

Systematic Innovation



e-zine

Issue 192, March 2018

In this month's issue:

Article – ValuesMatch – First Principle Mapping Of Enterprise & Individual Values

Article – Case Study: Rethinking Healthcare

Not So Funny – Another, Another Dimension

Patent of the Month – Piezoelectric-Based Solar Cells

Best of The Month – Skin In The Game

Wow In Music – Cannonball

Investments – e-Skin

Generational Cycles – No Logo

Biology – Parrot Fish

Short Thort

News

The Systematic Innovation e-zine is a monthly, subscription only, publication. Each month will feature articles and features aimed at advancing the state of the art in TRIZ and related problem solving methodologies.

Our guarantee to the subscriber is that the material featured in the e-zine will not be published elsewhere for a period of at least 6 months after a new issue is released.

Readers' comments and inputs are always welcome.
Send them to darrell.mann@systematic-innovation.com

ValuesMatch – First Principle Mapping Of Enterprise & Individual Values

How do you know if new job candidates will fit with the values of your enterprise? How do you know that current employees do the same? That they are authentically ‘talking the talk’? Especially since, looking at the spectrum of Mission, vision and values statements, it seems that there are almost as many different values systems as there are enterprises. One way would be to have someone design you a bespoke values questionnaire and have prospective new employees fill it out. Maybe, too, you could use it to conduct periodic surveys of everyone in the business? Either way you fall into the usual traps of high cost and low accuracy.

The Values-Match challenge is something we’ve been looking to use PanSensic to help with for some time now. By analyzing existing (anonymized) narrative input it overcomes most of the problems with traditional surveys. PanSensic already comprises a broad range of different ‘lenses’ that allow us to analyse narrative in a variety of different ways. As discussed in previous articles, if we want to measure Gravesian Thinking Styles, there’s a lens for that. If we automatically wish to measure Myers-Briggs profile (or their Jungian roots), we can already do that. Ditto Belbin, ‘ABC-M’, ‘Archetypes’, ‘Metaphor Themes’, ‘Adapter-Innovator’, ‘Starter-Finisher’ and a host of other dimensions. At first, when we were developing these lenses, we were driven by replicating existing psychometric taxonomies. But not far down the road we learned that what we were actually doing was measuring all the ‘first principle’ attributes that enable a person or a cohort group to be characterized. Now ‘getting to first principles’ has become a key tenet of the PanSensic offering.

It’s something that doesn’t come without its own set of problems. Very few people, for example, are familiar with Clare Graves, ‘Thinking Styles’ work. So, when we print the outputs of the analyses, not everyone understands the significance of what they’re seeing. That’s the big potential downside of looking at the world from a first-principles level: Graves implicitly understood how human psychology works at a first-principle level, but he wasn’t good at communicating that fact to his audience.

On the other hand, once you’ve captured ‘all’ the first-principles stuff, it starts to become very easy to combine the various different lenses to derive whatever values measures a client might ask us for. You just have to know how to combine the right parameters in the right combination.

For example, if an organization has ‘integrity’ as a core value, we can measure this by combining the following ‘first principle’ measures:

Integrity = f { ‘Equilibrium’ (JupiterMu)
– ‘Orphan’ (Archetypes)
+ ‘Monarch’ (Archetypes)
- ‘Feudal’ (Thinking Styles)
+ ‘Rocks’ (MercuryPhi (Vital Friends))
- ‘Anger’ (Sentiment Analysis) }

In other words, sticking with Graves and his Thinking Styles research for a second, that, all his findings pertaining to the impulsive nature of individuals when they are in the (CQ)

Feudal mindset, tells you that their level of integrity is quite low. When someone is expressing Feudal behavior they are inherently impulsive, and this very ready to switch allegiances to the next shiny object that grabs their attention. So when we see an individual (or team) has a high Feudal score, we know this is going to detract from their level of integrity.

Repeat this for all the other Values of the organization and each of the current round of candidates and you can start to produce outputs like this:

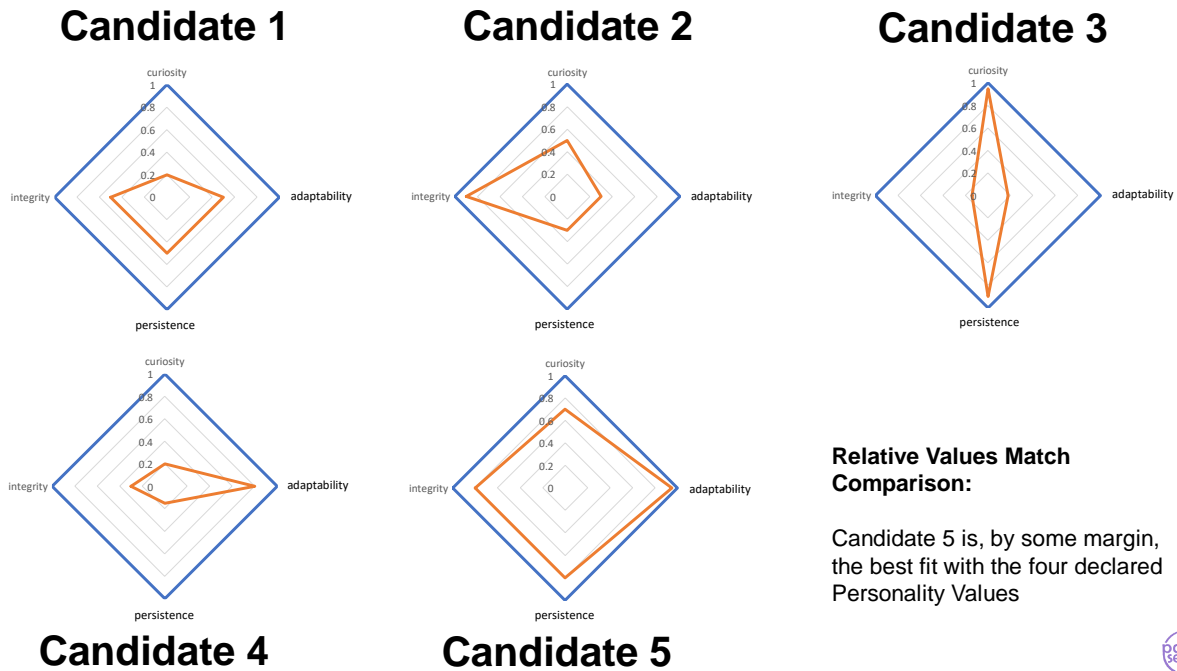


Figure 1: Typical ValuesMatch Output For Job Candidate Evaluation

We haven't quite reached the point of having PanSensic make the first-principles-to-company-values conversion automatically, but even at this early stage in the evolution journey it doesn't feel like we're too far off.

