biblical dogma of the T-in-O maps, there remain a few lingering, anomalous conventions. A Noah's Ark, complete with dove, decorated the Italian Paolo Forlani's otherwise restrained map of Africa, engraved in 1562. The mythical kingdom of Prester John was successively

relocated in various places in North-east Africa, and even included in an Ortelius atlas.

Only a handful of researchers have paid more than cursory attention to symbol use. Edward Lyman outlined a brief (and forced) evolutionary sequence in water symbolism in 1945, couched in colorful terms, but inaccurate in attributing styles and conventions to purely national origins:

"In olden times maps very often opened on the foam of perilous seas and struggling ships forlorn in furious whirlpools, represented by swirling lines. Billowing seas were continued by woodcut and line engravers until 1520, but in time the lakes and sea close to the coast became calmer, lying in long placid stretches. For about ninety years after 1540 water was usually dotted or stippled. But the Flemings, who were the most notable engravers between 1579 and 1620 and many of whom were refugees in England and engraved English maps, devised an artistic representation of their own for the ocean waves. It looked like gleaming, broken chevrons, and from its resemblance to a shot-silk effect it might be called moire" (Lyman, 1945-46).

This sequence oversimplifies the variety of techniques used in both copper-engraving and woodcuts, and presumes national schools of symbolic expression. Hodgkiss, in Understanding Maps (1981), gives graphic examples of the variety of different styles used to depict water. He notes that the early period of copper engraving was a period of experimentation, and that woodcut maps used different symbolization. However, his diagrams also imply that specific cartographers only used one type of symbol. National and individual styles were not wholly responsible for symbol type. Both the cartographic record, and the fact that skilled engravers were peripatetic, argue against a purely nationalistic approach to symbolization. The early printed maps have a great variety of water symbols, revealing both technical experimentation and perhaps a changed perception of oceans due to exploration and conquest.

The depiction of water in this two century period provides examples of two themes in the development of cartographic semiotics. Symbols which persist beyond their context become conventions, not easily abandoned, even with a changed world viewpoint. Thus the Red Sea symbolization spanned both mappaemundi and portolan charts. New techniques combined with new

concepts about the world resulted in symbol experimentation before an efficient and effective solution achieved consensus. Stipple eventually became the most widely used method for identifying the ocean, perhaps reflecting the conquest of the sea by reducing naturalistic symbols to an abstract surface. Both examples reflect the cultural context of symbols. Both are part of a graphic language which not only reveals technological development, but also contains a rich terra incognita in terms of symbolic and cultural meaning.

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