Monstrous Proportions

SLIDE 1

Intro

SLIDE 2

There is a lot of shrinking and growing in Alice in Wonderland but most of it is done in a most proportional way. But in Chapter five Alice nibbles a piece of mushroom which causes only her neck to grow, making her taller but in a most disproportional way. Alice is stretched.

Her shoulders were nowhere to be found: all she could see, when she looked down, was an immense length of neck, which seemed to rise like a stalk out of a sea of green leaves that lay far below her.

This disproportionate growth shocked Alice but also altered the way she was perceived by others. As Alice threaded her serpentine neck down through the foliage of the tree, attempting to find her own hands, a mother pigeon flew into her face and started beating her violently with her wings. 'Serpent' the pigeon screams.

Like the pigeon our understanding of complicated things is more likely to be influenced by the perceived shape of them than by a thorough grasp of their technical intricacies. Alice is scary because she is stretched beyond the limit of comprehension. Technologies can be the likewise. This paper looks at the relationship between proportion, understanding and fear in the public understanding of the trans-Atlantic telegraph cable.

Understanding about the proposed Atlantic telegraph project was mostly propagated through newspapers. And no newspaper article about the undertaking was complete without a map showing the route of the proposed cable across the ocean and the countries at either end which were to be put into communication. But maps are always an approximation of the real world because projecting the information contained on a sphere directly onto a flat piece of paper is not possible.

The exact nature of the distortion that occurs depends on which projection we choose for the base map. Land masses and oceans will be subject to stretching and shrinking, some areas will appear larger than they actually are and some will appear smaller. The map maker's job is deciding which areas are acceptable to distort to illustrate a particular project and which are not; effectively they decide how to depict reality.

SLIDE 3

Here are a few examples of different base map projections (all taken from worldmapper.org). Longitude (the horizontal axis) has been kept constant at 250 pixels so the relative stretching and shrinking of the latitudinal (or vertical) axis can be easily seen. Crude measurements of map heights have been given in pixels as a relative indicator of distortion.

 Equal area map/Lambert projection (H=37px)

 Fuller map/Dymaxion projection (H=69px)

 Land area map/Gall-Peters projection (H=72px)

 Robinson's projection (H=81px)

 Mercator projection (H=95px)

The mid 1980s brought a wealth of writing about cartography and map making. Writers such as Cosgrove and Daniels (1992), Livingston, 1992; Gregory, 1994, Harley (1988, 89, 92, etc.)) and Driver, (2001) drew on both Derrida and Foucauldian discourse to argue that we should read between the lines of topological content.

And it's clear that map projections are not neutral devices. Map images have power. They shape our world view. From the day we're old enough to watch Newsround, our understanding about the relationships between places and their relative importances are shaped by the maps we see.

There is a nice, obvious example on the screen here, the Mercator projection. In Europe it is the map we are most used to seeing. It's the base map on the weather forecast. It's handy for us as the areas near the northern and southern latitudes appear much larger than they actually are. This is useful as we can cram more of our 'local' information (about weather, cities, national borders, etc.) onto our maps.

The problem with the Mercator projection is that equatorial areas - notably Africa - are depicted as tiny. There is no room at the equator for annotative detail on towns, cities, weather, etc.. Many have argued that the Mercator projection dominates and subjugates equatorial areas by disallowing them land-mass, national differentiation and cultural detail. Indeed the date of creation in 1569 by Geradas Mercator makes it a cutting edge tool of European colonial expansion.

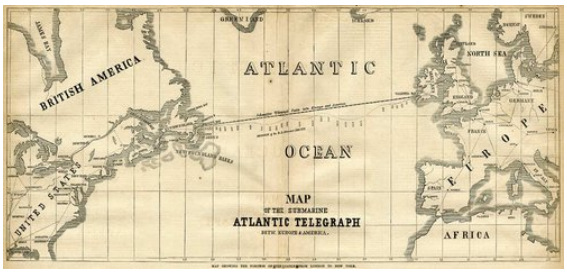
So knowing that maps are political and cultural tools where very deliberate decisions have been made about what aspects of reality should be distorted and why, my question is what if we do as Harley (1992) urges us to and deconstruct the map in search of 'the social forces that have structured cartography' (Harley 1992, 236).

What can the maps created for the Atlantic telegraphy project tell us about how the project was viewed and presented?

We're going to look at four maps made to illustrate the preparation and undertaking of the four attempts to lay a trans-Atlantic submarine telegraph cable between 1856 and 1866.

