Children of TEX

Hans Hagen

1   The theme

Nearly always TEX conferences carry a theme. As there have been many conferences the organizers have run out of themes involving fonts, macros and typesetting and are now cooking up more fuzzy ones. Take the BachoTUG 2017 theme:

Premises The starting point, what we have, what do we use, what has been achieved?

Predilections How do we act now, how do we want to act, what is important to us, what do we miss?

Predictions What is the future of TEX, what we'd like to achieve and can we influence it?

My first impression with these three P words was: what do they mean? Followed by the thought: this is no longer a place to take kids to. But the Internet gives access to the Cambridge Dictionary, so instead of running to the dusty meter of dictionaries somewhere else in my place, I made sure that I googled the most recent definitions:

premise an idea or theory on which a statement or action is based

predilection if someone has a predilection for something, they like it a lot

**prediction** a statement about what you think will happen in the future

I won't try to relate these two sets of definitions but several words stand out in the second set: idea, theory, action, like, statement and future. Now, as a preparation for the usual sobering thoughts that Jerzy, Volker and I have when we staring into a BachoTEX campfire I decided to wrap up some ideas around these themes and words. The books that I will mention are just a selection of what you can find distributed around my place. This is not some systematic research but just the result of a few weeks making a couple of notes while pondering about this conference.

2   Introduction

One cannot write the amount of TEX macros that I've written without also liking books. If you look at my bookshelves the topics are somewhat spread over the possible spectrum of topics: history, biology, astronomy, paleontology, general science but surprisingly little math. There are a bunch of typography-related books but only some have been read: it's the visuals that matter most and as there are no real developments I haven't bought new ones in over a decade, although I do buy books that look nice for our office

display but the content should be interesting too. Of course I do have a couple of books about computer (related) science and technology but only a few are worth a second look. Sometimes I bought computer books expecting to use them (in some project) but I must admit that most have not been read and many will soon end up in the paper bin (some already went that way). I'll make an exception for Knuth, Wirth and a few other fundamental ones that I (want to) read. And, I need to catch up on deep learning, so that might need a book.

My colleagues and I have many discussions, especially about what we read, and after a few decades one starts seeing patterns. Therefore the last few years it was a pleasant surprise for me to run into books and lectures that nicely summarize what one has noticed and discussed in a consistent way. My memory is not that good, but good enough to let some bells ring.
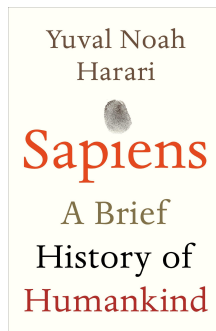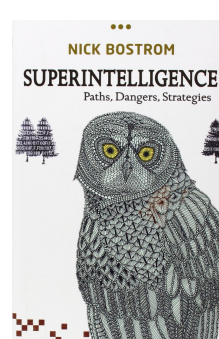

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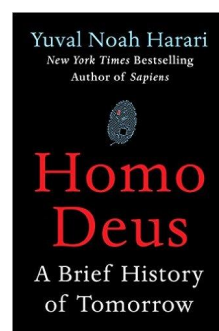
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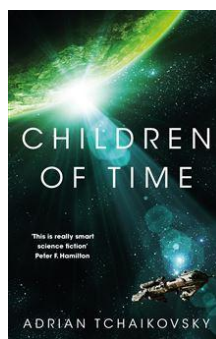
science fiction

informatics

The first book that gave me this "finally a perfect summary of historic developments" feeling is "Sapiens" by Yuval Noah Harari. The author summarizes human history from a broad perspective where modern views on psychology, anthropology and technical developments are integrated. It's a follow up on a history writing trend started by Jared Diamond. The follow up "Homo Deus" looks ahead and is just as well written. It also integrates ideas from other fields, for instance those related to development of artificial intelligence (Dennett, Bostrom, etc.).

Another inspiration for this talk and article is the 50 hour lecture series on behavioral biology by Robert Sapolsky of Stanford University, brought to my attention by my nephew Bram who visited a few TEX conferences with me and who is now also forced to use TEX for assignments and reports. (How come self-published books used at universities often look so bad?)

The title of this talk is inspired by the book "Children of Time" by Adrian Tchaikovsky that I read recently. There are science fiction writers who focus on long term science and technology, such as some of Alastair Reynolds, while others follow up on recent development in all kind of sciences. One can recognize aspects of "Superintelligence" by Bostrom in Neal Asher's books, insights in psychology in the older Greg Bear books, while in the mentioned "Children of Time" (socio)biological insights dominate. The main thread in that book is the development of intelligence, social behaviour, language, script and cooperation in a species quite different from us: spiders. It definitely avoids the anthropocentric focus that we normally have.

So how does this relate to the themes of the BachoTEX conference? I will pick out some ways to approach them using ideas from the kind of resources mentioned above. I could probably go on and on for pages because once you start relating what you read and hear to this TEX ecosystem and community, there is no end. So, consider this a snapshot, that somehow relates to the themes:

premise Let's look at what the live sciences have to say about TEX and friends and let's hope that I don't offend the reader and the field.

predilection Let's figure out what brings us here to this place deeply hidden in the woods, a secret gathering of the TEX sect.

prediction Let's see if the brains present here can predict the future because after all, according to Dennett, that is what brains are for.

At school I was already intrigued by patterns in history: a cyclic, spiral and sinusoid social evolution instead of a pure linear sequence of events. It became my first typeset-by-typewriter document: Is history an exact science? Next I will use and abuse patterns and ideas to describe the TEX world, not wearing a layman's mathematical glasses, but more from the perspective of live sciences, where chaos dominates.

3   The larger picture

History of mankind can be roughly summarized as follows. For a really long time we were hunters but at some point (10K years ago) became farmers. As a result we could live in larger groups and still feed them. The growing complexity of society triggered rules and religion as instruments for stability and organization (I use the term religion in its broadest sense here). For quite a while cultures came and went, and climate changes are among the reasons.

After the industrial revolution new religions were invented (social, economic and national liberalism) and we're now getting dataism (search for Harari on youtube for a better summary). Some pretty great minds seem to agree that we're heading to a time when humans as we are will be outdated. Massive automation, interaction between the self and computer driven ecosystems, lack of jobs and purpose, messing around with our genome. Some countries and cultures still have to catch up on the industrial revolution, if they manage at all, and maybe we ourselves will be just as behind reality soon. Just ask yourself: did you manage to catch up? Is TEX a stone age tool or a revolutionary turning point?

A few decades ago a trip to BachoTEX took more than a day. Now you drive there in just over half a day. There was a time that it took weeks: preparation, changing horses, avoiding bad roads. Not only your own man-hours were involved. It became easier later (my first trip took only 24 hours) and recently it turned into a piece of cake: you don't pick up maps but start your device; you don't need a travel agent but use the Internet; there are no border patrols, you can just drive on. (Okay, maybe some day soon border patrols at the Polish border show up again, just like road tax police in Germany, but that might be a temporary glitch.)

Life gets easier and jobs get lost. Taxi and truck drivers, travel agents, and cashiers become as obsolete as agricultural workers before. Next in line are doctors, lawyers, typesetters, printers, and all those who think they're safe. Well, how many people were needed 400 years ago to produce the proceedings of a conference like this in a few days' time span? Why read the introduction of a book or a review when you can just listen to the author's summary on the web? How many conferences still make proceedings (or go for videos instead), will we actually need editors and typesetters in the future? How much easier has it become to design a font, including variants? What stories can designers tell in the future when programs do the lot? The narrower your speciality is, the worse are your changes; hopefully the people present at this conference operate on a broader spectrum. It's a snapshot. I will show some book covers as reference but am aware that years ago or ahead the selection could have been different.

