Ex-Cell Art and its implications

Tin Towns and other Excel Fictions

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Ad for Microsoft Excel: Excel 2016 helps you unlock insights and tell the story in your data.

ExCell Art, and, by extension, *Tin Towns and Other Excel Fictions* involves issues of programs and software, opportunities and constraints of the computing environment, and narrative possibilities in a changing world.

I. Tin Town **Examples:** [This is just a quick look – longer explanations of all of these below available.]

<u>The Tin Towns Tinline (short version)</u>

This Timeline is, of course, expandable. It is open for new developments.

The Tin Towns Blogochart

Today we have a vibrant culture of doomers on the WWW. They are finding a linguistically colorful community in fellow bloggers. Their language seems appropriate for representing the "tin foil hatters" of *Tin Towns*.

Flightless Birds of a Feather (not included yet)

Memories of the Stone Age.

The Third World Commercial Invoice (not included yet)

The bill comes due in the Third World first. Summing up the number of people in poverty.

Horizons of Deep Water (not included yet)

Nothing has ever happened in Macondo and nothing ever will. Inventory list for the oil "spill."

The Good Fortune Land

The Good Fortune Land Slow Loss Training Program

TEPCO's Nursing Chart for the Reactors

The 2015 Fukushima Pinup Calendar

II. Narrative Interface

The proliferation of basic kinds of interfaces has been a constant feature of technical evolution. In addition to the classic standards – the Command Line Interface and the myriad versions of the Graphical User Interface (GUI) – we also have become accustomed to touch screen interfaces, gesture tracking interfaces, motion detecting interfaces, and voice interfaces – among others. Looming ahead - Interface-Free Electronic Literature. The idea that a story or poem can be revealed entirely through direct manipulation is fascinating, and it started me thinking about the role of interface in my own work. What I realized was that the interface was always critical aspect of the architecture/meaning of the work.

In fact, within the genre of digital literature itself, I had come to think of the software interface as a defining part of the story-making effort – much the way that sculptors might approach a work of wood differently from one of marble.

Aside from the initial content that spurred the beginning of a piece – the software and platform elements seemed to be in continual interaction with the content of my writing. This interaction not only shaped the structure of the work, but impacted the style and tone, the discovery and trajectory – in fact, the content itself sometimes emerges largely through the interface that the software allows. *Indeed, some works involve an actual surrender to the software*

III. Database, Spreadsheet, Linear Text

Early on in the growth of e-lit the lure of software that was both more directive and allowed considerable complexity was pervasive – although we hardly knew it. At the time that early writers were working with <u>Hypercard</u> and, especially, <u>Storyspace</u>, these programs seemed to be almost transparent. Looking back, though, it is easier to see how insistently the software shaped the ways in which a story or poem was structured. (That is not to say that writers didn't try to bend the software to their own vision – but it was not always easy). Although I began <u>Califia</u> in Storyspace [see also Raine Koskimaa's summary of <u>Califia</u>], I quickly switched to a software called <u>Toolbook</u>. At the time, this software was a kind of inexpensive, multi-purpose authoring/teaching system.

However, unlike the "card stack" hypertext-linking system of Storyspace, Toolbook had essentially an object-oriented database design. All of the text, images, audio clips, and animation were "called" from the database and assembled by the program for that screen.

Because of the data-base organization, I adopted the strategy of designing a "world" that mapped not only onto the landscape of California, the gold mines, and the constellations, but also onto the fields of the database. Because I was working with "fields", everything came in eights – or iterations of threes and fives - five time periods, eight locations,

eight gold mines, and eight main aspects of each of the three narrators. [That is, three vertical fields for the narrators, eight listings horizontally]. It was a way to keep track of a large narrative – but it also influenced the work. If I happened to be short for one of the fields, I made something up so that it all would be consistent.

IV. Director – Time-based Assembly

Egypt, The Book of Going Forth by Day - my second long narrative work - was similarly influenced by the software. I began it in Toolbook – but because of the frequent version updates, the cost of the software and the training, and the difficulty of finding help with writing code for it, I decided finally to move to <u>Director</u>. Director is a time-based program; it is essentially attuned to video; every element is incorporated not as an object-oriented database, like *Califia*, but as a movie frame. In this case, because of the programmable-cell organization, I adopted the strategy of compressing time, making it multilinear and layered. With Director, the trick was to compress space into "infinite" slices of time. I thought of these units as 'infinite manuscripts' – but manuscripts that had an unbounded run-time loop.

