

2011

## Crossings

Noel Brady

*Technological University Dublin*, noel.brady@tudublin.ie

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## **Crossings**

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*“The bridge gathers the earth as landscape around the stream.”<sup>i</sup>*

## **Noel J Brady - Crossings**

### **Axis Mundi**

In ancient Egypt the Nile served as an Axis Mundi around which the Egyptian world view was constructed. It served to re-affirm their cultural supremacy coincidental as it was to the axis of the earth, revolving around the Polar star. Around this axis they assembled a culture uniting art, religion and science. Dublin's our Axis Mundi, the Liffey, flows West to East towards the rising sun. Unlike the Nile the Liffey has not attracted the same attention, at least to our current knowledge. Our cultural axis has grown in a different direction. Nonetheless it is a permanent line around which Dublin has negotiated its development. All major cities have at their heart a major river, Paris has the Seine, London has the Thames, Rome has the Tiber and New York has two; the Hudson and East River. Over time these cities have developed various types of crossings to become united and integrated urban centres. It could be argued that without a sufficient number of crossings permanent or otherwise an asymmetrical city would emerge, perhaps tied to one side or develop as two cities. In ancient Egypt the crossing of the river was such a profound event it divided the living (east) from the dead (west). This separation was embodied in their architectural schema. The river gave life and as such it became the symbolic centre of their constructs. It took the Romans consummate road and bridge builders to tame river and valley and to construct a model that has been the basis of most western cities. The road and bridge remain the most potent symbols of that empire.

Though millennia separate our world from ancient Egypt and Rome the fundamental components of city building remain largely the same. As it was it is now all cities share common traits but differ in the details. These details are often a consequence of water. The availability of water is vital to the birth and continuance of urbanism. Dublin with its wide bay to the East has been favourably compared to Naples. It's lopsided valley split by the River Liffey, steeper on the Southern approaches, has been home to human habitation long before the official establishment of Baile Atha Cliath (town of the hurdled ford, see below). An ancient way follows the high ground that is now Thomas Street from the West arriving at the highest ridge where Christchurch and the Castle meet. It is no accident that right below this place the Vikings chose to establish their Longphort in 841 at Wood Quay. This has been home to many subsequent generations each benefiting from the topography and generous tidal river. The high ground on the southern bank has been adapted largely for its strategic opportunities and later religious purposes. Previous discussions about the built heritage of Dublin has concentrated on the various artefacts, buildings and street facades of the Medieval, Georgian, Victorian and the Modern overshadowing a reading of the river Liffey as divider, unifier, conveyor, purifier and signifier. Its bridges, the footnotes to the city, have long gathered the landscape of the city of Dublin together.

### **Bridging the River**

The earliest archaeological evidence has identified urban settlement in and around Wood Quay in contemporary Temple Bar. This does not preclude pre-historic settlement elsewhere along the valley. Late Mesolithic fish traps have been found in the vicinity of excavations at Spencer Dock indicating a wider occupation of the riverine system. Cities tend to continue along the axis of their origin and in Dublin's case the south side has long been favoured over the northern shore. The origins of Dublin support this. Today the asymmetry of the valley is supported by an asymmetry of the city itself with the greater population living south of the Liffey. Even today water remains responsible for this characteristic with potable water supplied from reservoirs in the Wicklow Mountains and Dublin foothills. Though lacking in direct evidence we can surmise other things about the early city and even suggest that until the construction of Dubhghall's Bridge located a short distance downstream from what was the ford of the hurdles sometime prior to 1014 most crossings were taken by ferry. The ford was undoubtedly the key to connecting the two sides of the valley. The ford of the hurdles would appear to have been located just north of Fr. Matthew's Bridge where a confluence of roads that predate Stoneybatter, Bolton Street and Parnell Street met the river.<sup>ii</sup> Sea fishing and trade especially during the Viking period was conducted along its east west axis. But it is the bridges that united the city, making permanent a connection the ford could not secure at high water or winter.

Roads exist because of desires, to connect, communicate, to trade. Once a more permanent crossing is enacted other possibilities come into being, the landscape is gathered around itself. Evidence of such peripheral settlement can be seen in the remnants of medieval settlements such as St. Mary's Abbey, once the wealthiest Cistercian Abbey in Ireland was founded in 1139 on the marshy flats of the northern shore. "Silken" Thomas Fitzgerald started his unsuccessful rebellion in 1534 in the still extant Chapter House, hidden off present day Capel Street. With greater activity comes the demand for more crossings, especially practical and secure crossings. The history and evolution of these crossings charts the progress of Dublin as a metropolitan centre. Even without the archaeological record bridges serve to direct our enquiry. Like the roads and streets that connect them they are amongst the oldest remnants of the city. To underpin their importance several have been re-built time and time again.