4   Words

Words (whatever they represent) found a perfect spot to survive: our minds. Then they made it from speech (and imagination) into writing: carved in stone, wood, lead. At some point they managed to travel over wires but no matter what happened, they are still around. Typesetting as visualization is also still surrounding us so that might give us a starting point for ensuring a future for TEX to work on, because TEX is all about words. There is a lot we don't see; imagine if our eyes had microscopic qualities. What if we could hear beyond 20KHz. Imagine we could see infrared. How is that with words. What tools, similar in impact as TEX, can evolve once we figure that out. What if we get access to the areas of our brain that hold information? We went from print to screen and TEX could cope with that. Can it cope with what comes next?

The first printing press replaced literal copying by hand. Later we got these linotype-like machines but apart from a few left, these are already thrown out of windows (as we saw in a movie a few Bacho-TEX's ago). Phototypesetting has been replaced too and because a traditional centuries old printing press is a nice to see item, these probably ring more bells than that gray metal closed box typesetters. Organizers of TEX conferences love to bring the audience to old printing workshops and museums. At some point computers got used for typesetting and in that arena TEX found its place. These gray closed boxes are way less interesting than something mechanical that at least invites us to touch it. How excited can one be about a stack of TEX Live DVDs?

5   Remembering

Two times I visited the part of the science museum in London with young family members: distracted by constantly swiping their small powerful devices, they didn't have the least interest in the exhibited computer related items, let alone the fact that the couch they were sitting on was a Cray mainframe. Later on, climbing on some old monument or an old cannon seemed more fun. So, in a few decades folks will still look at wooden printing presses but quickly walk through the part of an exhibition where the tools that we use are shown. We need to find ways to look interesting. But don't think we're unique: how many kids find graphical trend-setting games like Myst and Riven still interesting? On the other hand a couple of month ago a bunch of nieces and nephews had a lot of fun with an old Atari console running low-res bitmap games. Maybe there is hope for good old TEX.

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If indeed we're heading to a radically different society one can argue if this whole discussion makes sense. When the steam engine showed up, the metaphor for what went on in our heads was that technology, It's a popular example of speakers on this topic: "venting off steam". When electricity and radio came around metaphors like "being on the same wavelength" showed up. A few decades ago the computer replaced that model although in the meantime the model is more neurobiological: we're a hormone and neurotransmitter driven computer. We don't have memory the way computers do.

How relevant will page breaks, paragraph and line breaks be in the future? Just like "venting off steam" may make no sense to the youth, asking a typesetter to "give me a break" might not make much sense soon. However, when discussing automated typesetting the question "are we on the same page" still has relevance.

Typesetting with a computer might seem like the ultimate solution but it's actually rather dumb when we consider truly intelligent systems. On the large scale of history and developments what we do might get quite unnoticed. Say that mankind survives the next few hundred years one way or the other. Science fiction novels by Jack McDevitt have an interesting perspective of rather normal humans millennia ahead of us who look back on these times in the same way as we look back now. Nothing fundamental changed in the way we run society. Nearly nothing from the past is left over and apart from being ruled by AIs people still do sort of what they do now. TEX? What is that? Well, there once was this great computer scientist Knuth (in the remembered row of names like Aristotle — I just started reading "The Lagoon" by Armand Leroi — Newton, Einstein, his will show up) who had a group of followers that used a program that he seems to have written. And even that is unlikely to be remembered, unless maybe user groups manage to organize an archive and pass that on. Maybe the fact that TEX was one of the first large scale open source programs, of which someone can study the history, makes it a survivor. The first program that was properly documented in detail! But then we need to make sure that it gets known and persists.

6   Automation

In a recent interview Daniel Dennett explains that his view of the mind as a big neural network, one that can be simulated in software on silicon, is a bit too simplistic. He wonders if we shouldn't more tend to think of a network of (selfish) neurons that group together in tasks and then compete with each other, if only because they want to have something to do.

Maybe attempts to catch the creative mindset and working of a typesetter in algorithms is futile. What actually is great typography or good typesetting? Recently I took a look at my bookshelf wondering what to get rid of — better do that now than when I'm too old to carry the crap down (crap being defined as uninteresting content or bad looking). I was surprised about the on-the-average bad quality of the typesetting and print. It's also not really getting better. One just gets accustomed to what is the norm at a certain point. Whenever they change the layout and look and feel of the newspaper I read the arguments are readability and ease of access. Well, I never had such a hard time reading my paper as today (with my old eyes).

Are we, like Dennett, willing to discard old views on our tools and models? When my first computer was an RCA 1802 based kit, that had 256 bytes of memory. My current laptop (from 2013) is a Dell Precision workstation with an extreme quad core processor and 16 GB of memory and ssd storage. Before I arrived there I worked with DEC-10, VAX and the whole range of Intel CPUs. So if you really want to compare a brain with a computer, take your choice.

I started with TeX on a 4 MHz desk top with 640 MB memory and a 10 MB hard disk. Running ConTeXt MkIV with LuaTeX on such a machine is no option at all, but I still carry the burden of trying to write efficient code (which is still somewhat reflected in the code that makes up ConTeXt). In the decades that we have been using TeX we had to adapt! Demands changed, possibilities changed, technologies changed. And they keep changing. How many successive changes can a TeX user handle? Sometimes, when I look and listen I wonder.

If you look back, that is, if you read about the tens of thousands of years that it took humans to evolve ("The mind in the cave" by Lewis-Williams is a good exercise) you realize even more in what a fast-paced time we live and that we're witnessing transitions of another magnitude.

In the evolution of species some tools were invented multiple times, like eyes. You see the same in our TeX world: multiple (sub)macro packages, different font technologies, the same solutions but with an alternative approach. Some disappear, some stay around. Just like different circumstances demand different solutions in nature, so do different situations in typesetting, for instance different table rendering solutions. Sometime I get the feeling that we focus too much on getting rid of all but one solution while more natural would be to accept diversity, like bio-diversity is accepted. Transitions nowadays happen faster but the question is if, like aeons before,

we (have to) let them fade away. When evolution is discussed the terms 'random', 'selection', 'fit', and so on are used. This probably also applies to typography: at some point a font can be used a lot, but in the end the best readable and most attractive one will survive. Newspapers are printed in many copies, but rare beautiful books hold value. Of course, just like in nature some developments force the further path of development, we don't suddenly grow more legs or digits on our hands. The same happens with TeX on a smaller timescale: successors still have the same core technology, also because if we'd drop it, it would be something different and then give a reason to reconsider using such technology (which likely would result in going by another path).

7 Quality

Richard Dawkins "The Ancestor's Tale" is a non-stop read. In a discussion with Jared Diamond about religion and evolution they ponder this thread: you holding the hand of your mother who is handing her mother's hand and so on till at some point fish get into the picture. The question then is, when do we start calling something human? And a related question is, when does what we call morality creeps in? Is 50% neanderthaler human or not?