SLIDE 4

1858 Atlantic Cable route from Frank Leslie's Illustrated News.



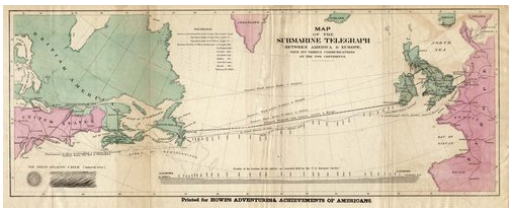
This map appears to be based on the Cylindrical Mercator Projection. The latitudinal (horizontal) meridian in which the UK lies is elongated, making the island appear disproportionately large. Newfoundland, the cable landing place on the American side falls into the meridian below and is therefore not emphasized in the same way. The island of Newfoundland is shown as roughly the same size as the island of Ireland when in reality Newfoundland is nearly half as large again. In fact, the latitudinal axis of the UK is exaggerated by almost exactly a factor of two. To illustrate, the distance between London and Liverpool (354km) is, according to this map, the same as the distance from Algiers to Bejo, which is in reality 700km. (This is puzzling as Frank Leslie's Illustrated News is an American publication, and I've never worked out why they chose to under-represent Newfoundland.)

The Atlantic Ocean is also handled in interesting ways. The longitudinal meridians (vertical) are shown at every 5°. This is unusually frequent, with 10° or 15° being more standard, perhaps it is an attempt to make the Atlantic look less like a large expanse of not very much! The longitudinal meridians are shown as running parallel, rather than converging on the pole. This shifts Greenland over towards Canada and exaggerates the size of the sea around Iceland. The far north therefore appears a vast expanse of ocean.

The dot-dash line describing the proposed route of the cable feels superimposed, cutting edge and highly telegraphic. Even more-so when set against the curvaceous and undulating line depicting the journey of the HSS Arctic as she crosses the Atlantic taking soundings of the sea-bed in preparation for the laying expedition. One line describing a weather-driven wake in a fluid medium, the other, the geography-bashing linearity of a super-technology.

SLIDE 6

1858 Atlantic Cable route. Printed for Howes Adventures & Achievements of Americans. (Probably Korff Bros. Practical Lithographers, 54 William Street, NY.)



This map uses the same route and soundings data collected by the HSS *Arctic* to produce a rather different-looking map. The base map appears to be a conical Lambert projection. There are seven variations of this projection created for different parts of the world. Selecting the right projection for your area of interest minimizes distortion within it. This map does not scale up to world-wide scale as distortion grows exponentially as you zoom out. The maker of this map was interested in the accurate representation of the North Atlantic but was not intending to relate developments to the rest of the world indicating that the cable was considered very much an Anglo-American project.

As in the previous map, the journey of HSS *Arctic* and the projected line of the telegraph are shown but interestingly it also seeks to integrate the new communications project into the existing communications network. Steamship routes and distances, military forts, train-lines, ports and harbours are included alongside the proposed new line. It shows an appreciation of the telegraph as a physical object, which will have to fit into your actual, real geography. This is underlined by the inclusion of a drawing of the cable itself, delicately sketched at its 'natural size'. Interestingly, thought the *Arctic* is here allowed to wander to-and-fro across the waves, the rest of the steamships must commute directly and unwaveringly…

SLIDE 7

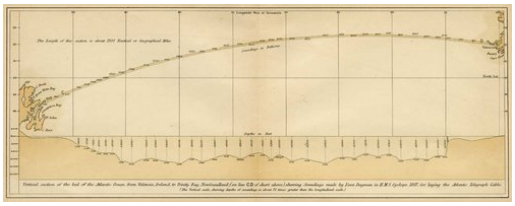
What interests me most, and brings me back to Alice's neck, is the graphic representation of the profile of the seabed stretching along the bottom of the map. Prior to the invention of the telegraph the seabed was sounded (which is where depth is measured by the lowering of a weight on a marked line) anywhere ships might be in danger of running aground. This would be in places like harbours or bays, or the locations of known shoals or shallows out at sea. Sounding was never carried out in deep water. A) because it was deep water is difficult and labourious to sound, and B), because there was no point: there was no danger to shipping.

The coming of the telegraph required the sounding of long transects of the open ocean for the first time. New devices were built to do this. Some of which could also sample the ocean floor and tell of all kinds of strange new things (but this is a story for another time). Hundreds of new measurements were made of the bottom of the Atlantic. Hundreds of new measurements which map makers were required to deal with. They had to find a way of projecting this new vertical – telegraphic - dimension onto maps, which by their nature usually only contained information about the horizontal plane. Their decisions as to how to do this are very revealing and give us some interesting insights.