Following the first permanent crossing it was another 650 years before a second crossing was established upstream in 1670. Originally called Bloody Bridge this was renamed Rory O'More Bridge in 1923. Between this bridge and the East Link Bridge, a distance of 4.5 kilometres, there are 17 crossings, at an average interval of 250 metres. Nearer the core the interval falls to about 100 metres. The three bridges at lower end of the river, completed since 1984 (1984, 2005 & 2010) have moving sections to allow for the movement of ships of various draughts upstream as far as the Custom House, completed in 1791. It was prudent to move the Customs House downstream replacing the earlier building 1701 which was located upstream on Essex Quay.

The industrial revolution transformed Dublin into a significant city on the back of its port. From 1755 to 1891 was the busiest period for bridge building with thirteen projects, 2 of which were rebuilds. Even with this significant expansion of connections ferry crossings remained an important means of communication particularly in the lower reaches of the river well into the late 20th century. Today the last river traffic is the tourist based Liffey River Cruises. Of the seventeen bridges, seven are over 100 years old and two are over 200 years old. Mellowes Bridge at 243 years is the oldest. Apart from the more iconic examples, the Calatrava twins; Beckett and Joyce, the Millennium and the older Liffey Bridge (halfpenny), the bridges tend to be invisible to the millions of transits that occur each year; people, bicyclists, cars, taxis, buses and trucks. Stitching together the north and south sides of the city their role remains the subtext to river's divisive qualities. Since the "Emergency" (c. 1939-1946) new bridges have made significant contributions to eroding the perceived division between northsiders and southsiders. Great public events such as the Liffey Swim established in 1920, St. Patrick's Day Skyfest and Tall ships events located around the Liffey help bring the whole city together. The Point Depot, the IFSC, have been recently joined by the National Conference Centre and Grand Canal Theatre succeed in bringing people eastwards towards the sea.

Joining the development of theatre in the 17<sup>th</sup> century, the music hall in the 19<sup>th</sup> century, event based public entertainment has become a significant factor in late 20<sup>th</sup> century urbanism. Further landscape improvements such as the boardwalk and the refurbishment of the Campshires have become the tissue that connects the bridges along the river's axis gathering, as Heidegger wrote, *the earth as landscape around the stream*.

The frequency and the dates of the crossings illustrate how the critical mass of the city has moved steadily downstream from its inception at Wood Quay. The main commercial core from Henry Street to St. Stephen's Green is connected by four bridges, two of which are pedestrian. These crossings support invisible desire lines that exist throughout the city. Dublin could not do without these connections as every new crossing attests to the demand. The loss of any one of the road bridges through obstruction or worse destruction would seriously impair the function of the city and would have repercussions as far out as the M50. With nine bridges over 100 years old built in either stone or cast/wrought iron it is clear that significant investment is required to maintain and repair them.

The river has exacted a toll on the bridges and their foundations. The number of rebuilds attests to this. Where Fr. Mathew Bridge is located there has been five bridges constructed since 1000, with intervals ranging from 9 years to 388 years. These were constructed during a period in which the river was the greatest threat. Today the greatest threat may be the very traffic that is carried. It is the stone bridges that are oldest and most at risk. Stone arches have been used in four bridges while another three are constructed as a stone iron hybrid. Erected long before modern seismic and finite element analysis we remain fortunate to live in an environment where weather and geological events are relatively benign. We cannot be so confident that that may continue into the future. Serious concerns have emerged in recent years with erosion of some of the stone arches of O'Connell Bridge. In 2008 a section of parapet gave way exposing stress cracks in the structure. At the time it was surmised that rising water levels at high tide was contributing to accelerated erosion.