It turns out there aren't a million different words and expressions enterprises use to describe their values to the world. Nearly everyone talks about 'integrity' in some form or other, for example. Almost as many, these days, use the word 'innovation'. Very few of them, as far as we can tell, actually mean it, but that's a whole other story. Very soon after we first combined all of the First Principles lens results together to create an 'innovation' values lens, we quickly came to see that, while individuals within an organization might exhibit innovative traits, most enterprises are close to 180degrees opposite. Everyone, it seems, feels the need to say they're innovative, but they rarely know what they're asking for.

That's the sort of thing a First Principles level understanding of the world is likely to reveal. If you think your organization might be ready for that kind of truth, you might like to come and do some kind of gentle-entry PanSensic experiment with us.

Case Study: Rethinking Healthcare



I picked up my newspaper today and found the word 'crisis' written over 40 times. Six of them as part of a headline. Debt crisis, NHS budget crisis, obesity crisis, KFC crisis, Brexit crisis, weather crisis, plastic crisis. You name it, its in crisis. To say the word has become somewhat devalued would probably be an understatement. What I think it actually means is 'has hit a contradiction'. Which, maybe, if you don't know about TRIZ is precisely the same thing as a crisis, but if you do know some TRIZ, you know that crises can be solved once we give ourselves permission to start solving contradictions.

Some contradictions, though, are perhaps more important than others. Both in terms of the extent of the problems they create. But also in terms of their potential for starting a forest-fire of contradiction-solving practices elsewhere. Anything to do with the healthcare system falls into this category. In the UK, the National Health Service now accounts for over 12% of the country's GDP. That's a lot of money. And, the amount only ever seems to go up. British people are very proud of the NHS. When it claims to be short of money – as it is again this year – we always bail it out. Maybe that's its biggest contradiction of all: no incentive to be efficient because we always throw more money at it? But then again, if we look at the other figures, the ones relating to patient health, or lack thereof, there's probably a much bigger contradiction: people are getting sicker and sicker despite the increased spending. This is especially so when it comes to some of the more emotion related illnesses such as stress and depression. Throwing more money and more drugs at this problem, if anything, seems to be making the problem worse. Maybe this is the contradiction that should find itself at the top of the priority list?

If it was me responsible for this problem, I'd look to map it onto the new Business Matrix. I'd map it as a Negative Intangibles versus Support Cost conflict. If I did that, the Inventive Principle suggestions I'd get back are currently, in descending order of priority:

Principle 25 – Self-Service
Principle 40 – Composite
Principle 3 – Local Quality
Principle 10 – Prior Action
Principle 35 – Parameter Changes, and
Principle 13 – The Other Way Around

After I made this analysis, I did something quite strange. I am in no position to do anything tangible to deploy these Principles in the NHS. We do work with them, but our job tends to be PanSensic ‘measurement stuff’ rather than solution implementation stuff. But this doesn’t mean I can’t look around the various parts of the NHS to see if there’s evidence of anyone using strategies relating to these Principles.

It didn’t take me long to find this:

It could, if the results stand up, be one of the most dramatic medical breakthroughs of recent decades. It could transform treatment regimes, save lives, and save health services a fortune. Is it a drug? A device? A surgical procedure? No, it’s a newfangled intervention called [Principle 40] community. This week the results from a trial in the Somerset town of Frome are published informally, in the magazine Resurgence & Ecologist. (A scientific paper has been submitted to a medical journal and is awaiting peer review). We should be cautious about embracing data before it is published in the academic press, and must always avoid treating correlation as causation. But this shouldn’t stop us feeling a shiver of excitement about the implications, if the figures turn out to be robust and the experiment can be replicated.

What this provisional data appears to show is that when isolated people who have health problems are supported by [Principle 25] community groups and volunteers, the number of emergency admissions to hospital falls spectacularly. While across the whole of Somerset emergency hospital admissions rose by 29% during the three years of the study, in Frome they fell by 17%. Julian Abel, a consultant physician in palliative care and lead author of the draft paper, remarks: “No other interventions on record have reduced emergency admissions across a population.”

Frome is a remarkable place, run by a [Principle 3] independent town council famous for its democratic innovation. There’s a buzz of sociability, a sense of common purpose and a creative, exciting atmosphere that make it feel quite different from many English market towns, and for that matter, quite different from the buttoned-down, dreary place I found when I first visited, 30 years ago.

The Compassionate Frome project was launched in 2013 by Helen Kingston, a GP there. She kept encountering patients who seemed defeated by the medicalisation of their lives: treated as if they were a cluster of symptoms rather than a human being who happened to have health problems. Staff at her practice were stressed and dejected by what she calls “silo working”.

So, with the help of the NHS group Health Connections Mendip and the town council, her practice set up a [Principle 10] directory of agencies and community groups. This let them see where the gaps were, which they then filled with new groups for people with particular conditions. They employed “health connectors” to help people [Principle 25] plan their care, and most interestingly trained [Principle 25, 13] voluntary “community connectors” to help their patients find the support they needed.

Sometimes this meant handling debt or housing problems, sometimes joining choirs or lunch clubs or exercise groups or writing workshops or men's sheds (where men make and mend things together). The point was to break a familiar cycle of misery: illness reduces people's ability to socialise, which leads in turn to isolation and loneliness, which then exacerbates illness.

This cycle is explained by some fascinating science, summarised in a recent paper in the journal Neuropsychopharmacology. Chemicals called cytokines, which function as messengers in the immune system and cause inflammation, also change our behaviour, encouraging us to withdraw from general social contact. This, the paper argues, is because sickness, during the more dangerous times in which our ancestral species evolved, made us vulnerable to attack. Inflammation is now believed to contribute to depression. People who are depressed tend to have higher cytokine levels. But, while separating us from society as a whole, inflammation also causes us to huddle closer to those we love. Which is fine – unless, like far too many people in this age of loneliness, you have no such person. One study suggests that the number of Americans who say they have no confidant has nearly tripled in two decades. In turn, the paper continues, people without strong social connections, or who suffer from social stress (such as rejection and broken relationships), are more prone to inflammation. In the evolutionary past, social isolation exposed us to a higher risk of predation and sickness. So the immune system appears to have evolved to listen to the social environment, ramping up inflammation when we become isolated, in the hope of protecting us against wounding and disease. In other words, isolation causes inflammation, and inflammation can cause further isolation and depression.

Remarkable as Frome's initial results appear to be, they shouldn't be surprising. A famous paper published in PLOS Medicine in 2010 reviewed 148 studies, involving 300,000 people, and discovered that those with strong social relationships had a 50% lower chance of death across the average study period (7.5 years) than those with weak connections. "The magnitude of this effect," the paper reports, "is comparable with quitting smoking." A celebrated study in 1945 showed that children in orphanages died through lack of human contact. Now we know that the same thing can apply to all of us. Dozens of subsequent papers reinforce these conclusions. For example, HIV patients with strong social support have lower levels of the virus than those without. Women have better chances of surviving colorectal cancer if they have strong connections. Young children who are socially isolated appear more likely to suffer from coronary heart disease and type 2 diabetes in adulthood. Most remarkably, older patients with either one or two chronic diseases do not have higher death rates than those who are not suffering from chronic disease – as long as they have high levels of social support.