So, in the history of putting thoughts on paper: where does TeX fit in? When do we start calling something automated typesetting? When do we decide that we have quality? Is TeX so much different from its predecessors? And when we see aspects of TeX (or related font technology) in more modern programs, do we see points where we cross qualitative or other boundaries? Is a program doing a better job than a human? Where do we stand? There are fields where there is no doubt that machines outperform humans. It's probably a bit more difficult in aesthetic fields except perhaps when we lower the conditions and expectations (something that happens a lot).

For sure TeX will become obsolete, maybe even faster that we think, but so will other typesetting technologies. Just look back and have no illusions. Till then we can have our fun and eventually, when we have more free time than we need, we might use it out of hobbyism. Maybe TeX will be remembered by probably its most important side effect: the first large scale open source, the time when users met over programs, Knuth's disciples gathered in user groups, etc. The tools that we use are just a step in an evolution. And, as with evolution, most branches are pruned. So, when in the far future one looks back, will they even notice TeX? The ancestor's tail turns the tree upside down: at the end of the successful branch one doesn't see the dead ends.

Just a thought: CDs and media servers are recently being replaced (or at least accompanied) by Long Play records. In the shop where I buy my CDs the space allocated to records grows at the cost of more modern media. So, maybe at some point retro-typesetting will pop up. Of course it might skip TeX and end up at woodcutting or printing with lead.

## 8	What mission

We rely on search engines instead of asking around or browsing libraries. Do students really still read books and manuals or do they just search and listen to lectures. Harari claims that instead of teaching kids facts in school we should just take for granted that they can get all the data they want and that we should learn them how to deal with data and adapt to what is coming. We take for granted that small devices with human voices show us the route to drive to BachoTeX, for instance, although by now I can drive it without help. In fact, kids can surprise you by asking if we're driving in Germany when we are already in Poland.

We accept that computer programs help physicians in analyzing pictures. Some wear watches that warn them about health issues, and I know a few people who monitor their sugar levels electronically instead of relying on their own measurements. We seem to believe and trust the programs. And indeed, we also believe that TeX does the job in the best way possible. How many people really understand the way TeX works?

We still have mailing lists where we help each other. There are also wikis and forums like stack exchange. But who says that even a moderate bit of artificial intelligence doesn't answer questions better. Of course there needs to be input (manuals, previous answers, etc.) but just like we need fewer people as workforce soon, the number of experts needed also can be smaller. And we're still talking about a traditional system like TeX. Maybe the social experience that we have on these media will survive somehow, although: how many people are members of societies, participate in demonstrations, meet weekly in places where ideas get exchanged, compared to a few decades ago? That being said, I love to watch posts with beautiful ConTeXt solutions or listen to talks by enthusiastic users who do things I hadn't expected. I really hope that this property survives, just like I hope that we will be able to see the difference between a real user's response and one from an intelligent machine (an unrealistic hope I fear). Satisfaction wins and just like our neurological subsystems at some point permanently adapt to thresholds (given that you trigger things often

enough), we get accustomed to what TeX provides and so we stick to it.

## 9	Intelligence versus consciousness

Much of what we do is automated. You don't need to think of which leg to move and what foot to put down when you walk. Reacting to danger also to a large extent is automated. It doesn't help much to start thinking about how dangerous a lion can be when it's coming after you, you'd better move fast. Our limbic system is responsible for such automated behaviour, for instance driven by emotions. The more difficult tasks and thoughts about them happen in the frontal cortex (sort of).
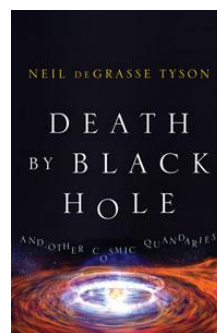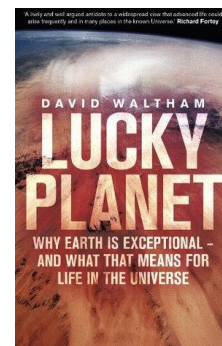

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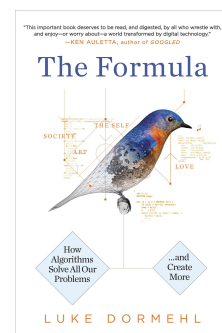
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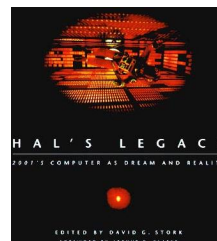
future science

earth science

For most users TeX is like the limbic system: there is not much thinking involved, and the easy solutions are the ones used. Just like hitting a nerve triggers a chain of reactions, hitting a key eventually produces a typeset document. Often this is best because the job needs to get done and no one really cares how it looks; just copy a preamble, key in the text and assume that it works out well (enough). It is tempting to compare TeX's penalties, badness and other parameters with levels of hormones and neurotransmitters. Their function depends on where they get used and the impact can be accumulated, blocked or absent. It's all magic, especially when things interact.

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Existing TeX users, developers and user groups of course prefer to think otherwise, that it is a positive choice by free will. That new users have looked around and arrived at TeX for good reason: their frontal cortex steering a deliberate choice. Well, it might have played a role but the decision to use TeX might in the end be due to survival skills: I want to pass this exam and therefore I will use that weird system called TeX.

All animals, us included, have some level of intelligence but also have this hard to describe property that we think makes us what we are. Intelligence and consciousness are not the same (at least we know a bit about the first but nearly nothing about the second). We can argue about how well composed some music is but why we like it is a different matter.

We can make a well thought out choice for using TeX for certain tasks but can we say why we started liking it (or not)? Why it gives us pleasure or maybe grief? Has it become a drug that we got addicted to? So, one can make an intelligent decision about using TeX but getting a grip on why we like it can be hard. Do we enjoy the first time struggle? Probably not. Do we like the folks involved? Yes, Don Knuth is a special and very nice person. Can we find help and run into a friendly community? Yes, and a unique one too, annoying at times, often stimulating and on the average friendly for all the odd cases running around.

Artificial intelligence is pretty ambitious, so speaking of machine intelligence is probably better. Is TeX an intelligent program? There is definitely some intelligence built in and the designer of that program is for sure very intelligent. The designer is also a conscious entity: he likes what he did and finds pleasure in using it. The program on the other hand is just doing its job: it doesn't care how it's done and how long it takes: a mindless entity. So here is a question: do we really want a more intelligent program doing the job for us, or do those who attend conferences like BachoTeX enjoy TeXing so much that they happily stay with what they have now? Compared to rockets tumbling down and/or exploding or Mars landers thrashing themselves due to programming errors of interactions, TeX is surprisingly stable and bug free.

## 10 Individual versus group evolution

After listening for hours to Sapolsky you start getting accustomed to remarks about (unconscious) behaviour driven by genes, expression and environment, aimed at "spreading many copies of your genes". In most cases that is an individual's driving force. However, cooperation between individuals plays a role in this. A possible view is that we have now reached a state where survival is more dependent on a group than on an individual. This makes sense when we consider that developments (around us) can go way faster than regular evolution (adaptation) can handle. We take control over evolution, a mechanism that needs time to adapt and time is something we don't give it anymore.

Why does TeX stay around? It started with an individual but eventually it's the groups that keeps it going. A too-small group won't work but too-large groups won't work either. It's a known fact that one can only handle some 150 social contacts: we evolved in small bands that split when they became too large. Larger groups demanded abstract beliefs and systems to deal with the numbers: housing, food production, protection. The TeX user groups also provide some organization: they organize meetings, somehow keep development going and provide infrastructure and distributions. They are organized around languages. According to Diamond new languages are still discovered but many go extinct too. So the potential for language related user groups is not really growing.