V. Spreadsheet Authoring - Excel

So, in a way, when I decided to work with <u>Excel</u>, it seemed that as long as one was not really thinking in linear text (or writing like that anymore), a spread sheet might work just as well as a database or a time-based software for a framing architecture.

Currently, I am at work on an extended project called *Tin Towns and Other Excel Fictions*. I started this piece in <u>Flash</u>, but became discouraged when Flash was not being supported on some of the newer platforms.

While I was working on *Tin Towns*, I also happened to be learning the software for my new Windows 7 operating system. The one program that did not require a long learning curve was Excel. I began experimenting with what I called Excel Poems – little one-screen stanzas that explored the Excel possibilities. Then, I decided to transfer *Tin Towns* into a largely Excel format.

Excel. Imagine, those spread sheet folks were able to work with software that operated essentially the same as the old, 1980 <u>Supercalc</u>, developed by <u>Dan Bricklin</u>, and bundled as part of the Wordstar package, originally for the Osborne 1 computer. It was one of the first spreadsheet programs capable of iteratively solving circular references – having cells that depend on each other's results. The newest Excel has many more options than decades ago – all of them, though, still based on the spreadsheet concept or other typical business functions.

As with my other large projects, *Tin Towns* comes out of a desire to use software-designed structures to re-arrange, layer, and compress time and space – to look at time as a kind of space and *vice versa*.

Tin Towns is most definitely a work that is shaped by the fact that it is a spreadsheet. But perhaps more importantly, it deals with material strangely suited to a format that seems to allow a speculative fiction narrative on a large-scale basis. The configuration of the software constrains the work and gives it a metaphorical referent. With *Tin Towns*, I wanted to explore the possibility of playing with very long time frames and conceptual relationships – while still including significant detail.

The basic premise of *Tin Towns* is a question – what role might the shortage of resources play in major historical upheavals? [This question includes the issue of the *distribution* of those resources – what might be squandered in First World countries could be critically short in Third World areas.]

History is always a part of my fictional experiments – and one of the periods that came to interest me was the end of the Bronze Age – around 1200 BC.

VI. Historical Background – Fictional Speculation

This description is from Wikipedia:

The Bronze Age collapse is a transition in the Near East and Eastern Mediterranean from the Late Bronze Age to the Early Iron Age. Some historians believe that it was violent, sudden and culturally disruptive. The palace economies of the Aegean and Anatolia by the isolated village cultures of the Ancient Dark Age.

Between 1206 and 1150 BCE, the cultural collapse of the Mycenaean kingdoms, the Hittite Empire in Anatolia and Syria, and the Egyptian Empire in Syria and Canaan <u>interrupted trade routes and extinguished literacy</u>. In the first phase of this period, almost every city between Troy and Gaza were violently destroyed, and often left unoccupied thereafter: examples include Hattusa, Mycenae, Ugarit. [Underlines are mine.]

This Bronze Age collapse was particularly fascinating in the light of present-day apocalyptic scenarios. The end of the Bronze Age was akin to a breakdown of the known world of the time – but how might we think about it (narrate it) and how did it really happen? I started wondering if "*interrupted trade routes and extinguished literacy*" might not be the *cause* of this chaos - not the result.

Scholars do not agree on a definitive case for why the cities and empires of the age disappeared so quickly: the Hittites disappeared from record, Ugarit and its famous library burned, the Sea Peoples invaded Egypt. There are many theories – changes in warfare tactics or weapons, invasions of barbarians, instability of the regimes – and almost always the scholars mention that there might have been some "disruption of trade" that finished off these civilizations. But finished they were. Even the writing systems of Turkey and Greece disappear from archaeology. Sometime around 800 BC, economies begin to pick up again – but what of the Ancient dark ages? the Middle Ages? the obscure ages ahead?