In other words, the evidence strongly suggests that social contact should be on prescription, as it is in Frome. But here, and in other countries, health services have been slow to act on such findings. In the UK we have a minister for loneliness, and social isolation is an official "health priority". But the silo effect, budget cuts and an atmosphere of fear and retrenchment ensure that precious little has been done.

Helen Kingston reports that patients who once asked, "What are you going to do about my problem?" now tell her [Principle 13], "This is what I'm thinking of doing next." They are, in other words, no longer a set of symptoms, but people with agency. This might lead, as the preliminary results suggest, to fewer emergency admissions, and major savings to the health budget. But even if it doesn't, the benefits are obvious.

If there really is such a thing as 'clinical evidence' in the healthcare system, I think there is a lot in the Frome story that could and should be transferred elsewhere. But then again, in the spirit of Inventive Principle 13, I'm inclined to suggest society as a whole uses their example to turn the whole system around and take their own – community – initiative. More friends, less pharmaceuticals, what's not to like? I reckon we could have NHS costs below 10% of GDP before the end of the decade. Big Pharma or no Big Pharma.

More generally, I think there's also a lesson here about using the Matrix and the Inventive Principles 'the other way around' to help find the someone, somewhere who already used them to solve a problem like yours.

Not So Funny – Another, Another Dimension

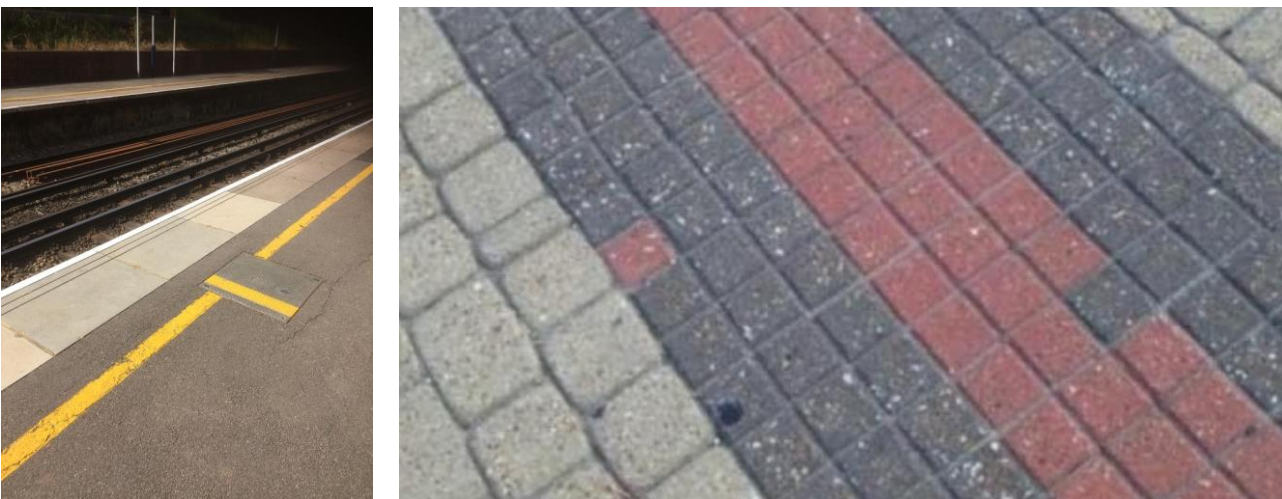
Inventive Principle 17. Another Dimension. One of the lesser used Inventive Principles. Getting away from straight lines and planes. Simple to say. Not always so simple to interpret. Although, when we can we can get some of the most powerful solution ideas. Like on our roads:



Or increasing parking efficiency...



Also pretty good for walkways...



Benches?...



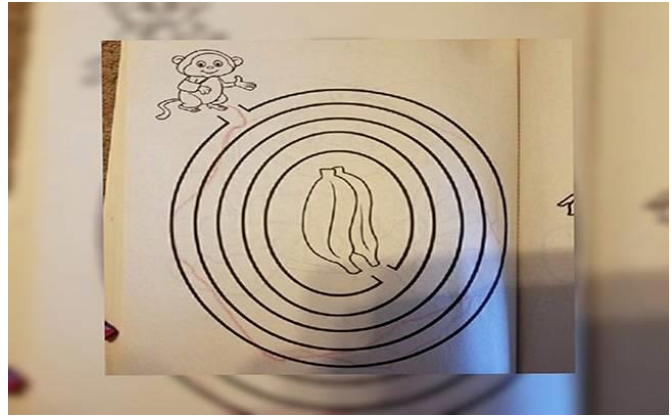
Water management...



Storage...



Teaching the kids good instincts...



Knowledge...



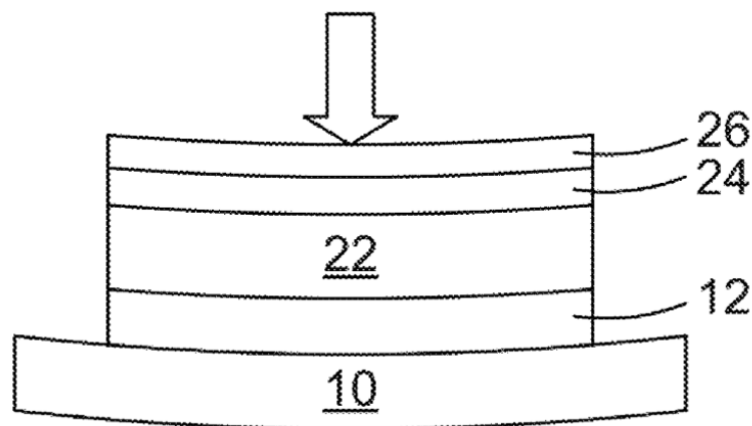
Not to mention good precautionary measures. Just in case all else fails...



Nothing to quite beat this one though...



Patent of the Month – Piezoelectric-Based Solar Cells



Patent of the month this month takes us to a duo of inventors at the University of South Florida. US9,911,540 was granted on 6 March... an apparently good day for inventions since we had half a dozen good candidates for this month's best-of award (honourable mention to 9,909,460, 'Quantum Otto Engine', which seems like a pretty big step forward in a potentially exciting technology first conceived in 1959). The South Florida invention, edged its way in to the lead because, frankly, it was much easier to read, and the elegance of the solution was much clearer to our lay-person eyes. Here's what the inventors had to say about the background to their work:

The two main challenges in solar cell technology are the cost and the energy conversion efficiency of solar cells. Different materials and structures have been tested for several decades to address these challenges. As a result, the technology has evolved from the first solar cell generation, starting with crystalline silicon based p-n junctions, to the third generation, which includes organic photovoltaics (OPVs), dye sensitized solar cells (DSSCs), and perovskite (PVSK) solar cells. While the choices of the photoactive material in different devices (organic semiconductors in OPVs, dyes in DSSCs, and perovskites in PVSKs) are mainly based up on which materials provide strong light absorption and efficient charge generation, the device structures must be designed to collect the charges efficiently from the photoactive materials and transfer the charges to the device electrodes. The approach for selective collection of electrons from photoactive layers in OPVs, DSSCs, and PVSKs is to use a layer of a material, referred to as an electron transport layer (ETL), having an energy structure that can block holes but is transparent to electrons so as to enable electron transport.