*“It struck me, a belief that has never left me since, that we are just a great machine for looking backward, and that humans are great at self-delusion. Every year that goes by increases my belief in this distortion.”<sup>iii</sup>*

## **The Future**

The only thing that can be said about predicting the future is that it will be invariably wrong. In 1985 during a similar period of recession no one predicted the “great expansion” of Celtic Tiger years, 2002 – 2007 and in 2007 few publically predicted the rapid deflation of the housing bubble and current deep recession. It is with great trepidation that any talk of the future is undertaken, as it is said that the only thing that can be said about prediction it will be invariably wrong. Nonetheless based on what we do know we can say with a reasonable amount of certainty is that Ireland’s population will expand. The 2006 Census measured the population at 4.2 million people and more recent data suggests that it may be as much as 6.5 million by 2060. Just how it will expand is due in part to human agreement and the limits of resources. We can also be reasonably certain that Dublin will be the focus of significant expansion. The main limit to this growth is Dublin’s water supply from the south and the complimentary drainage system to the sea. The fragility of the situation is not appreciated by its citizens. For instance the 133 year old Vartry water tunnel that provides for 80 million litres daily represents 25% of the supply to Dublin city and the Greater Dublin Area. The failure of this tunnel would be catastrophic. Even if funds were available a secure bypass pipe would only be available from 2013 at the earliest.<sup>iv</sup> Just how Dublin will provide for the future will take a considerable bit of luck and planning, because in spite of ourselves cities seem to grow under their own steam, even where planning is under performing.

*“The US Economist Herbert Simon points out that an absence of central planning does not necessarily mean that all cities are poorly ‘designed’. On the contrary, they are (or at any rate, they once were) often remarkably effective in arranging for goods to be transported, for land to be apportioned between residential, business and manufacturing districts, and for a lot of activity to be fitted into a small area.”<sup>v</sup>*

Recent scientific enquiries have identified planning as having only a partial influence on the resultant urban form. Despite our best efforts it seems that cities behave more like viruses. Maybe we should not worry so much and place our faith in the “hive mind”.<sup>vi</sup> There are things we need to plan for. To meet the Kyoto protocols on CO<sup>2</sup> reduction, to improve our energy footprint and to provide for a more inclusive urban environment we require a denser urban framework. We need to repopulate the core and provide an integrated transport infrastructure. Not only should the centre provide for new forms of urban entertainment it must provide for life, make a desirable place to live that has larger family oriented apartments and family friendly streets and parks. Since 1945 many cities have been excoriated of their urban core allowing the young to abandon civitas for bucolic suburban fantasies.

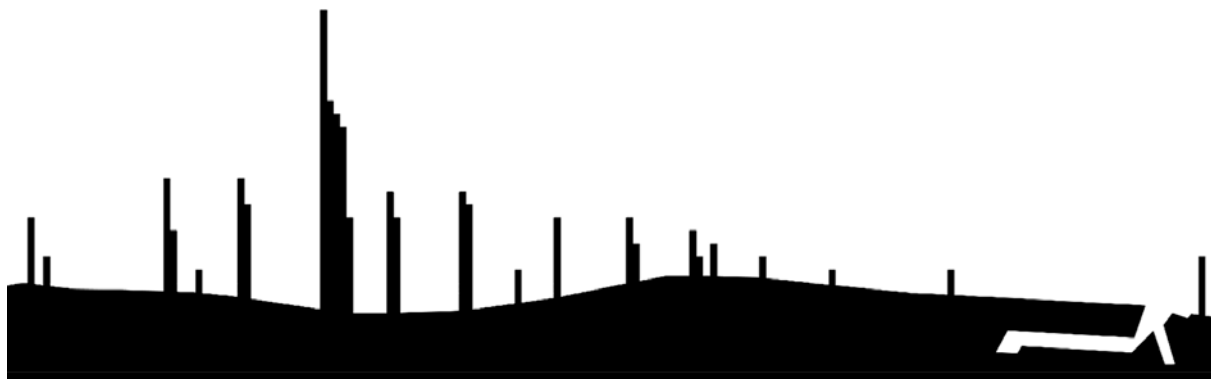
Since the 1980's cities have sought to reverse this viral expansion. In order to entice people back water has become a significant draw. Dublin is following where previously Boston, San Francisco, London, Rotterdam, Amsterdam and more recently Hamburg (Hafencity) have forged new urban identities through waterfront development. In Dublin a suitably attractive contemporary image of urban maritime engagement is attracting businesses and people back to the centre. In Hafencity a strategic decision has been made to include design contingencies to mitigate against climate change flooding. Providing for a complex mix of activities; a university, various business models, entertainment complexes and housing, the plan is attracting a new generation of active citizenry. Most of the significant inward investment seen in Dublin in the last 10 years has been along the lower Liffey corridor with the National Conference Centre, The Grand Canal Theatre, The O2 redevelopment along with numerous offices for the banking and legal fraternity.