Some of the problems that we face in this world have become too large to be dealt with by individuals and nations. In spite of what anti-globalists want we cannot deal with our energy hunger, environmental issues, lack of natural resources, upcoming technologies without global cooperation. We currently see a regression in cooperation by nationalistic movements, protectionism and the usual going back to presumed better times, but that won't work.

Local user groups are important but the number of members is not growing. There is some cooperation between groups but eventually we might need to combine the groups into one which might succeed unless one wants to come first. Of course we will get the same sentiments and arguments as in regular politics but on the other hand, we already have the advantage of TeX systems being multi-lingual and users sharing interest in the diversity of usage and users. The biggest challenge is to pass on what we have achieved. We're just a momentary highlight and let's not try to embrace some "TeX first" madness.
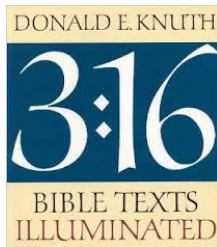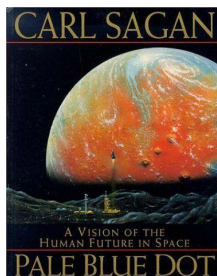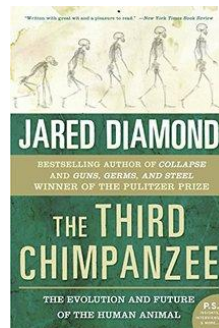
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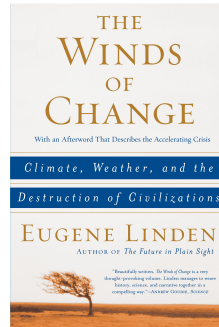
history

astronomy

history

11   Sexes

Most species have two sexes but it is actually a continuum controlled by hormones and genetic expression: we just have to accept it. Although the situation has improved there are plenty of places where some gender relationships are considered bad even to the extent that one's life can be in danger. Actually having strong ideas about these issues is typically human. But in the end one has to accept the continuum.

In a similar way we just have to accept that TEX usage, application of TEX engines, etc. is a continuum and not a batch versus WYSIWYG battle any more. It's disturbing to read strong recommendations not to use this or that. Of the many macro packages that showed up only a few were able to survive. How do users of outlines look at bitmaps, how do DVI lovers look at PDF. But, as typesetting relates to esthetics, strong opinions come with the game.

Sapolsky reports about a group of baboons where due to the fact that they get the first choice of food the alpha males of pack got poisoned, so that the remaining suppressed males who treated the females well became dominant. In fact they can then make sure that no new alpha male from outside joins the pack without behaving like they do. A sort of social selection. In a similar fashion, until now the gatherings of TEXies managed to keep its social properties and not been dominated by for instance commerce.

In the animal world often sexes relate to appearance. The word sexy made it to other domains as well. Is TEX sexy? For some it is. We often don't see the real colors of birds. What looks gray to us looks vivid to a bird which sees in a different spectrum. The same is true for TEX. Some users see a command line (shell) and think: this is great! Others just see characters and keystrokes and are more attracted to an interactive program. When I see a graphic made by MetaPost, I always note how exact it is. Others don't care if their interactive effort doesn't connect the dots well. Some people (also present here) think that we should make TEX attractive but keep in mind that like and dislike are not fixed human properties. Some mindsets might as well be the result from our makeup, others can be driven by culture.

12   Religion

One of Sapolsky's lectures is about religion and it comes in the sequence of mental variations including depression and schizophrenia, because all these relate to mental states, emotions, thresholds and such (all things human). That makes it a tricky topic which is why it has not been taped. As I was raised in a moderate Protestant tradition I can imagine that it's an uncomfortable topic instead. But there are actually a few years older videos around and they are interesting to watch and not as threatening as some might expect. Here I just stick to some common characteristics.

If you separate the functions that religions play into for instance explanation of the yet unknown, social interactions, control of power and regulation of morals, then it's clear why at TEX user group meetings the religious aspect of TEX has been discussed in talks. Those who see programs as infallible and always right and don't understand the inner working can see it as an almighty entity. In the Netherlands church-going diminishes but it looks like alternative meetings are replacing it (and I'm not talking of football matches). So what are our TEX meetings? What do we believe in? The reason that I bring up this aspect is that in the TEX community we can find aspects of the more extremist aspects of religions: if you don't use the macro package that I use, you're wrong. If you don't use the same operating system as I do, you're evil. You will be punished if you use the wrong editor for TEX? Why don't you use this library (which, by the way, just replaced that other one)? We create angels and daemons. Even for quite convinced atheists (it's not hard to run into them on youtube) a religion only survives when it has benefits, something that puzzles them. So when

we're religious about TeX and friends we have to make sure that it's at least beneficial. Also, maybe we fall in Dennett's category of "believers who want to believe": it helps us to do our job if we just believe that we have the perfect tool. Religion has inspired visual and aural art and keeps doing that. (Don Knuth's current musical composition project is a good example of this.)

Scientists can be religious, in flexible ways too, which is demonstrated by Don Knuth. In fact, I'm pretty sure TeX would not be in the position it is in now if it weren't for his knowledgeable, inspirational, humorous, humble, and always positive presence. And for sure he's not at all religious about the open source software that he sent viral.

I'm halfway through reading "The Good Book of Human Nature" (An Evolutionary Reading of the Bible) a book about the evolution of the bible and monotheism which is quite interesting. It discusses for instance how transitions from a hunter to a farmer society demanded a change of rules and introduced stories that made sense in that changing paradigm. Staying in one place means that possessions became more important and therefore inheritance. Often when religion is discussed by behavioral biologists, historians and anthropologists they stress this cultural narrative aspect. Also mentioned is that such societies were willing to support (in food and shelter) the ones that didn't normally fit it but added to the spiritual character of religions. The social and welcoming aspect is definitely present in for instance BachoTeX conferences although a bystander can wonder what these folks are doing in the middle of the night around a campfire, singing, drinking, frying sausages, spitting fire, and discussing the meaning of life.

Those who wrap up the state of religious affairs, do predictions and advocate the message, are sometimes called evangelists. I remember a TeX conference in the USA where the gospel of XML was preached (by someone from outside the TeX community). We were all invited to believe it. I was sitting in the back of the crowded (!) room and that speaker was not at all interested in who spoke before and after. Well, I do my share of XML processing with ConTeXt, but believe me: much of the XML that we see is not according to any gospel. It's probably blessed the same way as those state officials get blessed when they ask and pray for it in public.