I was in the process of reading as much as I could about the end of the Bronze Age when I came across <u>The</u> <u>Extraordinary Voyage of Pytheas the Greek</u> by Barry Cunliffe. Although we have only scraps of the original "On the Ocean" by <u>Pytheas</u> (in 325 BC he travelled out into the Atlantic and perhaps all the way to Iceland. Some say he was a liar, others say his reports can be substantiated in part), his story set me wondering. One surviving segment of his journey relates to *tin* – and tells of secret voyages from Cadiz to Cornwall to purchase tin. Humm – a long way, and someone had gone to a lot of trouble to keep this source of tin somewhat a secret for a long time!

Tin was a key resource of the Bronze Age economy. With armies across the Mediterranean clad in bronze armor and using bronze weapons, tin was in high demand (see Tin Notes below). If tin had suddenly become very scarce, might that have influenced the balance of Bronze Age power? Could the lack of a simple thing like tin have contributed to the collapse? In later reading, I have found scholars that have opined that this might be the case.

[While trade imbalances and material shortages have influenced the course of history, they receive comparatively little attention (wars are big, kings and empires, politics – but trade, no: money and trade might well be behind the demise of kingdoms and empires, but they are managed by select groups and not generally analyzed in historical accounts). In many historical accounts, the mainstays of commercial trade appear in stock phrases like "the homes of the wealthy merchants lined the shore."]

So perhaps the disruption of trade and literacy that ensued at the close of the Bronze Age might have something to do with tin. Even the most detailed accounts of the development of bronze fail to conclusively identify the sources of tin that made bronze possible. There might have been early trade in tin from Eastern Europe, or perhaps central or western Turkey, or Afghanistan, or even Thailand. But, generally, while the Bronze Age was in full swing, and armies all across the known world were equipped with bronze weapons, chariot fittings, and armor, few seem to know where the necessary quantity of tin came from. Tin sources must have been a valuable trade secret – and the merchants and manufacturers of bronze must have held their power closely. Then, too, the details of a tin crisis would likely have been kept fairly quiet for military and other reasons.

The disintegration of a widespread and viable civilization undoubtedly has many contributing factors – but I wanted to raise the possibility that the lack of this resource might have been *largely invisible or disregarded by the people of the*

time (and thus less visible to later researchers). And, that, when the more dramatic signs of destruction began to take place, the focus was on the events of the moment.

[Of course, valuable resources have been overexploited, polluted, and squandered all along in our history – timber, game, topsoil, water – and so forth. (Easter Island, Iceland) And, in most cases, the ordinary folk, and even many leaders, must not have had any real understanding of the consequences.

Most recently, there has been much talk about peak oil, global warming, nuclear power, and the cost of energy in general. Two recent "disasters" have brought these issues – essentially the "shortages" of our contemporary times – into dramatic focus. The end result can scarcely be anything but a realization that exponential growth of everything cannot continue apace.

But we are a culture of the world balance sheet today. If a solution – any solution – requires that the world economy is slowed down for any reason, it is vehemently opposed. As the money flows into more and more fantastical forms of digital entry – bubbles of everything – we live in the shadow of a world of Tin Towns.]

It may well have been that a few elite at the end of the Bronze Age saw the collapse as more endemic than just invasions and political instability – there are hints in letters sent from Ugarit to the Hittites, for instance. But in general, the violence of the presenting crisis takes most of the attention. And it seemed this might be so throughout history.

I started with a preliminary Timeline and began to experiment from there.

While I had initially selected Excel because it seemed so familiar and stable, as the project progressed, the various business applications – both literal and metaphorical – seemed to provide useful and provocative frameworks for exploring the kinds of large, oblique narratives I had in mind. The basic spreadsheet layout provided one approach; several other templates that were part of the program applications also suggested themselves.

I was not very concerned with the correct mathematics of the equations or the functions and forms – they were a way of commenting on the fact that, for all the quantification of our economy/culture (as a way of understanding the world), sometimes very important elements (both of the past and of the future) are simply not factored in. In some cases, the mis-use of the helpful templates is evident.

And thus I began experimenting with basic spreadsheets and also: budget makers, billing statements, expense reports, competitive alternative map for market positioning, blood pressure trackers, loan amortizations, agendas, tinkle potty charts, calendars, wedding seating charts, memos, production errors scatter charts, display booth diagrams, schedules, statements, breakeven interactive charts, and time sheets.