The energy levels in the ETL and the energy barrier between ETL and the photoactive layer are critical to achieve high energy conversion efficiency in a device. Therefore, many different materials have been tested for use in forming ETLs in OPVs, DSSCs, and PVSKs. These materials include metal oxides, such as titanium oxide (TiO_{2}) and zinc oxide (ZnO), and organic materials. Although, in theory, some materials should be more effective in improving device characteristics, in practice, significant improvement has not been achieved when ETL materials having matched energy levels have been used. This is mainly due to the other requirements for ETLs, such as optical transparency and high mobility of carriers. The combination of all the requirements of an ETL has limited the choice of material for ETL formation to only a few materials. For instance, TiO_{2} has been the dominant ETL in DSSCs for more than two decades.

From the above discussion, it can be appreciated that it would be desirable to have alternative ETLs that provide improved energy conversion efficiency.

The main conflict being addressed, in other words, concerns the desire to reduce energy losses being prevented by parallel needs for optical transparency and high carrier mobility (how quickly an electron can move through a metal or semiconductor). Here's how we might map these conflicts on to the Contradiction Matrix:

IMPROVING PARAMETERS YOU HAVE SELECTED:
Loss of Energy (27)

WORSENING PARAMETERS YOU HAVE SELECTED:
Speed (14) and Illumination Intensity (23)

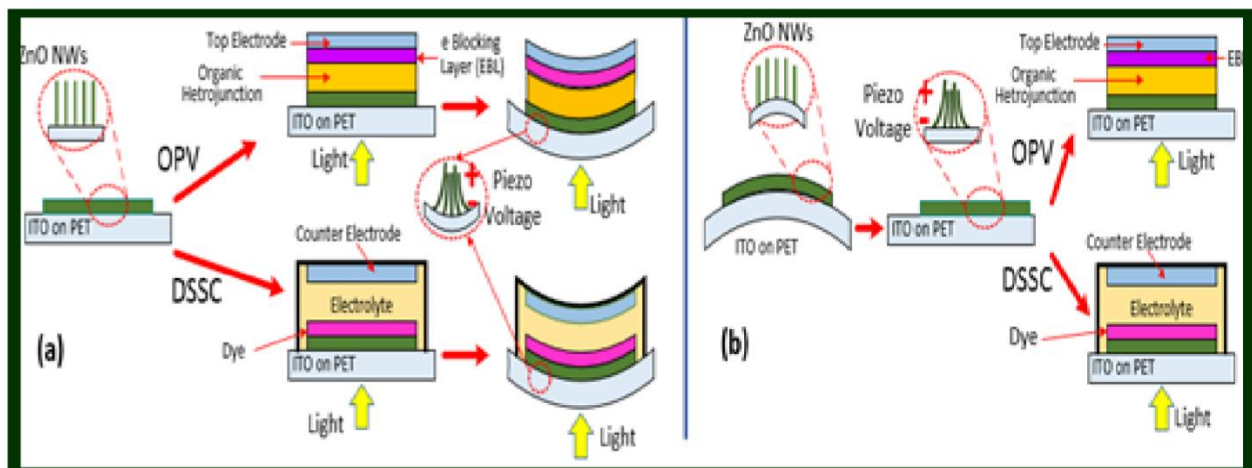
SUGGESTED INVENTIVE PRINCIPLES:
35, 13, 3, 19, 24, 14, 5, 28, 10, 32, 15

And here's what the inventors have done to resolve the problem:

A solar cell comprising: a transparent [Principle 32, Colour Change] electrode; a photoactive layer; and an electron transport layer positioned between the transparent electrode and the photoactive layer [Principles 3, Local Quality, and 5, Merging], the electron transport layer being made of a piezoelectric material [Principle 35, Parameter Change] that is mechanically deformed [Principle 15, Dynamics] such that it generates a voltage or charge [Principle 28, Mechanics Substitution] that modifies an energy barrier between the electron transport layer and the photoactive layer.

Simple when you know how. Also a good example, were we to be using the Principles to generate the solution rather than reverse engineer the South Florida solution, of the need to generate many ideas from each of the Inventive Principles and then explore different combination of those ideas. i.e. there is evidence of six inventive steps in the solution. And that's just the basic invention – reading the full patent you'll see several more in the ancillary claims.

Borderline genius.



(a) Using the piezo electric effect of ZnO NWs in modifying the energy barrier in OPVs and DSSCs.

(b) ZnO NWs grown on bent electrodes

Best of the Month – Skin In The Game



NEW YORK TIMES BESTSELLING AUTHOR OF
THE BLACK SWAN

SKIN IN THE GAME

Hidden Asymmetries
in Daily Life



NASSIM
NICHOLAS TALEB

When Nassim Nicholas Taleb releases a new book, its unlikely there will be anything else arriving on the market that will be able to compete for our Best Of The Month slot. And, true to form, his new book *Skin In The Game* delivers the goods.

Admittedly, however, when I saw Taleb lecturing in London on the day of the launch of the book, I felt like reversing my instincts. To the point where I ended up writing a blog post to vent my frustration about how bad the lecture was. Fortunately, (I think) I've managed to get that frustration out of my system now. Enough at least to allow myself to read and re-read the book without thinking about how poorly Taleb came across in the flesh.

So what we get in *Skin In The Game* is Taleb's anger at various sectors of society nicely turned up to eleven. If you don't like economists, politicians, fat-cat CEOs, journalists and academics, and want to read someone elegantly demolishing each of them, this is the book for you. Their problem, Taleb convincingly demonstrates is that these are the professions in which no-one has any real 'skin in the game'. That is, they are people who make pronouncements about the future safe in the knowledge that if those pronouncements don't pan out there's little or no negative consequence to them personally, but rather a lot to the people that had the bad fortune of listening to them and acting upon their pronouncements. About 40% of the book is basically a rant against these people.

Another 40% of the book describes a series of strategies and heuristics for dealing with risk and making sure you deal with people who do possess some actual skin in the games you're thinking of participating in.

The final 20% then seems to be about Taleb answering various of his critics. Some of this content is quite funny, but mostly it comes across as Taleb showing-off his 'let me show you how much smarter than you I am' intellect. Granted his ability to step back, see big pictures does put him at a major advantage over 99% of other commentators. When people attack him without understanding complexity they're always going to find themselves on shaky ground. Usually finding themselves embarrassed at the wrong end

of some serious mathematical argument. This too can be quite funny, even if I have to resort to humming the mathematical formulae half the time.

First time through at least, the 'best bits' are the always-pithy italicized pull-out sentences. If you're an aphorism fan, this is your book:

"You do not want to win an argument. You want to win."