Preparing for any future will require the preparation of key structures even if invisible to our comings and goings. With only six new bridges (two of which are pedestrian only) built in the last generation the remaining bridges require attention. Only making do with bridges that are over 200 years is no longer sufficient protection for the future. Vulnerable to the fluctuations of the river they remain viable, like the Vartry Tunnel, only by the grace of good fortune. At a rate of 2 mm per year we might expect that the average sea level around Dublin to rise by 80mm by 2051 but this does not account for the coincidental event such as that of a spring high tide, full moon and an eastwardly storm front such as in 2002. This led to flooding of areas of the northern shoreline.

*“In February 2002 for example, a low pressure system in the southern Irish Sea coincided with the spring tide, leading to an extreme water level of 2.9 m above mean sea level. This storm surge led to widespread flooding in Dublin and Belfast and marked coastal erosion between Cork and Belfast.”<sup>vii</sup>*

What were 1 in 1000 year events are now perhaps 1 in 200 year events with the possibility that two successive years may see these extremes seen in 2010 which was bracketed by two harsh winters. Every increase in water level and storm frequency will increase in wear and tear on the most vulnerable of these structures. The natural environment is only part of the equation. For instance man's impact exacts a much greater impact. In 2010 the Dublin City Council's traffic count recorded over 60,000 private cars and nearly 1,000 HGVs entering through the Canal cordon. The report identifies the 5 axle ban and the use of the new port tunnel as making a significant contribution to decreasing the physical impacts to the urban core. Nonetheless with progressive impact of this level of use it is inevitable that the bridges will require on-going inspection, repair and renewal. The danger of complacency in this regard was emphasised when the Broadmeadow viaduct collapsed in 2009 shutting down the main Dublin Belfast rail link. In addition to maintenance new crossings should be considered in part to supplement the existing but also to provide for a city that must expand inwards.





The relationship of the bridges to the Liffey is more a relationship between the activities of the city. City and Bridge are symbiotic. For Dublin the crossings are the musculoskeletal spine of the city and at present there are gaps. The diagram illustrates the relative location and number of iterations at each location through time from West to East. Bridge building is equivalent to city building. The synchronicity in developments of the city core and its bridges are self-evident. Further East the intervals between the bridges stretch along with lower habitation patterns. As this part of the city intensifies more crossings will be required. In reflecting on this dilemma it should be said that these crossings may in fact take on different dynamics. During the city's Victorian period the Loop Line Bridge was installed without any concern for the Classical ideals of Georgian Dublin. Opting in favour of engineering purity it wrapped around the Custom's House carving through the fabric of Gardiner Street, slicing houses in half. The Loop Line though vital to both passenger and freight traffic may be an unwelcome but necessary appendage to the city. Other options are possible, other strategies that will provide for the next generation.

In 1996 NJBA A+U proposed to relocate the Loop Line underground. The proposal to connect the new (then proposed) Barrow Street Station with a new underground Central Rail Terminal at Spencer Dock (the location of the National Conference Centre) would allow the removal of the existing Loop Line Bridge. Pearse Street Station could then be released to Trinity College as a sports hall or art gallery. Similar transfers of land to the city at Tara Street and Gardiner Street would repair the damage done to the visual continuity of the city. The contribution to reclaiming the classical presence of the Custom's House would be significant. Proposed connections could follow this lead going under the Liffey rather than over. In London's East End the 1902 Foot Tunnel that connects the Isle of Dogs to Greenwich is still actively used by pedestrians and cyclists. Dublin would not require anything as deep or as long to navigate the Liffey. In preparing for the future we should make crossings, lots of them, in as many variations as possible. Only by stitching the city together will we provide for an integrated city attractive to all. Only by preparing for all possibilities can all possibilities be accommodated.

