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CONCRETE AS METAPHOR

Opening Address to the 2nd International Conference on Concrete Repair, Rehabilitation and Retrofitting. Cape Town 24 November 2008.

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Most people, whether consciously or unconsciously, are attracted to what I shall call, the "great human narrative" of ***transformation through journey***. We find the narrative attractive because it appears prominently - as a leitmotif - in much of the way in which we construct our religious and cultural understandings of ourselves. The journey narrative speaks strongly to our sense of identity - both as belonging to a group (tribe, nation, human, etc) but also as individual (adult, academic, gardener, etc). We recognise these identities as having been formed through difficult intellectual, spiritual and often, physical journey. Importantly, we think of the personal as well as the shared journey as a process towards a better understanding of complexity – towards a more enlightened view of the world and our place in it.

Many religious narratives carry these themes of transformation through journey. Great spiritual leaders like Abraham, Jesus, Mohammed, Moses and Buddha all undertook journeys that left them and their followers fundamentally transformed. In the case of the prophet Mohammed, Muslims consider his (relatively short) journey from Mecca to Medina as such a seminal transformative moment in the conceptual development of Islam, that they mark their calendar by this event. Jesus' journey from the Garden of Gethsemane to the site of the Crucifixion captures the Christian imagination with equivalent power. We recognise that those involved in such a process are no longer able to see and understand the world as they did before undertaking the journey.

Of course, the narrative of transformation through journey is not limited to matters religious - our socio-political imaginations also draw strongly on this theme. In more recent times, Mao Tse Dung gave inspiration and impetus to a political movement in China by undertaking his Great March; Nelson Mandela speaks of South Africa's "Long Walk to Freedom" and, in the United States of America, the journey of the Pilgrim Fathers continues to be celebrated as an important narrative in constructing the national identity.

I cite the examples above to illustrate the importance of the journey metaphor as a part of the great human narrative. That my examples are strongly masculine in their character, fits with the generally patriarchal nature of the cultures to which these narratives refer. That it should be so, is a subject for a discussion that we have yet to turn our minds to as cement and concrete researchers – given the enormous leadership that we have drawn from giants like Katherine Mather, Della Roy, Carmen Andrade and Karen Scrivener, to name a few. But this for another time - and for a more competent mind.

In reflecting on cement and concrete as materials as well as the ways in which we respond to these materials as researchers, I have been struck by the parallels with the great human narrative of transformation through journey. While cement and concrete are not unique in this character, I use it because of both the subject of this conference as well as the fact that, very simply, it is the research area that I know best. In this lecture, I intend to consider these

connections and make the case for concrete and our roles as researchers – as an exciting example for the metaphor of transformation through journey.

It is easy to recognise that the journey from a mixture of limestone and clay to cement clinker and then to a garden pathway or the Three Gorges Dam is an irreversibly transformative journey. The process of hydration – to most people in the concrete industry, a phenomenon not deserving of a second thought – is as complex as the human condition can be. And, like the transformative development of human individuals and communities, the process demands - and releases - enormous amounts of energy.

As figure 1 shows, cement itself is a celebration of the principle of diversity and the idea that humans are irreducibly plural in their world views, opinions and, given a particular set of circumstances, will arrive at a wonderful array of different outcomes – sometimes completely unpredictable.

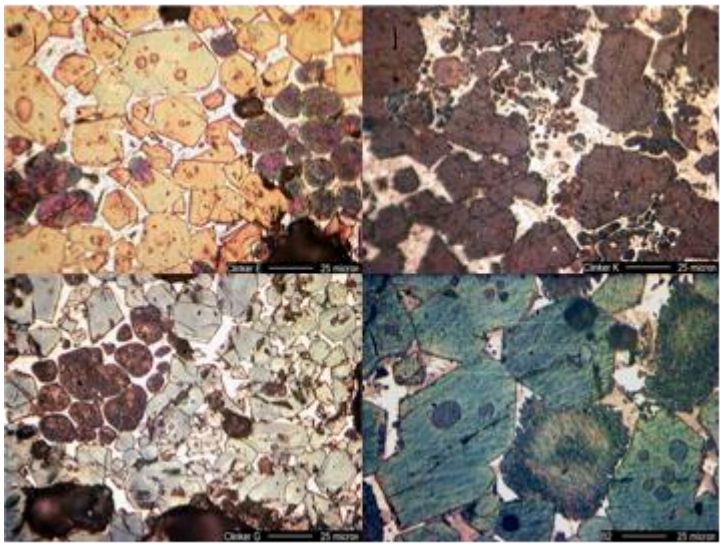


Figure 1: The irreducibly plural nature of cement. Optical microscope images showing crystal structure of four South African cement clinkers – all used to produce CEM I cement (with thanks to my colleague and one-time student, Dr. Peter Graham, who produced these images).



Figure 2: The enemy without – Damage to the near surface zone of concrete on which sodium sulphate was regularly spilt in a production process (the scale at the bottom of the picture is in mm).