It can get worse at TeX conferences. Some present here at BachoTeX might remember the PDF evangelists that we had show up at TeX conferences. You see this qualification occasionally and I have become quite allergic to qualifications like architect, innovator, visionary, inspirator and evangelist, even
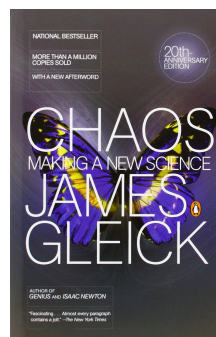
worse when they look young but qualify as senior. I have no problem with religion at all but let's stay away from becoming one. And yes, typography also falls into that trap, so we have to be doubly careful.
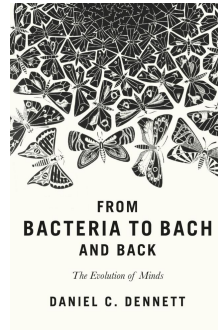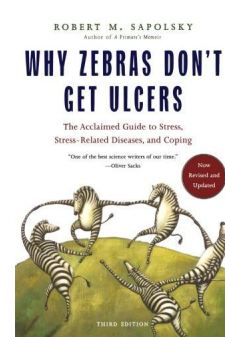

philosophy
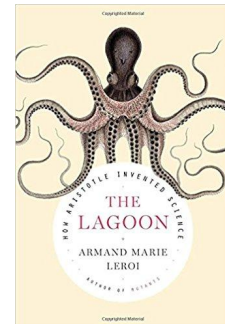
science history

science

behavioral biology

13   Chaotic solutions

The lectures on "chaos and reductionism" and "emergence and complexity" were the highlights in Sapolsky's lectures. I'm not a good narrator so I will not summarize them but it sort of boils down to the fact that certain classes of problems cannot be split up in smaller tasks that we understand well, after which we can reassemble the solutions to deal with the complex task. Emerging systems can however cook up working solutions from random events. Examples are colonies of ants and bees.

The TeX community is like a colony: we cook up solutions, often by trial and error. We dream of the perfect solutions but deep down know that esthetics cannot be programmed in detail. This is a good thing because it doesn't render us obsolete. At last year's BachoTeX, my nephew Teun and I challenged the anthill outside the canteen to typeset the TeX logo with sticks but it didn't persist. So we don't need to worry about competition from that end. How do you program a hive mind anyway?

When chaos theory evolved in the second half of the previous century not every scientist felt happy

about it. Instead of converging to more perfect predictions and control in some fields a persistent uncertainty became reality.

After about a decade of using TeX and writing macros to solve recurring situations I came to the conclusion that striving for a perfect TeX (the engine) that can do everything and anything makes no sense. Don Knuth not only stopped adding code when he could do what he needed for his books, he also stuck to what to me seems reasonable endpoints. Every hard-coded solution beyond that is just that: a hard-coded solution that is not able to deal with the exceptions that make up most of the more complex documents. Of course we can theorize and discuss at length the perfect never-reachable solutions but sometimes it makes more sense to admit that an able user of a desktop publishing system can do that job in minutes, just by looking at the result and moving around an image or piece of text a bit.

There are some hard-coded solutions and presets in the programs but with LuaTeX and MPlib we try to open those up. And that's about it. Thinking that for instance adding features like protrusion or expansion (or whatever else) always lead to better results is just a dream. Just as a butterfly flapping its wings on one side of the world can have an effect on the other side, so can adding a single syllable to your source completely confuse an otherwise clever column or page break algorithm. So, we settle for not adding more to the engine, and provide just a flexible framework.

A curious observation is that when Edward Lorenz ran into chaotic models it was partially due to a restart of a simulation midway, using printed floating point numbers that then in the computer were represented with a different accuracy than printed. Aware of floating point numbers being represented differently across architectures, Don Knuth made sure that TeX was insensitive to this so that its outcome was predictable, if you knew how it worked internally. Maybe LuaTeX introduces a bit of chaos because the Lua we use has only floats. In fact, a few months ago we did uncover a bug in the backend where the same phenomena gave a chaotic crash.

In chaos theory there is the concept of an attractor. When visualized this can be the area (seemingly random) covered by a trajectory. Or it can be a single point where for instance a pendulum comes to rest. So what is our attractor? We have a few actually. First there is the engine, the stable core of primitives always present. You often see programs grow more complex every update and for sure that happened with ε-TeX, pdfTeX, XƎTeX and LuaTeX. However there is always the core that is supposed to be stable. After some time the new kid arrives at a stable state not much different from the parent. The same is true for MetaPost. Fonts are somewhat different because the technology changes but in the end the shapes and their interactions become stable as well. Yet another example is TeX Live: during a year it might diverge from its route but eventually it settles down and enters the area where we expect it to end up. The TeX world is at times chaotic, but stable in the long run.

So, how about the existence, the reason for it still being around? One can speculate about its future trajectory but one thing is sure: as long as we break a text into paragraphs and pages TeX is hard to beat. But what if we don't need that any more? What if the concept of a page is no longer relevant? What if justified texts no longer matter (often designers don't care anyway)? What if students are no longer challenged to come up with a nice looking thesis? Do these collaborative tools with remote TeX processing really bring new long term users or is TeX then just one of the come-and-go tools?

14   Looking ahead

In an interview ("World of ideas") Asimov explains that science fiction evolved rapidly when people lived long enough to see that there was a future (even for their offspring) that is different from today. It is (at least for me) mind boggling to think of an evolution of hundreds of thousands of years to achieve something like language. Waiting for the physical being to arrive at a spot where you can make sounds, where the brain is suitable for linguistic patterns, etc. A few hundred years ago speed of any developments (and science) stepped up.

TeX is getting near 40 years old. Now, for software that **is** old! In that period we have seen computers evolve: thousands of times faster processing, even more increase in memory and storage. If we read about spaceships that travel at a reasonable fraction of the speed of light, and think that will not happen soon, just think back to the terminals that were sitting in computer labs when TeX was developed: 300 baud was normal. I actually spent quite some time on optimizing time-critical components of ConTeXt but on this timescale that is really a waste of time. But even temporary bottlenecks can be annoying (and costly) enough to trigger such an effort. (Okay, I admit that it can be a challenge, a kind of game, too.)

Neil Tyson, in the video "Storytelling of science" says that when science made it possible to make photos it also made possible a transition in painting to impressionism. Other technology could make the

exact snapshot so there was new room for inner feelings and impressions. When the Internet showed up we went through a similar transition, but TeX actually dates from before the Internet. Did we also have a shift in typesetting? To some extent yes, browsers and real time rendering is different from rendering pages on paper. In what space and time are TeXies rooted?

We get older than previous generations. Quoting Sapolsky "... we are now living well enough and long enough to slowly fall apart." The opposite is happening with our tools, especially software: it's useful lifetime becomes shorter and changes faster each year. Just look at the version numbers of operating systems. Don Knuth expected TeX to last for a long time and compared to other software its core concept and implementation is doing surprisingly well. We use a tool that suits our lifespan! Let's not stress ourselves out too much with complex themes. (It helps to read "Why zebras don't get ulcers".)

15 Memes

If you repeat a message often enough, even if it's something not true, it can become a meme that gets itself transferred across generations. Conferences like this is where they can evolve. We tell ourselves and the audience how good TeX is and because we spend so many hours, days, weeks, months using it, it actually must be good, or otherwise we would not come here and talk about it. We're not so stupid as to spend time on something not good, are we? We're always surprised when we run into a (potential) customer who seems to know TeX. It rings a bell, and it being around must mean something. Somehow the TeX meme has anchored itself when someone attended university. Even if experiences might have been bad or usage was minimal. The meme that TeX is the best in math typesetting is a strong survivor.

There's a certain kind of person who tries to get away with their own deeds and decisions by pointing to "fake news" and accusations of "mainstream media" cheating on them. But to what extent are our stories true about how easy TeX macro packages are to use and how good their result? We have to make sure we spread the right memes. And the user groups are the guardians.