The most recent addition to the city's crossings, the Samuel Beckett Bridge connecting Guild Street (alongside the Grand Canal) and Sir John Rogerson's Quay opens up a new axis across the city. Through this new structure the immediate landscape of the New Conference Centre and the Grand Canal Theatre development are brought together. To accommodate shipping access upstream this new structure rotates. This brings to three the number of bridges that move to accommodate east west river traffic as well as north south road traffic. Clearly the technology for dealing with an increasingly dynamic city is becoming more commonplace and responsive to changing demands. The next stage is to devise suitable crossings that might connect the South Quays to New Wapping Street or Castleforbes Road? Maybe a causeway bridge link further East completing the often discussed Eastern bypass. Together these would complete the mesh of streets providing for future densification of the core, opening access to desirable water frontage that will persuade people to return to the city. Coupled with this infrastructure will be the necessary tidal protection systems to ensure the survival of the city into the next millennium. The suggested Eastern bypass may include tidal protection as an integrated function.

A denser core, a living core will focus more attention on the river itself. The improvements to the quay walls, providing access for people include the boardwalk development and the Campshires have made the space of the Liffey more attractive. The introduction of Parisian like Bateaux Mouche for the Liffey River Tour points in the direction of other dynamic structural possibilities. In 2007 NJBA A+U proposed another development, this time for the Liffey itself. Plurabelia (a name inspired by James Joyce's Ulysses) was the name chosen for an artificial island at the centre of the Liffey, splitting the river into two channels. Along with this river a number of new pedestrian crossing points were proposed to connect the island to the quays. The proposal for the island was to identify with this ancient Axis Mundi of the city of Dublin creating a cultural island. On this island a number of satellite exhibitions would hold temporary exhibits from all of the main museums and galleries that can be found alongside the Liffey. This Island could provide the necessary infrastructure to gather the various drains that still enter the Liffey and treat their contents before returning cleaner water to the current. The island in turn would be an oasis for those that live, work and visit the city. With trees, parks and places for families to visit it would provide a welcome break from what has become a transit zone. It would be a place from which to recognise the role of the river and its bridges and the landscape that is gathered at the heart of the city.

*“Histories and societies do not crawl. They make jumps. They go from fracture to fracture, with a few vibrations in between. Yet we (and historians) like to believe in the predictable, small incremental progression.”<sup>viii</sup>*

The benefit of bridges and crossings appear to be self-evident and taken for granted. It is only when lost that we understand their value. The collapse of the Broadmeadow viaduct led to €245,000 in ticket refunds and €4 million in repairs. While only shut down for 3 months the incident emphasised how important the physical infrastructure remains even in this digital age. Providing for new infrastructure is bit of a black art. There is a fine balance to be found between the exact amount of investment that will ensure the minimal requirements are met and at the same time allowing for sufficient expansion, whether designed or not. When Sir Joseph Bazzlegate established the 1,100 mile sewer network for central London (completed in 1865), he instructed that the pipework would be doubled that which was adequate because *“we're only going to do this once”*. London has grown on the back of this generosity. Associated amenities such as the Embankment, a direct by-product of the work has become a defining character of the Thames enjoyed by millions of Londoners and visitors alike. This should not be considered a plea for large scale vanity works untethered by cost. It is a plea for sensible generous structures that are truly sustainable in their capacity to deal with a multitude of futures.

Providing for the future of the city is the responsibility of Dublin City Council. In successive 5 year development plans it identifies key strategic objectives for the future. From these objectives it prioritises and commissions works from the public purse. These undertakings are often beyond the means of the council but because they are of national importance central funding can be made available. Any work in and around Dublin Port and the Liffey would qualify as work of national importance. This deep water harbour, sitting close to such major population centre is home to Petroleum imports, Ferry and Cruise Ship Terminals, Freight and RoRo operations as well as bulk goods transfer. Any work that is considered adjoining this facility would have significant impact on the nation's passenger and trade operations.

More crossings will contribute to making the city functional and efficient especially a strategic link like the Eastern bypass. In order to facilitate this later connection a bridge would be necessary to allow shipping unhindered access. A piled causeway system similar to that of the Florida Keys could provide the necessary connective tissue. The low topographical profile of the bay though challenging would be of considerable benefit. It is clear that the city of Dublin alone could not support a massive infrastructural project that had national implications. In addition to the restoration of the older structures, at least 3 new crossings and an Eastern Bypass of combined bridge and causeway the bill would run into the billions of Euros. However a return of investment that would be garnered through tolling or some other road pricing system would be considerable.