"Things designed by people without skin in the game tend to grow in complication (before their final collapse)."

"Under the right market structure, a collection of idiots produces a well-functioning market'."

"Anything that smacks of competition destroys knowledge."

"If your private life conflicts with your intellectual opinion, it cancels your intellectual ideas, not your private life."

Second time through, you get to read the power behind the aphorism. And see the chips on Taleb's shoulders (both – he's a well balanced guy!) for what they are: the rantings of a smart person who is so disgusted by the (mainly journalists) who criticize him that he can no longer be bothered to assemble a coherent argument.

He doesn't understand 'solving contradictions' (the subject of a second blogpost I wrote), and because he therefore lives in a frustrating either/or world he can't see past the criticism to the usually intended useful discussion point. See, for example, Zoe Williams review of the book in The Guardian (<https://www.theguardian.com/books/2018/feb/22/skin-in-the-game-nassim-nicholas-taleb-review>). Mostly highly complementary about the book, Taleb, obviously still feeling aggrieved at a past argument with another journalist on the paper, ends up resorting to a suite of Twitter/Blog diatribes attacking Williams. Part of her criticism was that the book would have been better if Taleb had employed an assistant to do some fact checking for him. Assistants don't have skin in the game he swiftly retorted, the author is an artisan and must stand or fall on their own work. Which has a certain ring of truth to it if you don't understand contradictions. But if you do understand contradictions and you read some of the dumber stories in the book (the Prince Andrew nonsense would make a good start!), you're left thinking only that both he and Williams are right. Authors should indeed stand-or fall on their publications, but that shouldn't stop them from employing someone in the background to do a touch of fact-checking here or there. Assistants can be made to have skin in the game too. Especially if they're working for Nassim Taleb.

On this level, the book will make you angry. On most others it will make you positively gleeful. Either way, that's the mark of the man. It's Taleb, and therefore you need to read it.

Wow In Music – Cannonball



In eager anticipation (on my part at least) for the new Breeders album and tour, this month we pay tribute to the bands' 1993 classic, 'Cannonball'. The song comes from their 1993 album *Last Splash*. It was released as a single on August 9, 1993 on 4AD/Elektra Records, reaching #44 on the U.S. Billboard Hot 100, and #40 in the UK Singles Chart. Not bad for an independent release. Beyond that, the world's most respected music journalists consistently voted the song their best single of the year. In May 2007, NME magazine placed 'Cannonball' at number 22 in its list of the 50 Greatest Indie Anthems Ever. It ranked #83 on VH1's "100 Greatest Songs of the 90s". In September 2010, Pitchfork Media included the song at number 22 on their Top 200 Tracks of the 90s.

So, what explains the enduring appeal of the song? Especially one that to all intents and purposes contains just three chords.

A big part of the answer appears to lie in the use of (Principle 17, Another Dimension) direct modulation. Albeit a most unexpected one. One often described as the most the best use of modulation in rock (in keeping with the irreverent early 90s).

Unlike most modulation, The Breeders 'radio friendly unit shifter' changes keys after only about 10 notes. Kim Deal opens the band's signature song with muted 'aaaaoooooowaahh' vocals, imitating a submarine, followed by the opening bassline. The key change here takes place entirely in the bass, shifting up a fret or a single half step, from D major to Eb major (heard at :29). The Breeders almost fool us throughout the song, in making us believe there will be a second modulation after a dramatic pause, but it does not come to be (Principle 12, Equi-potentiality in reverse). These (Principle 3, Local Quality) multiple dramatic pauses & dynamic changes in the verses follow the "loud-quiet-loud" style, for which Deal's band The Pixies were well known in the late 80s and early 90s. This stylistic feature came to be a hallmark of 90s alternative rock.

Perhaps what's so surprising about the key change is that it comes (Principle 10, Prior Action) so early in the song. Most modulations come late in a piece as part of a way of lifting or shifting the mood to another level. They only work (not that they all do!) after the initially chosen key has been sufficiently familiarized and assimilated by the listener. To create the effect after 10 notes is thus quite a feat. And, because it works, it becomes a tremendously subtle tension builder.

Modulation is closely related to tonicization. Tonicization occurs when a chord or short succession of chords are borrowed from another key in order to emphasize—or tonicize—a chord in the home key. Modulation occurs when a longer succession of chords emphasizes a new tonic, leading to the perception of a new key. The principal difference

between tonicization and modulation is the presence or absence of a cadence: tonicization does not incorporate a cadence in the tonicized key; modulation does incorporate at least one cadence in a new key.

There are several ways in which a composer can affect a modulation. The most common is the direct/phrase modulation found in Cannonball: A direct modulation occurs when a chord in the previous key is followed directly by a chord in the new key. In other words, there is no smooth transition or overlap between keys, just a direct movement from one key to the next. This often happens at phrase boundaries, with the old-key tonic ending one phrase and the new-key tonic beginning the next. When a direct modulation happens across a phrase boundary, it is also called a phrase modulation.

Examples of phrase modulations abound at the point between the end of the exposition in a minuet or a sonata and the beginning of the repeat of the exposition (if an exposition repeat is present).

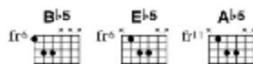
A direct modulation is noted in a harmonic analysis by following the last chord in the old key with the new key, followed by a colon, and then the first chord in the new key.

G: I II V I Am: I . . .
or
G: T1 S4 D5 T1 Am: T1 . . .

Simple when you know how.

THE BREEDERS: Cannonball

Words & Music by
Kim Deal



Intro N.C. (Distorted vocals, bass and drums.)

||: B^{b5} E^{b5} || Play 6 times

Verse 1

B^{b5} E^{b5} B^{b5} E^{b5}
Spit - ting in a wish - ing well
B^{b5} E^{b5} B^{b5}
Blown to hell crash

N.C.
I'm the last splash.

||: B^{b5} E^{b5} || Play 5 times

B^{b5} E^{b5} B^{b5} E^{b5}
I know you little liber - tine
B^{b5} E^{b5} B^{b5} E^{b5}
I know you're a real coo-coo.