I see these templates as a way of compressing time, space, and data into hypermedia "stories." They also tend to suggest a storyline with material that may or may not *actually* be a narrative – but does count as an account. Connections can be made, perhaps, between History, Memory, Image, Data, Text, Understanding. Or not!

VII. Tin Town Stories in Depth:

The Tin Towns Tinline (short)

The Tin Towns Blogochart

Flightless Birds of a Feather (not included yet)

The Third World Commercial Invoice (not included yet)

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Horizons of Deep Water (not included yet)



The Good Fortune Land

The Good-Fortune Land is a collection of pieces that take the Fukushima meltdown as its starting point. The name, Fukushima, translates roughly into English as *the good fortune land*. [Caveat: I have no idea whether or not the Fukushima meltdowns will severely affect the future of Japan or the people across the globe – my interest here is mainly in the way that data that might shape the future can be read and interpreted by contemporary sources.]

While radiation itself is stubbornly alien to human senses – it cannot be seen, smelled, heard, tasted, or felt - the current data stream of information is perhaps more non-human, or inhuman, than even radiation itself.

Air, Water, Ground, Food, Fish, Animals, Infrastructure, People. The Fukushima Nuclear Disaster brought a more-thanordinary complexity to a global event. The Excel applications provide a framework and metaphorical referent – a way of looking at surreptitious loss and unintended consequences. The "cells" can include data, images, video, text, and extra notes.

When I began this piece, I envisioned that, as the data became more organized and accurate, I could add new kinds of material to the different spreadsheets – updating them regularly. I kept close watch on the news coming out (This was/is available mainly from non-traditional Web sources – not the Mainstream Media, which has been largely silent throughout. See <u>ENENews.com archive</u>.) Whereas we might have surmised that a concerted and thorough scientific tracking and testing effort would be mounted, that has not happened. Although we know that levels of radiation are continuing to rise in the ocean, in the atmosphere, on the ground, in humans, plants, and animals, and in the food supplies of Japan, the official results have been scant, contradictory, and haphazard.

Unfortunately, in *Good Fortune Land*, the statistical evidence of the short and long term effects of the Fukushima disaster are nearly incomprehensible – and the calculus of the available results can scarcely be parsed, even with Excel!

As a result, I have focused, in the "Slow Loss Training Program" and "Nursing Chart for the Reactors" on the condition of the damaged nuclear units – something one can see daily when the cameras are operational (assuming the images have not been altered <<u>http://www.tepco.co.jp/en/nu/f1-np/camera/index-e.html</u>>).

Among the many possible approaches to this complex, continuing event, this involves a careful, daily watch of the plants. One can also track the huge costs of simply maintaining the site amid the exposed nuclear fuel. [I have continued to visit the TEPCO camera site daily since 2011.]

The Good Fortune Land Slow Loss Training Program

Excel Version

Web Version

The Slow Loss Training Program is an exercise program chart – designed to provide a long-term view of radiation reduction in soluble, digestible nucleoids in the plant and the atmosphere. No matter how hard one exercises, the slow loss program is the best that can be hoped for!

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Isotope	Half-life	GI abs	orption
Strontium-90/yttrium-90	28 years	30%	
Caesium-137	30 years	100%	
Promethium-147	2.6 years	0.01%	
Cerium-144	285 days	0.01%	
Ruthenium-106/rhodium-106	1.0 years	0.03%	
Zirconium-95	65 days	0.01%	
Strontium-89	51 days	30%	
Ruthenium-103	39.7 days	0.03%	
Niobium-95	35 days	0.01%	
Cerium-141	33 days	0.01%	
Barium-140/lanthanum-140	12.8 days	5%	
lodine-131	8.05 days	100%	
Plutonium - 244 80 million	0.04		200 years
Plutonium - 239 24100 yrs	0.04		24,000 years

Uranium - 238 4.468 billion 0.00% 24 million?

As can be seen – these are healthy numbers – posing no danger to human life. However – do not try to cook these at home.

The Fukushima accident is no longer news. With the "cold shutdown" announcement, the media, which barely covered the event all year, has moved on. Fukushima didn't even get listed in notable news events of 2011.

