## TERRY WINTERS x EDWARD FRENKEL ON BUILDING PATTERNS

(a conversation in PURPLE Fashion Magazine, F/W 2014)

photos by Rachel Chandler



RACHEL CHANDLER - How did you meet?

TERRY WINTERS – How did we meet...

EDWARD FRENKEL – I guess, as a mathematician, I'm the one who has to remember the details.

TERRY WINTERS – I remember – we met at the Guggenheim some time after Edward published his book *Love and Math* ...

EDWARD FRENKEL – That's right. We were introduced by our common friend Eneas Capalbo. And then I went to see the *UFO* show that Eneas curated at the David Nolan Gallery in Chelsea, where I saw Terry's collage in which he juxtaposed Van Gogh's *Starry Night* and images of these geometric shapes called "Riemann surfaces". Around the same time my book had come out, with Van Gogh's *Starry Night* on the cover and inside the same images of Riemann surfaces as in Terry's collage! It was serendipitous... We started talking and that's how this project began. It's about trying to find a new synthesis between mathematics and art. People have been talking about links between math and art for centuries of course. Leonardo Da Vinci used the Golden Ratio in his works. These days you find paintings of fractals and fractal geometry printouts integrated into works of art, which is great. But I think this is kind of missing the point.

TERRY WINTERS – It's too illustrative?

EDWARD FRENKEL – Well, what I saw in Terry's collage, apart from just the serendipity of Van Gogh's *Starry Night* and the Riemann surfaces, was that it went much further in pursuing a dialogue between mathematics and art. I asked myself: Why is he using the Riemann surfaces? Then it dawned on me that maybe what Terry is trying to say is these mathematical shapes represent a new vocabulary of an artist, just as Van Gogh's stars and night sky did. Unfortunately, most people who aren't professional mathematicians never get to see this stuff... But Terry obviously did, and to me this was striking. That was the beginning of our dialogue.

TERRY WINTERS – This is an experiment – we ask each other questions about the connections between mathematics and painting. Or about the overlapping concerns with the abstract spaces being generated right now. And how to visualize those spaces. I wonder what Edward can reveal about such things. It's not so much that there is a one-to-one correspondence between the activities. But what correspondences might exist in the context of each method or system.

EDWARD FRENKEL – That's correct. We're not simply trying to render mathematical formulas or concepts in a work of art, but in some sense are looking for a third way. Mathematics is built into art to begin with. Space is inherently a mathematical concept. Cézanne famously said that art is built on an invisible scaffolding of shapes and patterns.

TERRY WINTERS – Cylinders, spheres, and cones.

EDWARD FRENKEL – People have described art as a way to find patterns. And the great British mathematician G.H. Hardy said that a mathematician is, like an artist or a poet, a maker of patterns. So we are makers of patterns, but to what end? To most people this may sound counterintuitive because most of us never get to see the real math, but to me, mathematics is a search for truth and beauty. And that's what art is about as well. But how do we find truth and beauty? Where? What is Truth?

TERRY WINTERS – Come on – just tell us!

EDWARD FRENKEL – In a novel by a Russian author Viktor Pelevin the protagonist says, if you ask someone what is the truth, then if that person knows anything about it, the only proper answer is silence because if they try to say something, it means they don't know. Words obscure rather than illuminate truth. But silence doesn't have to be

silent. Art and mathematics give us two ways to access and express the truth without words. However, being a mathematician, I also know that mathematics is inherently incomplete. No matter how hard we try, we cannot reach the ultimate Truth. But what if we combine the rigor of mathematics with the clairvoyance of an artist?

TERRY WINTERS – Aren't there clairvoyant mathematicians?

EDWARD FRENKEL – There are, but it's a clairvoyance of a different kind. The Russian mystic Ouspensky said the true artist is a clairvoyant. An artist has a gift of seeing something others don't, and then being able to convey this to others. If that's the case, then maybe an artist's perspective can enhance and help a mathematician like me to transcend some of the barriers of my field — and maybe I can reach a new understanding through the lens of an artist. That's why this collaboration is interesting to me.

TERRY WINTERS - So you think I'm clairvoyant?

EDWARD FRENKEL – That's one way to think about it.

TERRY WINTERS – I'm not, though... So, let's backtrack. It was Eneas Capalbo's idea to put something together.

EDWARD FRENKEL – Yes, and if this thing doesn't work out, we'll just blame him.

[laughter]

TERRY WINTERS – Eneas suggested I do a show of drawings, with a publication of a book that would be a collaborative effort. I'd show Edward some drawings and he could write something — but not necessarily about the drawings, rather about what they might have provoked in his own mathematical thinking. The drawings function as a visualization system — that's the goal, to generate surprising pictures. Hopefully, this project will produce unexpected results.

EDWARD FRENKEL – If indeed mathematical objects or concepts are part of artist's vocabulary, can works of art inform and enhance our understanding of mathematics, and vice versa? For me this is a learning experience, which has already forced me to re-evaluate my vision of what art is and what artists do.

TERRY WINTERS – And I'm looking for other views or ways of seeing painting from Edward's perspective. The exhibition itself reflects an interest I've had in surfaces and silhouettes and the figural characteristics of shape. There are five large drawings under one title "Thickness) points" – this title is taken from a poem by E.E. Cummings that Edward used as an epigraph to his previous book.

EDWARD FRENKEL - So what are you getting from this?