Maybe macro packages are like memes too. In the beginning there was a bunch but only some survived. It's about adaptation and evolution. Maybe competition was too fierce in the beginning. Like ecosystems, organisms and cellular processes in biology we can see the TeX ecosystem, users and usage, as a chaotic system. Solutions pop up, succeed, survive, lead to new ones. Some look similar and slightly

different input can give hugely different outcomes. You cannot really look too far ahead and you cannot deduce the past from the present. Whenever something kicks it off its stable course, like the arrival of color, graphics, font technologies, PDF, XML, ebooks, the TeX ecosystem has to adapt and find its stable state again. The core technology has proven to be quite fit for the kind of adaptation needed. But still, do it wrong and you get amplified out of existence, don't do anything and the external factors also make you extinct. There is no denial that (in the computer domain) TeX is surprisingly stable and adaptive. It's also hard not to see how conservatism can lead to extinction.
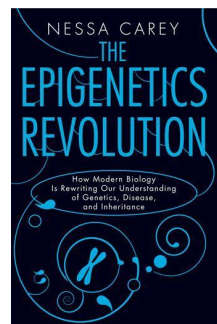
genetics
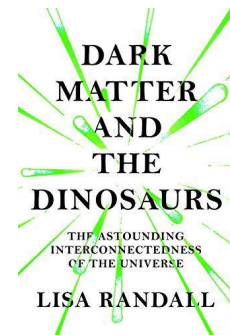
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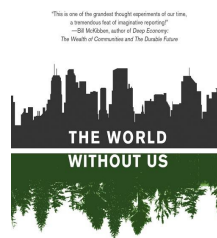
history
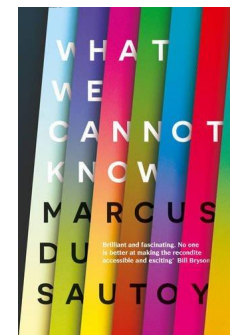
science

16 Inspiration

I just took some ideas from different fields. I could have mentioned quantum biology, which tries to explain some unexplainable phenomena in living creatures. For instance how do birds navigate without visible and measurable clues. How do people arrive at TeX while we don't really advertise? Or I could mention epigenetics and explorations in junk DNA. It's not the bit of the genome that we thought that matters, but also the expression of the genes driven by other factors. Offspring not only gets genetic material passed but it can get presets. How can the TeX community pass on Knuth's legacy? Do we need to hide the message in subtle ways? Or how about the quest for dark matter? Does it really exist or do

we want (need) it to exist? Does TeX really have that many users, or do we cheat by adding the users that are enforced during college but don't like it at all? There's enough inspiration for topics at TeX conferences, we just have to look around us.

17   Stability

I didn't go into technical aspects of TeX yet. I must admit that after decades of writing macros I've reached a point where I can safely say that there will never be perfect automated solutions for really complex documents. When books about neural networks show up I wondered if it could be applied (but I couldn't). When I ran into genetic algorithms I tried to understand its possible impact (but I never did). So I stuck to writing solutions for problems using visualization: the trial and error way. Of course, speaking of ConTeXt, I will adapt what is needed, and others can do that as well. Is there a new font technology? Fine, let's support it as it's no big deal, just a boring programming task. Does a user want a new mechanism? No problem, as solving a reduced subset of problems can be fun. But to think of TeX in a reductionist way, i.e. solving the small puzzles, and to expect the whole to work in tandem to solve a complex task is not trivial and maybe even impossible. It's a good thing actually, as it keeps us on edge. Also, ConTeXt was designed to help you with your own solutions: be creative.

I mentioned my nephew Bram. He has seen part of this crowd a few times, just like his brother and sister do now. He's into artificial intelligence now. In a few years I'll ask him how he sees the current state of TeX affairs. I might learn a few tricks in the process.

In "The world without us" Weisman explores how fast the world would be void of traces of humankind. A mere 10.000 years can be more than enough. Looking back, that's about the time hunters became farmers. So here's a challenge: say that we want an ant culture that evolves to the level of having archaeologists to know that we were here at BachoTeX ... what would we leave behind?

Sapolsky ends his series by stressing that we should accept and embrace individual differences. The person sitting next to you can have the same makeup but be just a bit more sensitive to depression or be the few percent with genes controlling schizophrenic behaviour. He stresses that knowing how things work or where things go wrong doesn't mean that we should fix everything. So look at this room full of TeXies: we don't need to be all the same, use all the same, we don't need some dominance, we just need to accept and especially we need to under-

stand that we can never fully understand (and solve) everything forever.

Predictions, one of the themes, can be hard. It's not true that science has the answer to everything. There will always be room for speculation and maybe we will always need metaphysics too. I just started to read "What we cannot know" by Sautoy. For sure those present here can not predict how TeX will go on and/or be remembered.

18   Children of TeX

I mentioned "Children of time". The author lets you see their spidery world through spider eyes and physiology. They have different possibilities (eyesight, smell) than we do and also different mental capabilities. They evolve rapidly and have to cope conceptually with signals from a human surveillance satellite up in the sky. Eventually they need to deal with a bunch of (of course) quarrelling humans who want their place on the planet. We humans have some pre-occupation with spiders and other creatures. In a competitive world it is sometimes better to be suspicious (and avoid and flee) that to take a risk of being eaten. A frequently used example is that a rustle in a bush can be the wind or a lion, so best is to run.

We are not that well adapted to our current environment. We evolved at a very slow pace so there was no need to look ahead more than a year. And so we still don't look too far ahead (and choose politicians accordingly). We can also not deal that well with statistics (Dawkins's "Climbing Mount Probability" is a good read) so we make false assumptions, or just forget.

Does our typeset text really look that good on the long run, or do we cheat with statistics? It's not too hard to find a bad example of something not made by TeX and extrapolate that to the whole body of typeset documents. Just like we can take a nice example of something done by TeX and assume that what we do ourselves is equally okay. I still remember the tests we did with pdfTeX and hz. When Hàn Thế Thành and I discussed that with Hermann Zapf he was not surprised at all that no one saw a difference between the samples and instead was focusing on aspects that TeXies are told to look at, like two hyphens in a row.

A tool like TeX has a learning curve. If you don't like that just don't use it. If you think that someone doesn't like that, don't enforce this tool on that someone. And don't use (or lie with) statistics. Much better arguments are that it's a long-lived stable tool with a large user base and support. That it's not a waste of time. Watching a designer like Hermann

Zapf draw shapes is more fun than watching click and point in heavily automated tools. It's probably also less fun to watch a TeXie converge towards a solution.

Spiders are resilient. Ants maybe even more. Ants will survive a nuclear blast (mutations might even bring them benefits), they can handle the impact of a meteorite, a change in climate won't harm them much. Their biggest enemy is probably us, when we try to wipe them out with poison. But, as long as they keep a low profile they're okay. TeX doesn't fit into the economic model as there is no turnaround involved, no paid development, it is often not seen at all, it's just a hit in a search engine and even then you might miss it (if only because no one pays for it being shown at the top).

We can learn from that. Keeping a low profile doesn't trigger the competition to wipe you out. Many (open source) software projects fade away: some big company buys out the developer and stalls the project or wraps what they bought in their own stuff, other projects go professional and enterprise and alienate the original users. Yet others abort because the authors lose interest. Just like the ideals of socialism don't automatically mean that every attempt to implement it is a success, so not all open source and free software is good (natured) by principle either. The fact that communism failed doesn't mean that capitalism is better and a long term winner. The same applies to programs, whether successful or not.