The TEPCO live camera lens is smudged, and our view both day and night leaves us wondering about the end result. Certainly there is loss and there may be new information coming in the future. We are a culture of the data set and the balance sheet – but we suspect that, even if we had more data, actual, reliable figures, the picture might be the same in the end.

Other comments include expected results for Uranium 238 -

And:

The Japan Tourism Agency wishes to inform people both inside and outside Japan of the fact that Fukushima I Nuclear Power Plant has achieved a "cold shutdown state". Thanks to the 3rd supplementary budget for the fiscal 2011 year, the Agency will consider the entire Tohoku region as one big exhibition hall, and by coordinating the various regional and private efforts promote the domestic tourism with events like "Tohoku Tourism Exhibition". The Agency will also strive for a steady recovery of foreign tourists visiting Japan. (Shinbun)

Screen Eight (tin6current.htm)

Preparations are ongoing for the 2020 Tokyo Olympics.

TEPCO's Nursing Chart for the Reactors

Excel Version

Web Version

TEPCO'S Nursing Chart for the Reactors. The six reactors at Daiichi, although officially in a state of cold shutdown, or more accurately "cold shutdown conditions", will entail intensive care for at least 40 years (most importantly without any income stream). This chart outlines some of the considerations for the company in keeping the physical site healthy:

Screen Five (<u>tin3.htm</u>) Number of fuel assemblies In the reactor 400 unit 1 548 unit 2 548 unit 3 0 unit 4 548 unit 5 764 unit 6

Fuel assemblies must be continually cooled with water – the water needs to be stored in radiation-resistant containers.

Heartbeat may be 10 quadrillion Becquerels per hour. But we don't know exactly.

• Spent fuel assemblies in the spent fuel pool

- 292 unit 1
- 587 unit 2
- 514 unit 3

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1,331 unit 4 946 unit 5 876 unit 6

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• They count for at least 1700 tons of fuel on site.

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New fuel assemblies in the spent fuel pool
100 unit 1
28 unit 2
52 unit 3 (this indicates unit 3 was fully loaded with MOX)
204 unit 4 (MOX)
48 unit 5
64 unit 6
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The Excel program has a feature for pop-up notes – here are a few from the Nursing Chart:

Eight thousand rods in Japan Daiichi. Since the Rods are rather are small, they cannot find them all.

We don't know how many Rods there might remain in

Medical note: Patients' temperatures safely under 100 degrees. However, attendants do not know where the Cores of the Reactors are presently located.

Of Japan – 56 Reactors. US 103 Reactors.

Other possible comments to insert:

Patients' leaking of fluids. About 230 tonnes of water was found leaking on December 18.

Sympathizers are encouraged to be optimistic. The government may import Pandas to cheer up the children of Fukushima.

Sendai City in Miyagi Prefecture wants to "borrow" pandas from China to cheer children in the city. So the vice mayor of Sendai visited PM Noda on December 22 with two TV celebrities to press Noda to ask for panda loan when he visits China on December 25.

...Kondo says the money will come from donations that his office has collected from citizens for the people in disaster-affected areas. (Yomiuri Shinbun Miyagi local version 12/23/2011)

Further away: As much as 20 million tons of debris from the accident is estimated to have washed out to sea when the tsunami struck Japan in March. Now the first traces are appearing on the other side of Pacific Ocean, on US and Canadian shores.

These patients are not contagious, Japanese officials and concerned agencies agree: <u>Dr. Shunichi Yamashita</u> has maintained that "The effects of radiation do not come to people that are happy and laughing. They come to people that are weak-spirited, that brood and fret."

Diagnoses:

Reactor 1 - Full Melt-through for Fuel Assemblies. Status: Spent Fuel Pool Unknown.

Reactor 2 - Full Melt-through for Fuel Assemblies. Status: Spent Fuel Pool Unknown.

Reactor 3 - Full Melt-through for Fuel

Assemblies. Status: Spent Fuel Pool Under Reconsideration = into the sky?

Reactor 4 - No Fuel Assemblies. Status: Spent Fuel Pool Precarious.

Reactors 5 and 6 – No information.