The domain of concrete durability, deterioration and repair also reflects much of the challenges faced by individuals and communities. Deteriorating agents stand as bad ideas that,

even in small and apparently innocent presence, can completely unravel fabric and structure. Sometimes the harmful ideas are from without (see Figure 2) and sometimes the destructive ideas are infused through the community (see Figure 3). The result is to turn a system that is considered to be of long-term value and representation, into a crumbling mass and others look on with a nervous shake of the head (see Figure 4)

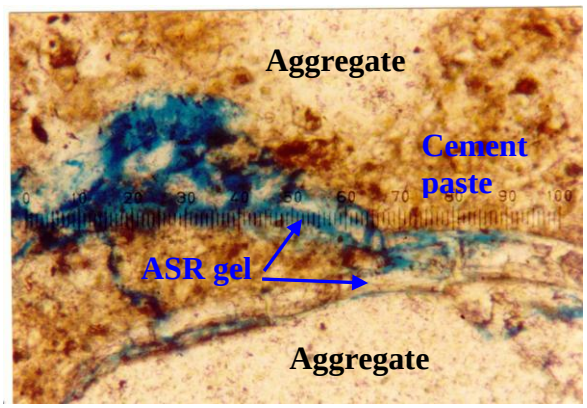


Figure 3: The enemy within – transmitted light microscope image of expansion and cracking due to alkali silica reaction. (I included a blue dye in the impregnation epoxy used to prepare the thin section. 1 division on the scale marker = 10 μm)



Figure 4: Sidewalk level of large concrete elements showing signs of serious ASR damage.

I would now like to turn to one of my favourite narratives – Virgil's Aeneid, in which Virgil recounts the journey of the Trojan hero Aeneas after the fall of Troy to his founding of the city of Rome. This narrative seems to me to have important messages to us as researchers and intellectuals as we embark on the path of research and the search for a better truth. (Incidentally, I do subscribe to the idea that the best of science is about finding better wrong answers.)

Despite loud warnings and protestations from the High Priest of Troy, Laocoon, the Trojans choose to bring the destructive idea of the wooden horse into the city's walls. They see the horse as a celebration of their victory and an acknowledgement of a new beginning for them – now that the all consuming old questions of the bothersome Greeks have finally and completely been solved. However, the horse is pregnant with danger and, once within the

midst of the city, this misinterpreted idea leads to the sacking and destruction of Troy. The Trojans miss the point that is always acknowledged by good researchers – ideas or theories are no more than representations of reality and that, as such, can have very different meanings when viewed from different directions. The world seems to be learning this point with the field of accountancy in the present global financial crisis – that a balance sheet is also no more than a representation of reality - which has to be interpreted in the context of the fundamental values of the society that it aims to give meaning to.

Aeneas realises that he has to flee the crumbling city, leaving behind the comfort of all that he knew and trusted – the ideas that he was willing to defend against all enemies - to face life as an exile. He runs from the city carrying his aged father on his back and holding the hand of his young son, to meet with equally concerned colleagues, where they will make plans for the journey that lay ahead. Aeneas abandons the city carrying the burden of his past on his back and holding the hand of his hopes and dreams for the future. In many ways, like Aeneas, the researcher is in a sort of intellectual exile – acknowledging the weakness of past ideas and driven by the hope of a future with more clarity of meaning in an enormously complex world. Furthermore, carrying the burden of our past and our hopes and dreams for the future, we too come from afar to gather in conferences like this one, with equally concerned colleagues, to make plans for our future intellectual journey.

A last metaphor from Virgil: on his journey, Aeneas relies on the kindness and support of those in power and who have resources. Without knowing the outcome, many are convinced of the value of his journey – for its own sake and for the utility value to his followers – and so support him with materials and resources but also by giving him safe harbour for respite. Often, such as when he enjoys the hospitality of Queen Dido, Aeneas has to resist, with much difficulty, the temptation to form a comfortable alliance with those who support him because he recognises that the loss of his independence will distract him from the path of his search. In similar form, researchers need the support of industry and government in a way that acknowledges the value of what researchers do in giving better meaning to complexity and without the answers to current technical questions being immediately obvious. As researchers, we also need to maintain a relationship with our resource supporters that is critically engaged rather than comfortably sycophantic. And finally, researchers too need an occasional protection from the storm and a safe harbour for respite – because it is when they have an opportunity to spend intermittent periods away from the noise and pollution of everyday activity, away from the gaze of tyrannical and meddling institutional administrators, that researchers are able to breathe the clearer air and express themselves best as intellectuals in their disciplines.

To return to the religious narrative, let me conclude by turning to the journey of Moses after winning the freedom of the Israelites in Egypt and leading them on the path to the "promised land". At a point on the journey, when Moses is in spiritual retreat seeking guidance from God, his followers begin to doubt the idea of the "promised land". They see that the path ahead is difficult and beset with danger and their confidence flags. The road sign is clear but it points to a path that they are not sure they have the courage for. Some among them propose to build a symbol of worship where they are encamped – indicating that they choose to worship the road sign instead. This new idea catches on and soon they have support to build a golden calf - not a stone or a wooden image but one made of gold. God's response is to make this recently liberated group of people wander in the desert for 40 years. One generation of this group has to die in the desert because they are un-transformable. The idea of an ability to freely search for truth is so inimical to their understanding of the world that a new generation,

unfettered by the limits of a world view constructed in a time of slavery, will have to pick up the path. In our daily lives as researchers and intellectuals, we must be careful not to be counted amongst those who have to die in the desert because we hold so rigidly to our theories that we are unable to even contemplate the possibility of a light being shone on our subjects from another direction. It is the possibility of an alternative view that makes our lives as researchers so exciting – and this is to be celebrated.

Many of you have travelled from afar to attend this conference. A scan of the papers to be presented tells me that this promises to be an intellectually stimulating event. I hope that, in some small way, at the end of the conference, you leave here feeling that your journey to this southern tip of Africa has been transformative.

I urge you to drink deeply from the deliberations and interactions during the conference. I also remind you that, in those last few minutes before they fall asleep, when they don't have to present a posture to anyone, intellectuals say a six-word prayer:

"I may have been wrong today"

Thank you