Maybe we should be like the sheep. Dennett uses these animals as a clever species. They found a way to survive by letting themselves (unconsciously) be domesticated. The shepherd guarantees food, shelter and protection. He makes sure they don't get ill. Speaking biologically: they definitely made sure that many copies of their genes survived. Cows did the same and surprisingly many of them are related due to the fact that they share the same father (something now trying to be reverted). All TeX spin-offs relate to the same parent, and those that survived are those that were herded by user groups. We see bits and pieces of TeX end up in other applications. Hyphenation is one of them. Maybe we should settle for that small victory in a future hall of fame.

When I sit on my balcony and look at the fruit trees in my garden, some simple math can be applied. Say that one of the apple trees has 100 apples per year and say that this tree survives for 25 years (it's one of those small manipulated trees). That makes 2.500 apples. Without human intervention only a few of these apples make it into new trees, otherwise the whole world would be dominated by apple trees.

Of course that tree now only survives because we permit it to survive, and for that it has to be humble (something that is very hard for modern Apples). Anyway, the apple tree doesn't look too unhappy.

A similar calculation can be done for birds that nest in the trees and under my roof. Given that the number of birds stays the same, most of energy spent on raising offspring is wasted. Nevertheless they seem to enjoy life. Maybe we should be content if we get one enthusiastic new user when we demonstrate TeX to thousands of potential users.

Maybe, coming back to the themes of the conference, we should not come up with these kinds of themes. We seem to be quite happy here. Talking about the things that we like, meeting people. We just have to make sure that we survive. Why not stay low under the radar? That way nothing will see us as a danger. Let's be like the ants and spiders, the invisible hive mind that carries our message, whatever that is.

When Dennett discusses language he mentions (coined) words that survive in language. He also mentions that children pick up language no matter what. Their minds are made for it. Other animals don't do that: they listen but don't start talking back. Maybe TeX is just made for certain minds. Some like it and pick it up, while for others it's just noise. There's nothing wrong with that. Predilection can be a user property.

19   The unexpected

In a discussion with Dawkins the well-spoken astrophysicist Neil deGrasse Tyson brings up the following. We differ only a few percent in DNA from a chimp but quite a lot in brain power, so how would it be if an alien that differs a few percent (or more) passes by earth. Just like we don't talk to ants or chimps or whatever expecting an intelligent answer, whatever passes earth won't bother wasting time on us. Our rambling about the quality of typesetting probably sounds alien to many people who just want to read and who happily reflow a text on an ebook device, not bothered by a lack of quality.
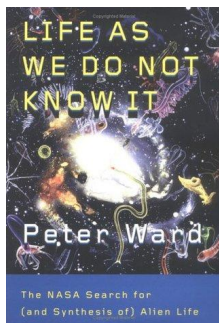
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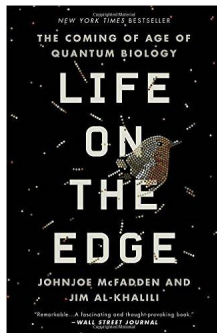
quantum biology
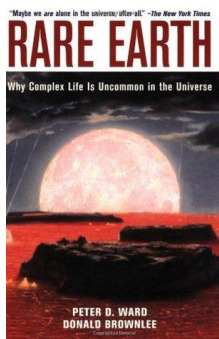
astrophysics

economics

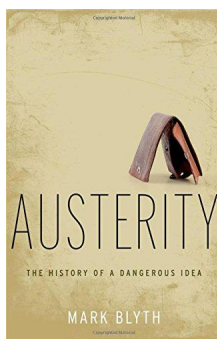We tend to take ourselves as reference. In "Rare Earth", Ward and Brownlee extrapolate the possibility of life elsewhere in the universe. They are not alone in thinking that while on one hand applying statistics to these formulas of possible life on planets there might also be a chance that we're the only intelligent species ever evolved. In a follow up, "Life as we do not know it" paleontologist and astrobiologist Ward (one of my favourite authors) discusses the possibility of life not based on carbon, which is not natural for a carbon based species. Carl Sagan once pointed out that an alien species looking down to earth can easily conclude that cars are the dominant species on earth and that the thingies crawling in and out them are some kind of parasites. So, when we look at the things that somehow end up on paper (as words, sentences, ornaments, etc.), what is dominant there? And is what we consider dominant really that dominant in the long run? You can look at a nice page as a whole and don't see the details of the content. Maybe beauty hides nonsense.

When TEXies look around they look to similar technologies. Commands in shells and solutions done by scripting and programming. This make sense in the perspective of survival. However, if you want to ponder alternatives, maybe not for usage but just for fun, a completely different perspective might be needed. You must be willing to accept that communicating with a user of a WYSIWYG program might be impossible. If mutual puzzlement is a fact, then

they can either be too smart and you can be too dumb or the reverse. Or both approaches can be just too alien, based on different technologies and assumptions. Just try to explain TEX to a kid 40 years younger or to an 80 year old grandparent for that matter. Today you can be very clever in one area and very stupid in another.

In another debate, Neil deGrasse Tyson asks Dawkins the question why in science fiction movies the aliens look so human and when they don't, why they look so strange, for instance like cumbersome sluggish snails. The response to that is one of puzzlement: the opponent has no reference of such movies. In discussions old TEXies like to suggest that we should convert young users. They often don't understand that kids live in a different universe.

How often does that happen to us? In a world of many billions TEX has its place and can happily coexist with other typesetting technologies. Users of other technologies can be unaware of us and even create wrong images. In fact, this also happens in the community itself: (false) assumptions turned into conclusions. Solutions that look alien, weird and wrong to users of the same community. Maybe something that I present as hip and modern and high-TEX and promising might be the opposite: backward, old-fashioned and of no use to others. Or maybe it is, but the audience is in a different mindset. Does it matter? Let's just celebrate that diversity. (So maybe, instead of discussing the conference theme, I should have talked about how I abuse LuaTEX in controlling lights in my home as part of some IoT experiments.)

20   What drives us

I'm no fan of economics and big money talk makes me suspicious. I cannot imagine working in a large company where money is the drive. It also means that I have not much imagination in that area. We get those calls at the office from far away countries who are hired to convince us by phone of investments. Unfortunately mentioning that you're not at all interested in investments or that multiplying money is irrelevant to you does not silence the line. You have to actively kill such calls. This is also why I probably don't understand today's publishing world where money also dominates. Recently I ran into talks by Mark Blyth about the crisis (what crisis?) and I wish I could argue like he does when it comes to typesetting and workflows. He discusses quite well that most politicians have no clue what the crisis is about.

I think that the same applies to the management of publishers: many have no clue what typesetting is about. So they just throw lots of money into the wrong activities, just like the central banks seem

to do. It doesn't matter if we TEXies demonstrate cheap and efficient solutions.

Of course there are exceptions. We're lucky to have some customers that do understand the issues at hand. Those are also the customers where authors may use the tools themselves. Educating publishers, and explaining that authors can do a lot, might be a premise, predilection and prediction in one go! Forget about those who don't get it: they will lose eventually, unfortunately not before they have reaped and wasted the landscape.