TERRY WINTERS – A sense about the degree of abstraction that's involved in trying to make an image or model of what is happening here and now. That's complex and obscure, I know. It's difficult to locate a feeling or situation, but that's what I'm trying to describe in the work, however indirectly.

RACHEL CHANDLER - What do you mean by here and now?

TERRY WINTERS – Current events – the immediacy of living forms and forces. The operating system. Edward and I both spend our time constructing and formulating – just very differently.

EDWARD FRENKEL – We take for granted the idea that math and art are opposites – even though we say that superficially there are similarities. We think they are very different because one is more cerebral and rigorous and the other is more visceral and intuitive. But what if that perception is wrong?

RACHEL CHANDLER – Sounds like Fantasia!

EDWARD FRENKEL – That's right. What if we can take the visceral and cerebral to a completely different level, like maybe multiplying them together? Maybe this way we can reach a hidden reality.

TERRY WINTERS – In a way it is about animation – words and pictures connected to ideas about life. Again, that's what I mean about here and now: the animated situation we occupy, which is driven by very abstract processes.

RACHEL CHANDLER - Most people don't have the tools to access hidden realities.

TERRY WINTERS – I access the same reality painters always have. It's a very traditional approach, except my "motifs" are data and information.

EDWARD FRENKEL – Think about it this way: I have special access, like a VIP card, to the math's Platonic reality. And Terry has a VIP card to, let's call it – for lack of a better word – an artistic reality. The two seem to be different.

TERRY WINTERS – Like a club with two VIP rooms!

EDWARD FRENKEL – Yes. We have different tools and different means of access. We approach from different angles, but we try to reach the same reality.

RACHEL CHANDLER - Has anyone else opened this dialogue in the past?

EDWARD FRENKEL – Leonardo Da Vinci is a good example of someone who was fluent in both worlds.

RACHEL CHANDLER - And in contemporary art?

EDWARD FRENKEL - Is Marcel Duchamp contemporary enough?

TERRY WINTERS – Well, early Modernist abstraction was founded on both scientific principles and metaphysical speculations – an attempt to build on the symmetries. It would be good now to come up with a pragmatic linkage.

RACHEL CHANDLER – When is the show at Eneas' National Exemplar Gallery in Soho, November?

EDWARD FRENKEL – November sounds right. We're now working on the book and the problem is words.

RACHEL CHANDLER – Why's that?

EDWARD FRENKEL – Words tend to mean different things to different people. But mathematics means the same thing to everyone. It's independent of our perception, which is what I love about it. Pythagoras discovered his theorem 2,500 years ago, though it might have been discovered earlier by the Babylonians or the Chinese. It means the same today as it did 2500 years ago. It doesn't have a shelf life, and it's independent of interpretation. It exists outside of our mind and outside of space and time, in a Platonic world. That's the beauty of it. Maybe art also exists in such a way, with connections to a Platonic world.

RACHEL CHANDLER – Maybe you should do equations instead of a text.

EDWARD FRENKEL – That's what I was thinking: the book should have paintings and formulas so as not to obscure the truth. But I'm not yet ready to convert paintings into formulas, or maybe Terry is not quite ready to convert formulas into paintings. So we are in an intermediate stage; we're still building the scaffolding.

TERRY WINTERS – Painted space can't be quantified or measured, and that's painting's contribution: the non-metrical. But over the course of our conversations Edward is developing his own approach to the project. Now it's about his contribution, as my work is basically finished. It comes down to him seeing the work and the two of us figuring out a territory. For example, his interest in my collage led me to develop more drawings that utilized that family of forms. That was my response to his initial interest. Hopefully the drawings now will provoke a response from him in terms of mathematical spaces. Our dialogue is based on a series of meetings and getting to know each others' work and concerns.

RACHEL CHANDLER – Have you ever worked this closely with an artist before, Edward?

EDWARD FRENKEL – Not at such a deep level of collaboration.

RACHEL CHANDLER - You have always been interested in art?

EDWARD FRENKEL – Yes.

TERRY WINTERS – We did first meet at the Guggenheim!

EDWARD FRENKEL - Invisible forces set up all this.

TERRY WINTERS - Uh oh.

RACHEL CHANDLER - And, Terry, your interest in math goes back?

TERRY WINTERS – A long time—it came out of my interest in architecture and the architecture of natural forms. I look for organized structures that I can use in paintings. So it's great talking to Edward, even though I have a very intuitive and imaginative response to scientific information. I have no experience or capacity on a functional level. So it's been interesting to talk to someone who comes at similar imagery from a very different direction.

EDWARD FRENKEL – In my book, *Love and Math*, I talk about Duchamp's painting *Nude Descending a Staircase, No. 2* of 1912, as a way to examine dimensions. The

book is addressed to non-mathematicians, so I try to use metaphors that help to illuminate mathematics. Duchamp's painting integrates a very powerful statement about the fourth dimension. Doing research for my book, I found that Duchamp was very much attuned to mathematics and physics of his era. That painting appeared around the same time as Einstein's theory of relativity, which stated that time and space are inseparable. And Duchamp was studying that. He made notes, which I quote in my book, based on a popular geometry textbook that he was reading. They show his uncanny understanding of mathematics and geometry. Clearly he was looking to mathematics for inspiration. And he was able to use it to see certain things at a deeper level. Duchamp's paintings could be a metaphor for a fruitful collaboration between art and mathematics. I've always been interested in that, but I wasn't sure what form it could take. And now I think this might be it.

TERRY WINTERS - See, it has a happy ending.