||: B^{b5} E^{b5} || Play 4 times

Chorus 1

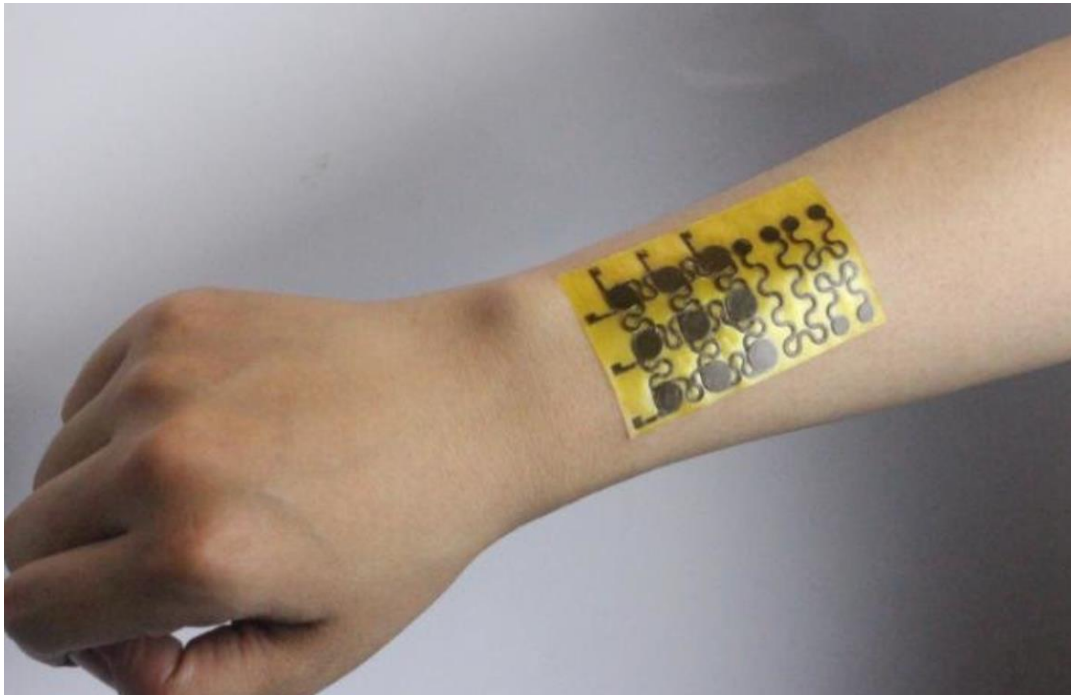
B^{b5} E^{b5} A^{b5}
Want you coo-coo can - nonball,
B^{b5} E^{b5} A^{b5}
Want you coo-coo can - nonball,
B^{b5} E^{b5} A^{b5} B^{b5}
In the shade, in the shade,
E^{b5} A^{b5} B^{b5}
In the shade, in the shade.

||: B^{b5} E^{b5} || Play 4 times

Verse 2

B^{b5} E^{b5} B^{b5} E^{b5}
I know you little liber - tine
B^{b5} E^{b5} B^{b5} E^{b5}
I know you're a cannon - ball.

Investments – e-Skin



University of Colorado Boulder researchers have developed a new type of malleable, self-healing and fully recyclable "electronic skin" that has applications ranging from robotics and prosthetic development to better biomedical devices.

Electronic skin, known as e-skin, is a thin, translucent material that can mimic the function and mechanical properties of human skin. A number of different types and sizes of wearable e-skins are now being developed in labs around the world as researchers recognize their value in diverse medical, scientific and engineering fields.

The new CU Boulder e-skin has sensors embedded to measure pressure, temperature, humidity and air flow, said Assistant Professor Jianliang Xiao, who is leading the research effort with CU Boulder chemistry and biochemistry Associate Professor Wei Zhang. It has several distinctive properties, including a novel type of covalently bonded dynamic network polymer, known as polyimine that has been laced with silver nanoparticles to provide better mechanical strength, chemical stability and electrical conductivity.

"What is unique here is that the chemical bonding of polyimine we use allows the e-skin to be both self-healing and fully recyclable at room temperature," said Xiao. "Given the millions of tons of electronic waste generated worldwide every year, the recyclability of our e-skin makes good economic and environmental sense."

A paper on the subject was published this month in the journal *Science Advances*. Co-authors on the study include Zhanan Zou and Yan Li of mechanical engineering and Chengpu Zhu and Xingfeng Lei of chemistry and biochemistry.

Many people are familiar with the movie *The Terminator*, in which the skin of film's main villain is "re-healed" just seconds after being shot, beaten or run over, said Zhang. While the new process is not nearly as dramatic, the healing of cut or broken e-skin, including the sensors, is done by using a mix of three commercially available compounds in ethanol, he said.

Another benefit of the new CU Boulder e-skin is that it can be easily conformed to curved surfaces like human arms and robotic hands by applying moderate heat and pressure to it without introducing excessive stresses.

"Let's say you wanted a robot to take care of a baby," said Zhang. "In that case you would integrate e-skin on the robot fingers that can feel the pressure of the baby. The idea is to try and mimic biological skin with e-skin that has desired functions."

To recycle the skin, the device is soaked into recycling solution, making the polymers degrade into oligomers (polymers with polymerization degree usually below 10) and monomers (small molecules that can be joined together into polymers) that are soluble in ethanol. The silver nanoparticles sink to the bottom of the solution.

"The recycled solution and nanoparticles can then be used to make new, functional e-skin," said Xiao.

There are already a number of patent applications in the system. US applications 20150259458 and 20170237119 both look like pretty good places to start.

Or, you can read more at:

Zhanan Zou, Chengpu Zhu, Yan Li, Xingfeng Lei, Wei Zhang, and Jianliang Xiao. Rehealable, fully recyclable, and malleable electronic skin enabled by dynamic covalent thermoset nanocomposite. *Science Advances*, 2018; DOI: [10.1126/sciadv.aag0508](https://doi.org/10.1126/sciadv.aag0508)

Generational Cycles – No Logo



How do you write a manifesto for a no-manifesto, how-dare-you-tell-me-what-to-think, alienated, Nomad generation? Well, the first part of the answer inevitably involves the expression, 'another Nomad'. Enter Naomi Klein – born in 1970, right in the middle of the Nomad generation cohort – and her 1999 book, 'No Logo'. Which in turn tells us the second part of the answer: the manifesto must attack everything that has even the faintest sniff of me-generation Baby-Boomer big business sell out. And that's exactly what No Logo still represents for today's Pragmatic Nomads: big business is evil. Wearing a logo endorsing big business is even worse. Although, admittedly, No Logo's iconic cover has now also become a logo.

Perhaps this is the very definition of the Nomad generation transition from the Alienation of their 20s and 30s to the Pragmatism of today? There are too many battles to fight, so if we're going to pick and choose the best ones, probably safe to assume that not having a dig at Naomi Klein is one of the easier sacrifices to make.

Pragmatism does something else too. The Nomads are getting old. The oldest are now in their mid-50s. A time of life when it's 'normal' to start slowing down, to begin to reap the rewards of the hard work done in their 30s and 40s. Except the no-logo thing never quite goes away...

A scroll through Instagram can become a costly experience for Aadil Seedat, a search market executive, as his shopping list of luxury goods grows.

But it's not the presence of branding or logos which informs these purchases, rather the desire to "replicate (the) lifestyle" of the influencers he follows, as he explained to CNBC in a recent survey.

According to recent market research, Seedat is typical of today's incarnation of a luxury goods consumer, looking past visible branding and instead relying on nouse to identify quality. This is all with the intention of mimicking a way of life as a whole, rather than ownership of a specific product.

More consumers are opting for luxury handbags with little or no visible branding. Statistics released last month revealed that one third of the handbags purchased in the U.S. last year did not have a visible logo, according to data from The NPD Group, an information gathering firm.

