

THREE PAGES ON  
THE UGLINESS OF MODERN SCIENCE

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‘Does one really have to care for that now, too?’ was a reaction I got at the EGU General Assembly 2007. The question was addressing my opinion that even a scientist has to care for typography. On the other hand, the critical person had immediately noticed the design of my poster being different from the mainstream.

This little text shall illustrate my position. I would like to show the disadvantages of the common ‘scientific ignorance’ about design issues (where resulting ugliness is less than half of the story), and give some hints how to make things better. There is no great effort needed! You even may stick to your favourite typesetting program, although I’d recommend  $\LaTeX$ .

**ARIAL AND TIMES.** Why are we so constrained to these two fonts in the science business? Both are unnecessary hurdles for the flow of information.

Arial shares one disadvantage with all sans-serif fonts: It is more exhausting to follow running text compared to classical serif passages like this one. The eye likes to get a grip at the tiny hooks and feet. And this is the good reason why most professional books are typeset in serif fonts.

Times New Roman, on the other hand, is not a good alternative. It is over-used, and it suffers from the goal for which it had been designed in 1931: getting as much text as possible into the columns of the equally named newspaper. Other classical bread fonts, even some from the 16<sup>th</sup> century, offer better legibility with style.

A problem in choosing type design for scientific papers is the lack of math alphabets. But in the recent years fontdesigners filled some gaps. And they rediscovered the minuscule or ‘oldstyle’ numbers: 1 234 567.890 – less ambiguous than 1 234 567.890.

**TEXT WIDTH AND LINESPREAD.** You also may have noticed that the habit of increased linespacing does not much increase legibility.

A better way to mitigate reading resistances is to shorten the lines. The standard setting of one-inch-edges on A4 or letter format often produces lines offending a typographic rule of thumb: the average line should not exceed 66 characters. Otherwise, the eyes have difficulties in jumping directly from line ends to the following starts.

Things get really bad when combining the Times New Roman with common edge settings and double linespacing. Despite that, this disadvantageous and ugly combination is a standard for most of us to write their papers in.

**LESS IS MORE.** This is mainly about scientific posters. I've seen thousands of them, many from other research branches than mine. But a few attracted me, and I took the time to read them, even with lacking background knowledge. What did then decide between getting the message and just passing about?

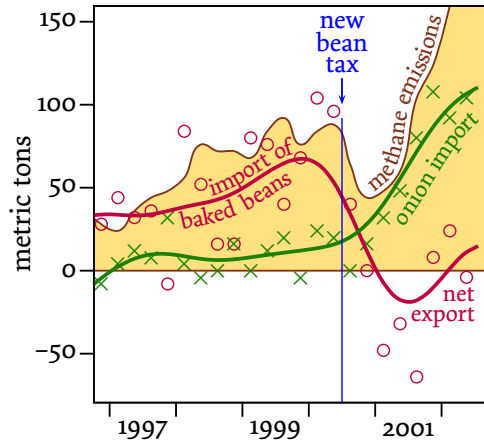
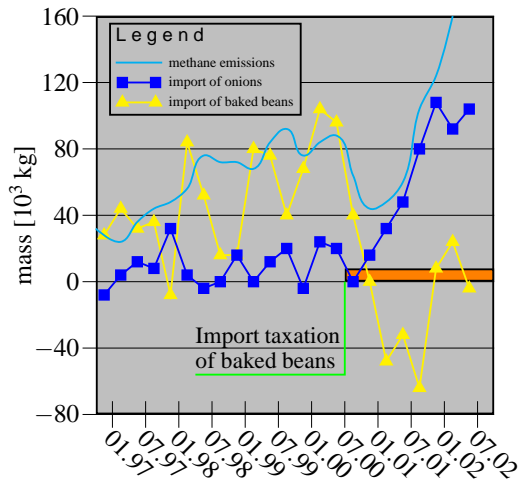
The main factor was not colours, nor layout – just the amount of text. And in 90–95 % of all cases, people put too much of it on their poster. And, didn't you think anything like 'Hm, just three pages, o.k., let's give it a chance...' when you decided to read this? So, I don't need to make more words here.

**HYPHENS AND DASHES.** Now, we have to address a source of typographical flaws that stems from the typewriter age. Or from the limitations of the historical ASCII charset.

There are only two horizontal lines on a keyboard: '-' and '\_'. The first one is sometimes called the 'minus', but it is, in fact, a hyphen. And, as all textprocessors hyphenate automatically, it is nearly always used incorrectly—where a longer dash is required. This is the British style—an em-dash without additional space –, and this the continental European – an en-dash with a little air around. The en-dash without spaces is needed for ranges like 23–42.

A widespread proprietary software tries to assist the writer by automatically changing the hyphen to an en-dash while typing, but this feature doesn't work reliably. Even worse, only few users care what happens there, and why. Therefore, you can find lots of documents with hyphens where dashes were needed, ranges with spaces between numbers and dash, and so on. But the well-known software allows to insert any 'symbol' from a menu, if necessary. So there is no reason why '+' and '-' appear side by side as '+' and '-'. Yes, the real minus is another different character!

**SPONTANEOUS INTERPRETATION.** A picture can say more than thousand words. And a figure should need less than twenty words to get explained. The best way to express the problem here is of course – a figure. Or two figures, showing the same content a bit differently:



Isn't it hard to see that both graphs contain exactly the same data? Which one is easier to understand, and why?

The right example follows the principles of spontaneous interpretation: e.g. direct labelling in respective colours instead of legends, or smoothed trend curves instead of void zigzag between single points. You may discover some more, just have another look.

The æsthetic quality of a paper, by the way, increases, if the font used in the figures matches that of the text. Figures are the eye-catchers of an article. No effort invested here is ever wasted.

**EXPERT KNOWLEDGE.** Many people think typography is about making fancy fonts for invitation cards or the name of an obligatory course for art students. Knowledge of letter design *can* be an expert topic, indeed. But typography is even more and, despite that, understandable for non-experts.

The basics of typography should be taught at school like grammar or a foreign language. The primary objective is actually the same, optimized exchange of information. And you have just learned much about the basics, no graduate course is needed.

But if you are interested to learn more about good style, to dig a bit under the surface, and to help convince the scientific world of leaving the current low-level publication standard, there is much more knowledge for you out there. Just google for 'typography'.

**BEAUTY IN SCIENCE.** No effect without side-effects. The good news in the end: the side-effect of making a scientific work legible by typographic means is beauty. There is no measure of beauty, and thus it is no matter of science. But it is a pleasure to care for an optimal scientific presentation and to obtain a beautiful document!