The first thing you will notice (which is what brings us back to Alice) is it's doing screwy things with scale. The depth of the Atlantic ocean is vastly exaggerated in comparison to its width. The deepest point on the cable route is 2070 fathoms; which is depicted on the profile drawing as a depth of about 1cm. If the exact same 2070 fathoms to 1cm scale was used to represent the longitudinal dimension of the cable (which is some 1.4 million fathoms

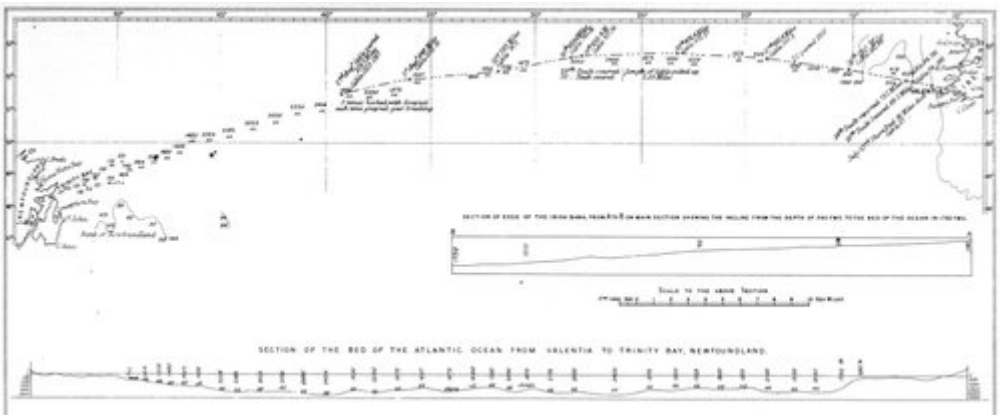
between Valencia and Newfoundland – I worked it out) our 1 cm high profile drawing would need to be 7 metres long!

SLIDE 8



The skew-scaled profile drawing is a common solution in telegraphic mapping. And playing with the relative scale of the seabed quickly becomes a standard way of dealing with the information right from the beginning. It occurs here on the 1857 chart as part of the first attempt to lay an Atlantic cable. This map is based on the soundings of HMS Cyclops. The vertical scale here is about 70 times greater than the longitudinal scale.

SLIDE 9



and it is present again during the second attmpt on this 1865 chart of the soundings taken by the Great Eastern.

So returning to Harley's observation that 'maps are… a collection of codes' (Harley 1992,238). How should we decipher what's here?

Wildly differing axis scales distort the image of the seabed in public imagination, shrinking the huge and unimaginable distance across the Atlantic to a more human and manageable scale (from serpent to neck); making it look less frightening, less wild, less threatening.

We've mapped it so we understand it. We practically own it. It is, as Cosgrove and Daniels would have it, 'the complicity of geography' (Cosgrove and Daniels, 1992).

The projection does more than simply make the distance look more manageable. It also creates the environment. The SS Arctic took 33 soundings along the route, an average of one every 80km. Each sounding tells us about the point at which it was taken and only that point. The 80kms between each point of are completely unknown and could contain anything, mountains, trenches, rocks, Atlantis, etc.. Distorting the distance scale in favour of depth brings the survey points closer together, making the data look fuller, shrinking the uncertainties.

The hard line delineating the profile of the seabed is a line of best fit; it smooths, cutting through/over/under potential hazards and uncertainties. Choosing a flowing line negates the possibilities of treacherous peaks and troughs. therefore The seabed looks, if anything, like a range of softly rolling hills. The line of best fit is therefore doing a great PR job for Cyrus Fields and the Atlantic Telegraph Company. The Atlantic cable will be well received in the depths. It is not in danger. It will not be broken, stretched or scraped. This project will be a walk in the park: give me all your money.

Conclusion

The choices made by the cartographer were vital in shaping popular understandings of the sea bed and the marine environment. The Atlantic cable maps are a carefully contrived political campaign; a cluster-bomb of subliminal messages reinforcing positive attitudes to the project. The maps flatter Anglo-American vanities through the choice of base projection. They play down dangers in the natural world, making the Atlantic look tameable, benign and manageable. They pad-out gaps in our knowledge, making the unknown seabed look like a stroll through rolling hills. They speak of a mighty technology unmoved by winds or tides. Steely, determined, modern.

The maps play with proportions on many levels. They compress public anxieties, minimise fear, expand popular optimism and often stretch credulity. Without the maps it would not have been possible to find financial backers to support the Atlantic Telegraph through two unbelievably expensive, high profile failures. The distorted projection created by these new telegraphic ways of mapping provided a sufficiently distorted perception of the project to drive through what was arguably the world's most mechanically, politically and economically ambitious gamble.