"Consumers want to be one in a million, not one of a million," Marshal Cohen, chief industry analyst at The NPD Group said. For Cohen, the data revealed that consumer tastes are now more "personalisation-oriented," favouring "products that are more modular."

The anti-branding trend pans across generations. Sales of handbags with no visible logo were highest amongst those aged 50 and older, but the phenomenon gained the most traction with Generation Z – those aged 17 years and under – whose unit sales of handbags with no visible logo rose 8 percent year on year.

According to The NPD Group's data, older millennials, aged 25-34, and Generation X, aged 35-49, also increased their purchasing of designer bags with no visible logo.

The style has been pioneered by luxury brand Céline, as well as Giorgio Armani and Hermes amongst others, said Silvano Vangi, luxury buyer and creative director at online luxury fashion retailer LUISAVIAROMA. "The concept keeps the focus on the product, it's a discreet luxury that is really based on the tailoring and fabric."

Adding a different dimension to Cohen's analysis, Richard Cope, senior trends consultant at Mintel, chalks the anti-branding movement up to consumers "want(ing) more discreet, more experiential products." Cope told the survey that consumers today "don't just define luxury in terms of material goods."

Cope cited Mintel data from March 2016 which charted only 15 percent of survey respondents specifying luxury goods to be those featuring visible logos. The most popular definition associated with luxury was high quality, non-massed produced goods, backed up by 42 percent of those asked.

Speculating on the psychology behind anti-branding, Cope said that "brands now have multiple price entry points and so are diluted psychologically, (they) no longer bring mystique." Cope added that consumers want to invest in products that they perceive as not widely available or mass produced. Items that are customised, limited or unique in some way are relevant for this reason.

Vangi added that anti-branding creates its own exclusivity, appealing to a "select group of people who are very luxury oriented and appreciate minimalism." He said that items including the Loewe Puzzle bag, the Max Mara Manuela coat and Manolo Blahnik's shoes are "definitely amongst the most popular" for the trend.

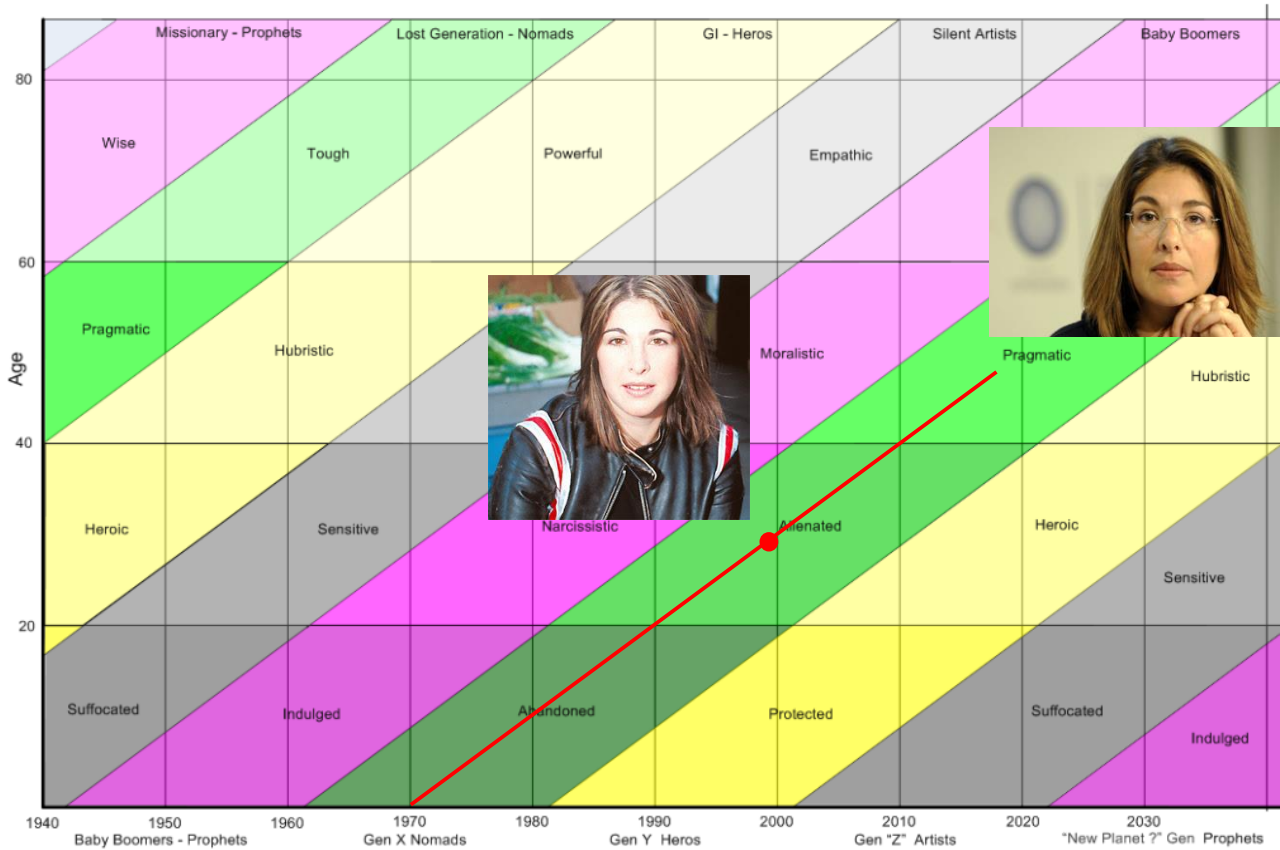
The anti-branding trend is moving eastwards, with the stereotype of Chinese middle class shoppers in pursuit of big brands also starting to slip. Mintel's data revealed that 44 percent of Chinese consumers said that they preferred experiential luxury such as spas and resorts rather than material items.

Anti-branding may seem counter-intuitive in today's increasingly visual culture. But, according to Cope, "social media allows us to brag about where we are (and) what we're doing as well as what we have," meaning that logos are no longer the key status symbol they once were.

The connection to lifestyle resonates with Florence-based LUISAVIAROMA. Camilla Gennari Feslikenian, social media manager at the firm, told the survey that for its Instagram account, "we have found that it's better to avoid anything with a logo, as it keeps the post as 'real and lifelike' as possible." LUISAVIAROMA, a multi-brand retailer, said that "using images with visible logos or immediately recognizable brands can often take away from that."

While competition between brands may now seem difficult, given this shift towards unmarked goods, Cohen suggested that "it comes down to the product itself and its relationship with the consumer." For Cohen, shoppers want to "pick a personality, then pick the components."

Here's what the Naomi Klein, No Logo story looks like when mapped on to a Generation Map:



Slightly surprising to hear the Millennials following the No Logo lead. Not so surprising that the emerging 'Generation Z' Artists are listening... Nomads and Artists sit well together. And if Auntie Naomi said it, it must be true. We might even call it a manifesto.