In 1984 the East Link was completed at a cost of IR£6.1m (€12.25m at today's prices) and currently carries more than the predicted usage of 11,000 vehicles a day. This infrastructure has contributed many times that figure in local contributions and taxes. Though initiated through private finance it illustrates that public works should remain the domain of state. The annual profit the bridge garners is by any standards a remarkable return on investment. The return of investment to the state, city and people made by the other city crossings are probably incalculable; their contribution, like their presence, remaining invisible to many.

*“The East-Link took in €4.4m (after appropriations) for the same period (2003) with a profit of €2.6m to NTR from its share of the bridge.”<sup>ix</sup>*

If one were to look to a suitable comparator it would be the Øresund Bridge which connects Denmark to Sweden; a combined twin-track railway and dual carriageway bridge-tunnel across the Øresund strait. The cost of the project was about 4 billion Euro but is expected to pay for itself by 2035. It has been credited with instilling a new found cultural appreciation between the two countries as well as being the impetus form one of the largest and most interesting contemporary urban infrastructure projects in Denmark; the Öresund quarter south of Copenhagen. If we adopted a similar trans-generational approach to providing for the city of the next generation retaining the benefits for the city and nation we would have a firmer foundation to deal with the future.

The raising of the necessary funds for any of the works proposed above need not be wholly out of exchequer current spending. Though out of fashion for some time, bridge bonds like war bonds could be floated to pay for the investment and given what we know about tolling on the East-Link it would be a win-win for everyone involved. The 30 or so year payback period identified for the Öresund Bridge is nothing in the life time of a city over 1,000 years old. If in preparing for a future that may require environmental protection against the sea a combined infrastructure that deals with both may in fact be a highly economical solution.

Preparing for the future with an eye to the past is always dangerous. Nonetheless there are lessons in history that we do well to attend to. The history of cities is one of a history of water, our relationship to this fundamental element of life. Our transit through, over and under has defined many cities. It has given the world some iconic images, from the Brooklyn Bridge, to Sydney Harbour Bridge and yet their real value is their consistency of connection, their mute presence a testament to the importance of the city in our lives. The future can never be as certain as the past but we can prepare for uncertainty. We can provide a reasonable framework for continuity now, rather than waiting for disaster to visit. In the city bridge building is akin to city building. It is one of its fundamental building blocks. By gathering to itself the landscape of the city we might have a city united in purpose and ideal.

*“There can be little doubt that in many ways the story of bridge-building is the story of civilisation. By it we can readily measure an important part of a people's progress.”<sup>x</sup>*

### Author's Biography

Noel J Brady has received his diploma in architecture from Dublin Institute of Technology (DipArch 1985) and a masters from the Massachusetts Institute of Technology (SMArchS 1989). After a stint in architectural offices in London, the US and Ireland, he established NJBA Architecture and Urbanism. He also is involved with teaching at the School of Architecture and Urban Design DIT and has written extensively on Architectural and Urban Design matters.

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- i *Martin Heidegger - Building Dwelling Thinking p. 152, Poetry Language Thought Harper & Row 1975*
- ii *See Hermann Geissel's "A Road on the Long Ridge" for a discussion and extrapolation of early road systems below the contemporary street pattern of Dublin, CRS Publications 2006.*
- iii *Nassim Taleb – History does not crawl it jumps p.12, The Black Swan, Penguin Books, 2007*
- iv *Information from <http://www.dublincity.ie/WaterWasteEnvironment/waterprojects/pages/waterprojects.aspx>*
- v *Philip Ball – The march of reason p.191 Critical Mass Arrow Books, 2005*
- vi *The reference to Hive Mind relates to socially intelligent behaviour evident in bee hives and ant colonies where individuals work in concert to achieve a larger goal*
- vii *Policy Research Corporation + MRAG EU Commission Maritime Affairs, The economics of climate change adaptation in EU coastal areas, (p.2 Country (Ireland) Overview and Assessment).*  
[http://ec.europa.eu/maritimeaffairs/climate\\_change\\_en.html](http://ec.europa.eu/maritimeaffairs/climate_change_en.html)  
*"Were all the ice on Greenland to melt, a process that would likely take many centuries to millennia, sea level would go up by roughly 7 meters."*  
*www.climate.org <http://www.climate.org/topics/sea-level/index.htm>*
- viii *Nassim Taleb – History does not crawl it jumps p.11, The Black Swan, Penguin Books, 2007*
- ix *Sunday Independent January 16 2005 Liam Collins*
- x *Franklin D. Roosevelt October 18, 1931*