

Beauty is the first test

Opening remarks by Tomás Ó Ruairc, Director, Teaching Council, to officially launch “Beauty is the first test” at the National Craft Gallery, Kilkenny

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When Karen left a voicemail asking me to launch this exhibition, and explained that it was looking at how Maths and Art are closely interlinked, I knew straight away that I wanted to say yes – even if the diary did not! This is something that is very close to my heart, and it reflects the journey that I have travelled to date as a learner, professional and human being.

Beauty is the first test – it is a most intriguing title for an exhibition. The first test of what? And “beauty” and “test” don’t strike us as natural bedfellows – the last thing you would want to do with a beautiful photograph or painting is to “test” it – you would read / view / listen, form an opinion and discuss that with others, you might do nothing more than simply close your eyes and savour the beauty of what you see deep in your soul – but you would not “test” it. I think of the lighthouse on Inis Oírr that I see every year from the house that my family rent in Clare, or Poll na bPéist in Árann, the Wormhole – I could stare at those phenomena for hours and never once “test” them.

I think in that sense the title is quite subversive – in a good way. For it places beauty at the heart of the conversations and discourse of the modern world, in a way that suggests it is perfectly at home there. These conversations or discourses still labour under the misapprehension that people are rational beings, that growth should be our primary goal, as opposed to well-being or

social progress, and that there is an optimum, linear path to our progress that can be discovered. “Testing” is what that particular world is all about. This, ironically, is the door through which beauty is appearing to come centre stage in our modern world.

The title “Beauty is the first test” is taken from the following quote from G H Hardy in 1940:

‘The mathematician’s patterns, like the painter’s or the poet’s, must be beautiful, the ideas, like the colours or the words, must fit together in a harmonious way. Beauty is the first test; there is no permanent place in the world for ugly mathematics.’

Note that Hardy was not an artist or craftsperson, but a Mathematician – or perhaps he was ...

The only argument I would pick with Hardy is the tone of “compulsion” in his statement – as if Mathematics has veered from the true path of beauty and must return. There is no “must” necessary – Mathematics, properly understood, **is** beautiful; it is at one with the beauty of nature and of artistic endeavour.

I heard a Professor say at a European conference recently that “we must respect the subjects” in any changes that we make in education. I think that respecting the subjects has been misunderstood as saying that all subjects must be treated separately and distinctly if they are to be properly understood. I would argue on the other hand that if the full riches of learning of every area of human endeavour are to be appreciated at all, then we cannot but look at the links between each of those areas. There is a history to science,

and a science to history – but you would be forgiven for thinking otherwise from the textbooks that students take to schools these days.

I think that in that sense, this exhibition, while extremely pleasing to the eye, presents fundamental challenges to both the artistic and scientific communities. Some will have a view that artistic endeavour by definition is creative, free-flowing, and therefore any sense of structure, theory or formula is inherently threatening to that. Equally, some will hold the view that mathematics and science are exacting in nature and rigorous in demand – robust, peer-reviewed, objective research is at its core, and any talk of beauty, freedom, comfort with uncertainty is inherently threatening to progress. We could of course go further, like those in UCD who used to write over the toilet roll dispenser – *Arts degree, please take one!* – but I won't comment any further on that, except to wonder how the accountants and scientists of UCD had the creativity and time to write that graffiti in the first place!

What this exhibition shows us, in all its vivid dynamism, is that both views are not only superficial at best, but fundamentally wrong. I am not sure if beauty is the first test, but it is certainly the fundamental truth. I am reminded of what John O'Donohue had to say about kindness, which I think would resonate very much with how we might feel about beauty:

There is a kindness that dwells deep down in things; it presides everywhere, often in the places we least expect."

He goes to talk about beginnings:

The beginning often holds the clue to everything that follows. Given the nature of our beginning, it is no wonder that our hearts are imbued with longing for beauty, meaning, order, creativity, compassion and love..... The eye adores the

visible world.... For the exploring eye, there could be no dream greater than the world that is."

This reminds me of that line from Anne of Green Gables, where in describing her preferred way to pray, said that she would rather go to the middle of a field and simply feel a prayer. When I have sat at Dún Dúchathair in Árainn, or seen the sun set at Kilmore Quay in Wexford, I have understood what she meant.