Biology – Parrot Fish



Viewers of Blue Planet 2 were treated to the spectacle of parrotfish eating stony coral, only for it to emerge the other end as sand. Through this process, a single parrotfish can produce around 400 kilograms of sand every year. This digestive beach building would not be possible without the parrot-like "beaks" – actually made of modified teeth – that give these fish their name. The hardness of these teeth is equivalent to a stack of about 88 African elephants compressed to a square inch of space.

Matthew Marcus, a researcher at Berkeley Lab, wanted to investigate the structure of this fish's beak to find out what endowed it with such strength.

'This is a fish that crunches up coral all day and is responsible for much of the white sand on beaches,' Mr Marcus said.

But how can this fish eat coral and not lose its teeth?

In a recent paper published in ACS Nano, Marcus and his collaborators have revealed the source of the parrotfish's powerful bite. Their findings even suggest future designs for materials that mimic the durability of parrotfish teeth. The researchers used X-ray techniques to reveal an 'interwoven fibre nanostructure'. Crystals of a mineral called fluorapatite are woven together in a chain mail-like arrangement. It is this structure that gives parrotfish teeth their incredible durability.

'Parrotfish teeth are the coolest biominerals of all,' said Professor Pupa Gilbert, a biophysicist at the University of Wisconsin-Madison and the leader of the study. 'They are the stiffest, among the hardest, and the most resistant to fracture and to abrasion ever measured.'

Professor Gilbert suggests that 'weaving crystals' to imitate this structure could be a way of producing new synthetic materials. Efforts are already underway to replicate the structure of human tooth enamel artificially, but the teeth of parrotfish present an exciting opportunity to make something really durable. The properties shown by their teeth would make useful additions to mechanical components found in electronics, for example, which must often withstand a lot of strain.

Here's what the stress-strain contradiction looks like when mapped on to the Contradiction Matrix:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Stress/Pressure (19)

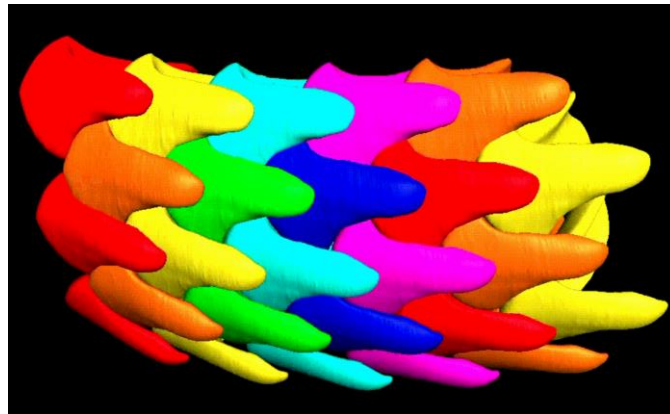
WORSENING PARAMETERS YOU HAVE SELECTED:

Length/Angle of Moving Object (3) and Force/Torque (15)

SUGGESTED INVENTIVE PRINCIPLES:

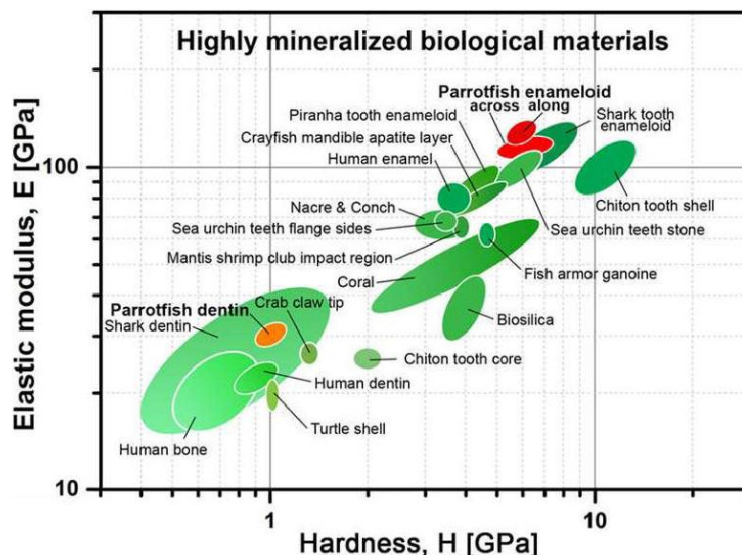
35, 9, 17, 14, 4, 40, 3, 12, 13, 36

And here's what the micro-structure of the parrotfish tooth tip looks like:



Still image from excellent micro-structure animation at: <http://newscenter.lbl.gov/2017/11/15/xrays-reveal-biting-truth-about-parrotfish-teeth/>

- Principle 35, Parameter Changes? Check.
- Principle 9, Prior Counter-Action? Check.
- Principle 17, Another Dimension? Check.
- Principle 14, Curvature? Check.
- Principle 4, Asymmetry Check.
- Principle 40 Composites? Check.
- Principle 3, Local Quality? Check.



Short Thort

“Life shrinks or expands in proportion to one's courage.”

Anaïs Nin



*“Wisdom comes through suffering.
Trouble, with its memories of pain,
Drips in our hearts as we try to sleep,
So men against their will
Learn to practice moderation.
Favours come to us from gods.”*

Aeschylus, Agamemnon

News

Webinar

We will be running our first webinar through TRIZ Journal on 25 April. ‘TRIZ & First-Principles Innovation’ will be the title. The main thrust of the one-hour session is a recognition that 98% of innovation attempts fail. 98% of innovation attempts using TRIZ also fail. The same applies to all other methods. This doesn't mean that TRIZ doesn't help, it means that it has to be used in the right way. The webinar is all about describing what that ‘right way’ means. We will discuss complex adaptive systems, emergent behaviour and the importance of first-principle level of understanding of system behaviour. We will show that once these foundations are in place, the power of TRIZ is increased by several orders of magnitude. Register for the (free) session at triz-journal.com

India

Darrell will be back in India, in Bangalore, during the week of 21 May. It is likely the visit will extend into the following week with a job in Mumbai. Anyone interested in having him come and do something with you during the week beginning May 28 should get in touch.

Short Course

We will be conducting the Wednesday 'disruption' day on the University of Buckingham 'Foundations Standardisation & Disruption' MSc Short Course. The accredited course will take place during the week of 25-29 June at the University's campus. More details and to book check out the 'BLEU' page at the University website.

DTU

Darrell's two-day SI 'Voice Of Customer/Voice Of System' workshop on the EMBA programme at DTU in Copenhagen has been confirmed for 19-20 October.

New Projects

This month's new projects from around the Network:

- Automotive – SI Workshops
- Automotive – SI Problem-Solving Sessions
- Automotive – SI Certification Workshops
- Construction – Future Strategy Study
- Government – Public Engagement Project
- Transport – SI Certification Workshops
- IT – Innovation Project Mentoring Support Programme
- Utility – Design-Make Project
- Electronics – Executive Innovation Education Programme
- FMCG – Consumer Anthropology Study