Despite the condition of the Reactors, TEPCO, the Japanese Government, the US Government, and all international Agencies agree there will be no immediate effect on Human Health.

Screen Six (<u>tin4.htm</u>)

In the meantime the structures are deteriorating. The "tent" that was to cover the skeletal damage of Unit One is sagging and buckling. The catwalks are collapsing. Reactor number three is a pile of rubble. Reactor Four has been partially disassembled. The Daiichi plant itself promises to become an icon; whatever effects are finally revealed about the melt-throughs, the physical place will age and decay – a moment in the history of technology. Fortunately, in Good Fortune Land, things have an illusionof improvement. By 2016, all of the failing reactors have been tented and covered over. The camera image suggests that Fukushima might be just like any other industrial site – even though the radiation is so high that neither humans nor robots can enter any of the three main reactor buildings.

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The 2015 Fukushima Pinup Calendar

The 2015 Fukushima Pinup Calendar

This is a web-based piece that is viewable on Windows IE, Safari, Android Tablets, and the iPad. <u>http://califia.us/TinCalendar</u>.

The 2015 Fukushima Pinup Calendar adds another few data points to *The Good Fortune Land*. As we look back on the years between 2011 and 2015, this Calendar is provided as a vivid reminder of the history of the five-year attempt to pretty up the picture. It was also a useful calendar online or printed, for home or office. It consists, of course, of the twelve months of the year – each month commemorating one of the extant issues surrounding the "control" of the plant and its surrounding water and land. In the spaces for each day, data from 2011, 2012, and 2013, and 2014 is recalled – along with the important holidays!

The 2015 Fukushima Pinup Calendar is not a comprehensive account of the Fukushima Triple Melt-Through. Rather, since the disaster is relatively complicated, the figures inconsistent, and news reports mainly fragmentary and conflicting, I approached the subject with some specific (in a sense, artistic – since all art and literature involves limitation) constraints. Having closely followed reports from the few sources that had been covering Fukushima over almost four years – sources including TEPCO itself, the Daily Yomuri, Asahi News, Fukushima Diary, ENEnews, NHK World, and SimplyInfo, among others – I found I had collected hundreds of articles – and had access to many more through news archives. What sense to be made of all of this data (especially since this affair will be ongoing for many years)?

I decided to choose one theme for each month of the year (the explosions, the land contamination, the health effects) – and, in the calendar for that month, to include *only* articles on that particular subject. **June**, for example, is the month for *Water* – and the problems relating to the radioactive water leaks from Fukushima. Surprisingly, choosing only the articles published in *June* 2011, 2012, 2013, and 2014, I had more than enough headlines to fill the boxes for individual days. The *Calendar*, then, is an impressionistic look at a continuing narrative – the end of which is unknown....

What does emerge, I believe, is a sense of what happens to information/storyline (disaster narrative, if you wish) – when input is scattered, confusing, and extended over long time intervals.

January –

Is about the initial explosions – and the ongoing ones.

February -

Takes a look at the state of nuclear reactors worldwide and some nuclear waste storage facilities, as well.

March - the anniversary month -

Looks at ongoing radiation statistics in Japan.

April –

Is about nuclear plant radiation fallout data worldwide.

May –

Reports the effect on the Japanese people.

June -

Is about the persistent problems with Water (the cooling problems, the leakage from the reactors, the pollution of groundwater, and the efforts to seal off the bay).

July –

Considers the data about radiation levels inside the plants themselves.

August –

Covers the news about Tsunami debris and the pollution of the beaches in Japan and the West Coast.

September –

Cites reports about strange animals and plants – your meal problems solved, gigantic oysters and twelve-pound tomatoes!

October -

Conditions for Workers at the plant and their tweets.

November -

What the nuclear authorities and scientists are saying (and some the funny things they have opined – including that "people who smile are impervious to radiation diseases").

December –

The ongoing general conditions of the physical plant.

Of course, some of the best news articles did not occur in the months that I had sectioned out for a particular topic – but we have plenty of time ahead. When it's time to hang up your 2020 Calendar, who knows?