And I have also understood it, surprisingly, in the middle of my Junior Certificate Maths exam in 1992!

I went to school just up the road in Carlow, and pursued a largely academic route at post-primary school. I really enjoyed it, I did well at school, but the system was very much driven by exams, text books, tests, revision notes.... And I remember vividly sitting my Junior Cert maths paper, and coming to the question on quadratic equations, which was about a rocket! I can still see the moment in my mind's eye – I found this fascinating and illuminating. The question gave you an equation and you had to draw the graph of the rocket's flight path from launch to landing, and then identify how high it was at various times, and vice versa. I had never come across a question like it in all my years studying Maths. And I look back on that moment, and until last Christmas, I was often asking myself – where did that rocket go?

Roll forward to last Christmas, and I finally get around to reading a book called Alex's Adventures in Numberland by Alex Bellos. And in that book, I found where the rocket had gone to! Chapter after chapter, he shows in so many different ways what an artistic, beautiful and contingent or uncertain a concept Maths is. I had many feelings on finishing the book, but an

overwhelming one was – where was this book when I was studying Maths in school? It seems to me that all creative endeavours are contingent and uncertain – you start drafting a poem or novel and have no idea whether your first scribbles will make any sense or appeal to others; the same when you take a brush to a blank canvas. Maths is not really all that different. I remember being practically floored at the realisation that the only concrete expression we have of hyperbolic or folded space is crochet! Crochet can do what computers cannot! I see my youngest daughter's crocheted cardigan in a whole new light now!

In his introduction to the book, Bellos says:

Maths suffers from the reputation that it is dry and difficult. Often it is. Yet Maths can also be inspiring, accessible, and above all, brilliantly creative.

Maths is often misinterpreted as an exact science – there is a right answer and a wrong answer; there is one correct way of doing it – and many wrong ways! Thérèse Dooley from St. Patrick's College asked teachers at one point to look at the question of $2+2$. Answer seems straight forward enough – 4. But what if you have 2 apples and 2 oranges? Then it becomes a little more complex!

This idea, that what appears banal or straightforward at first sight actually represents a complexity of beauty to still the soul, if we will only look properly, is one that resonates strongly with me. It is exemplified in the poetry of Patrick Kavanagh. And it is also found in one of my favourite passages of literature ever, across fiction and non-fiction - this piece from Tim Robinson's *Stones of Aran*. In this piece, he eloquently describes how beauty, mathematics and geology are fused at their respective cores – everything really IS connected:

The Worm and the Root

If as an artist I wanted to find the sculptural form for my intuition of the Aran landscape, I would not think in terms of circles.In other landscapes the rounded might be equated with the natural and the right angle with human contribution. Here, though, it is as if the ground itself brings forthright angles. Because of the limestone's natural partings along its vertical fissures and horizontal stratifications, the oblong and the cuboid are the firstfruits of the rock.A block, then, would best embody the essence of Aran's landforms – or, since I am dealing in abstractions and have undergone the metamorphoses of contemporary art, the absence of a block, a rectangular void to stand for all blocks. And since the sea is the most decisive sculptor among the various erosive agents that disengage Aran's form from its substance, let this void be filled by water, reversing the relationship of sea and island. Site it on one of the great stages of rock below the cliffs; do it on a prodigious scale, a spectacle rather than a gallery-piece; let the ocean dance in it, and the cliffs above step back in wide balconies to accommodate the thousands who will come to marvel at this kinetic conceptualist, megalominalist, unrepeatable and ever-repeated, sublime and absurd show of the Atlantic's extraction of Aran's square root!

What I have imagined, exists.

I'm not sure if Tim Robinson was thinking of the Red Bull divers who were on Inis Mór recently when he was referring to the thousands who would come to marvel at Poll na bPéist, but then beauty as they say is in the eye of the beholder. I count myself very lucky that one of my favourite passages of literature is fused in my own space-time continuum with one of my favourite places on earth. Beauty transcends any linear demarcations we may wish to impose on it.