Google, Facebook, Amazon, Microsoft and others invest a lot in artificial intelligence (or, having all that virtual cash, just buy other companies that do). They already have such entities in place to analyze whatever you do. It is predicted that at some point they know more about you then you know yourself. Reading Luke Dormehl's "The Formula" is revealing. So what will that do with our so-called (disputed by some) free will? Can we choose our own tools? What if a potential user is told that all his or her friends use WhateverOffice so they'd better do that too? Will subtle pressure lead them or even us users away from TEX? We already see arguments among TEXies, like "It doesn't look updated in 3 years, is it still good?" Why update something that is still valid? Will the community be forced to update everything, sort of fake updates. Who sets out the rules? Do I really need to update (or re-run) manuals every five years?

Occasionally I visit the Festo website. This is a (family owned) company that does research at the level that used to be common in large companies decades ago. If I had to choose a job, that would be the place to go to. Just google for "festo bionic learning network" and you understand why. We lack this kind of research in the field we talk about today: research not driven by commerce, short term profit, long term control, but because it is fundamental fun.

Last year Alan Braslau and I spent some time on BibTEX. Apart from dealing with all the weird aspects of the APA standard, dealing with the inconsistently constructed author fields is a real pain. There have been numerous talks about that aspect here at BachoTEX by Jean-Michel Hufflen. We're trying to deal with a more than 30-year-old flawed architecture. Just look back over a curve that backtracks 30 years of exponential development in software and databases and you realize that it's a real waste of time and a lost battle. It's fine to have a text based database, and stable formats are great, but the lack of structure is appalling and hard to explain to young programmers. Compare that to the Festo projects and you realize that there can be more challenging projects. Of course, dealing with the old data can

be a challenge, a necessity and eventually even be fun, but don't even think that it can be presented as something hip and modern. We should be willing to admit flaws. No wonder that Jean-Michel decided to switch to talking about music instead. Way more fun.

Our brains are massively parallel bio-machinery. Groups of neurons cooperate and compete for attention. Coming up with solutions that match what comes out of our minds demands a different approach. Here we still think in traditional programming solutions. Will new ideas about presenting information, the follow up on books come from this community? Are we the innovative Festo or are we an old dinosaur that just follows the fashion?

21   User experience

Here is a nice one. Harari spends many pages explaining that research shows that when an unpleasant experience has less unpleasantness at the end of the period involved, the overall experience is valued according to the last experience. Now, this is something we can apply to working with TEX: often, the more you reach the final state of typesetting the more it feels as all hurdles are in the beginning: initial coding, setting up a layout, figuring things out, etc.

It can only get worse if you have a few left-over typesetting disasters but there adapting the text can help out. Of course seeing it in a cheap bad print can make the whole experience bad again. It happens. There is a catch here: one can find lots of bad-looking documents typeset by TEX. Maybe there frustration (or indifference) prevails.

I sometimes get to see what kind of documents people make with ConTEXt and it's nice to see a good looking thesis with diverse topics: science, philosophy, music, etc. Here TEX is just instrumental, as what it is used for is way more interesting (and often also more complex) than the tool used to get it on paper. We have conferences but they're not about rocket science or particle accelerators. Proceedings of such conferences can still scream TEX, but it's the content that matters. Here somehow TEX still sells itself, being silently present in rendering and presentations. It's like a rootkit: not really appreciated and hard to get rid of. Does one discuss the future of rootkits other than in the perspective of extinction? So, even as an invisible rootkit, hidden in the workings of other programs, TEX's future is not safe. Sometimes, when you install a Linux system, you automatically get this large TEX installation, either because of dependencies or because it is seen as a similar toolkit as for instance Open (or is it Libre) Office. If you don't need it, that user might as well start seeing it as a (friendly) virus.

Children of TEX

22 Conclusion

At some point those who introduced computers in typesetting had no problem throwing printing presses out of the window. So don't pity yourself if at some point in the near future you figure out that professional typesetting is no longer needed. Maybe once we let machines rule the world (even more) we will be left alone and can make beautiful documents (or whatever) just for the joy, not bothering if we use outdated tools. After all, we play modern music on old instruments (and the older rock musicians get, the more they seem to like acoustic).

There are now computer generated compositions that experienced listeners cannot distinguish from old school. We already had copies of paintings that could only be determined forgeries by looking at chemical properties. Both of these (artificial) arts can be admired and bring joy. So, the same applies to fully automated typeset novels (or runtime rendered ebooks). How bad is that really? You don't dig channels with your hand. You don't calculate logarithmic tables manually any longer.

However, one of the benefits of the Internet is watching and listening to great minds. Another is seeing musicians perform, which is way more fun that watching a computer (although googling for "animusic" brings nice visuals). Recently I ran into a wooden musical computer made by "Wintergatan" which reminded me of the "Paige Compositor" that we use in a LuaTEX cartoon. Watching something like that nicely compensates for a day of rather boring programming. Watching how the marble machine x (mmx) evolves is yet another nice distraction.

Now, the average age of the audience here is pretty high even if we consider that we get older. When I see solutions of ConTEXt users (or experts) posted by (young) users on the mailing list or stack exchange I often have to smile because my answer would have been worse. A programmable system invokes creative solutions. My criterion is always that it has to look nice in code and has some elegance. Many posted solutions fit. Do we really want more automation? It's more fun to admire the art of solutions and I'm amazed how well users use the possibilities (even ones that I already forgot).

One of my favourite artists on my weekly "check youtube" list is Jacob Collier. Right from when I ran into him I realized that a new era in music had begun. Just google for his name and "music theory interview" and you probably understand what I mean. When Dennett comments on the next generation (say up to 25) he wonders how they will evolve as they grow up in a completely different environment of connectivity.

I can see that when I watch family members. Already long ago Greg Bear wrote the novel "Darwin's Children". It sets you thinking and when looking around you even wonder if there is a truth in it.

There are folks here at BachoTEX who make music. Now imagine that this is a conference about music and that the theme includes the word "future". Then, imagine watching that video. You see some young musicians, one of them probably one of the musical masterminds of this century, others instrumental to his success, for instance by wrapping up his work. While listening you realize that this next generation knows perfectly well what previous generations did and achieved and how they influenced the current. You see the future there. Just look at how old musicians reflect on such videos. (There are lots of examples of youth evolving into prominent musicians around and I love watching them). There is no need to discuss the future, in fact, we might make a fool of ourselves doing so. Now back to this conference. Do we really want to discuss the future? What we think is the future? Our future? Why not just hope that in the flow of getting words on a medium we play our humble role and hope we're not forgotten but remembered as inspiration.

One more word about predicting the future. When Arthur Clarke's "2001: A Space Odyssey" was turned into a movie in 1968, a lot of effort went into making sure that the not so far ahead future would look right. In 1996 scientists were asked to reflect on these predictions in "Hal's Legacy". It turned out that most predictions were plain wrong. For instance computers got way smaller (and even smaller in the next 20 years) while (self-aware) artificial intelligence had not arrived either. So, let's be careful in what we predict (and wish for).

23 No more themes

We're having fun here, that's why we come to BachoTEX (predilection). That should be our focus. Making sure that TEX's future is not so much in the cutting edge but in providing fun to its users (prediction). So we just have to make sure it stays around (premise). That's how it started out. Just look at Don Knuth's 3:16 poster: via TEX and METAFONT he got in contact with designers and I wouldn't be surprised if that sub-project was among the most satisfying parts. So, maybe instead of ambitious themes the only theme that matters is: show what you did and how you did it.

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