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double image before/after

The tidy camera image now

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VIII, Conclusion

The predominant trend in technology has been to make the human-machine interface/interaction more and more simpleseeming. As the more popular applications of electronic communication favor speed and simplicity, audiences have become used to and now desire a minimum of content. On the other hand, one of the most interesting aspects of the

real world is its layered complexity, and I have always thought of art (in whatever medium) as a way of making that complexity into a greater truth that we can ordinarily experience.

Tin Towns, then, is a suite of stories that gather a set of "data points," reflecting intersections in technology, history, economics, and memory - telling a tale of human behavior, unwarranted excess, and unexpected loss. *Tin Towns and Other Excel Fictions* contains works about mega-events that include historical periods from the collapse of the Bronze Age to the present. In looking at the reconfigured data for these events, we begin to explore how our narratives of understanding (or misunderstanding) are assembled.

Tin Foil Hat Towns // Tinturn Towns // Tinder Towns // Tinsel Towns // Cat on a Hot Tin Roof

IX. Notes on Tin

A. The earliest bronze objects had tin or arsenic content of less than 2% and are therefore believed to be the result of unintentional alloying due to trace metal content in the copper ore. It was soon discovered that the addition of tin or arsenic to copper increased its hardness and made casting much easier, which revolutionized metal working techniques and brought humanity from the Copper Age to the Bronze Age around 3000 BC²

The first evidence of tin use for making bronze appears in the Near East and the Balkans around 3000 BC. It is still unclear as to where the earliest tin was mined as tin deposits are very rare and evidence of early mining is scarce. Europe's earliest mining district appears to be located in Erzgebirge, on the border between Germany and the Czech Republic and is dated to 2500 BC. From there tin was traded north to the Baltic Sea and south to the Mediterranean following the Amber Road trading route. Tin mining knowledge spread to other European tin mining districts from Erzgebirge and evidence of tin mining begins to appear in Brittany, Devon and Cornwall, and in the Iberian Peninsula around 2000 BC.

- B. The Cape Gelidonya (Turkish: Gelidonya Burnu or Taşlık Burnu) near Finike, Turkey is an interesting late Bronze Age wreck (c. 1200 BC). Among the finds were Mycenaean pottery and copper and tin ingots that had been reduced to a 'toothpaste-like substance'.
- C. The belief that a tin foil hat can significantly reduce the intensity of incident radio frequency (RF) radiation on the wearer's brain is not completely without a basis in scientific fact. A well-constructed tin foil enclosure would approximate a Faraday cage, reducing the amount of radiofrequency electromagnetic radiation entering from outside. A common high school physics demonstration involves placing an AM radio on tin foil, and then covering the radio with a metal bucket. This leads to a noticeable reduction in signal strength. The efficiency of such an enclosure in blocking such radiation depends on the thickness of the tin foil, as dictated by the skin depth, the distance the radiation can propagate in a particular non-ideal conductor. For half-millimeter-thick tin foil, radiation above about 20 kHz (i.e., including both AM and FM bands) would be partially blocked.
- D. A tin cry is the characteristic sound heard when a bar of tin is bent. Variously described as a "screaming" or "crackling" sound, the effect is caused by the shearing of crystals in the metal. The sound is not particularly loud, despite terms like "crying" and "screaming". The tin cry is often demonstrated as a simple science experiment. The bar of tin will "cry" repeatedly when bent until it breaks. The experiment can then be recycled by melting and recrystallizing the metal. The low melting point of tin (only 232 °C) makes this easy. Although most typical of tin, other materials, including niobium and indium, exhibit a similar effect.
- E. Tin (Old English: tin, Old Latin: plumbum candidum ("white lead"), Old German: tsin, Late Latin: stannum) is one of the earliest metals known and was used as a component of bronze from antiquity. Because of its hardening effect on copper, tin was used in bronze implements as early as 3,500 BC. A shipwreck at Uluburun, Turkey dating to 1336 BC contains a shipment of tin, perhaps originating in Afghanistan.[6] European tin mining is believed to have started in Cornwall and Devon (esp. Dartmoor) in Classical times, and a thriving tin trade developed with the civilizations of the Mediterranean[7][8]. However the lone metal was not used until about 600 BC. The last Cornish Tin Mine, at South Crofty near Camborne closed in 1998 bringing 4,000 years of mining in Cornwall to an end, but as of 2007 increased demand from China may lead to its reopening.