When we have spoken of beauty, artistic and mathematical endeavour truly being connected at the deepest level, this is not utopian mumbo jumbo – what we imagine, exists. It exists all around us here tonight, it exists in the single blade of grass, the petals of a flower – even a Hoover!

Henry Dreyfuss, an industrial designer associated with the Hoover, said:

“Man achieves his tallest measure of serenity when surrounded by beauty.”

If Mathematics requires a clear mind to think and grapple with seemingly intractable problems, then good Mathematics depends on serenity, which Dreyfuss tells us is bound up with the presence of beautiful things! When I think about this as a teacher and as Director of the Teaching Council, this sounds a lot like the concept of reflective practice which is at the core of the standards we wish the profession to uphold. Everything else in teaching and learning rests on reflective practice being an embedded part of the culture of teaching, for all teachers. And artistic endeavour is also contingent on this. Reflective practice, teaching and learning, are uncertain, fragile at times, and take time. And beauty is also fragile, and also takes time. The beauty of life as we see it today has taken billions of years to get to the point we see it today, and as Bryan Cox shows, could so easily have not come into being at all.

And I know from my sisters, from students I taught in school, that the beauty of artistic endeavour takes time. And so does the beauty of scientific endeavour. You may have seen recently where scientists working from data gathered by a telescope at the South Pole recently announced some exciting findings about the first few trillionth seconds of the Universe. And how long did they take in analysing the data in order to confirm their findings? 3 years!

So when I saw the line in the brochure for tonight that craft can be described as the “embodiment of thinking processes through technique and with particular attention to the materials employed, and a demonstration of how the artist’s mind and eye guide the hand,” I figure that it could just as easily be adapted to the profession of teaching and the wizardry of science.

The only mistake we might make here is to assume that the common link between the artist and the scientist, and their pursuit of beauty, is to reduce the narrative to one about perfection. And it is a mistake that is easily made. My brother is a photographer who gets up early on weekend mornings in pursuit of the perfect picture – he has taken some exquisitely beautiful shots, but even he would say that he has not taken the perfect picture. The concept of fractals in mathematics shows us that the perfect straight line does not exist in nature – it is a humanly-imagined concept. What does exist in nature are aberrated lines repeated in patterns – in the leaf of a fern plant; in a snowflake, as Queen Elsa tells us in the film, Frozen. An aberrated line, therefore, not a perfectly straight one, is the foundation of beauty in nature, and I would argue, is fundamental to craft and design. If this is not quite a paradox, it certainly is a beautiful irony.

In defence of my brother, his pursuit of perfection is a noble end if it is understood as a journey, a process, rather than a product – beauty is imperfect; the concept of perfection, in and of itself, is neither artistically nor mathematically sound. All theories are approximations to reality!

Conclusion - Everything is connected

In a letter to our children, my father said the following:

“You will not know the great being who formed and contains the Universe by the same name or analog images by which I formed a mental paradigm of this truth, nevertheless in moments of quiet joy you will notice systems and saving principles through which S/He reveals the pulsing principles of life in all that lives and breathes and is.”

I always thought my father was a genius, but in many ways his statement chimes perfectly with the views of Bryan Cox, the rock star come physicist. In his book *The Wonders of Life*, he opens with an account of a conversation between an artist and Richard Feynman, a Nobel Prize winning physicist. The artist accused Feynman and his ilk of parsing beauty to the point where it becomes a dull thing. Feynman believed that whilst the aesthetic beauty of nature is surely open to everyone... the world becomes more beautiful as our understanding deepens. And how does our understanding deepen? By learning. And how do we learn? By being taught, in the deepest, truest sense of that word. Good teaching is the key that unlocks the door to the riches of understanding how all that we do, say, see, hear and feel is connected. Good teaching is how we are all empowered to explore how the fundamental truth of beauty is visible in our world. Good teaching is how we learn to share that exploration so that, to paraphrase John O'Donohue, we let our imaginations

“Trawl the compressed seas

To bless the dawn

With a generous catch

Of luminous dream.”

I am more than happy to launch this exhibition, and hope that many people will trawl its compressed oceans to form luminous, beautiful, mathematical dreams of their own.