Mis-Design of The Metric System
Another Unnoticed Engineering Error

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1 About Unrecognized Global Mistakes

There are many things for which right and wrong are very real. When right and wrong can be reached based on logic, they are absolute – because logic is absolute. Such rights and wrongs are not a matter of opinion, personal or global beliefs.

It is not unusual for global beliefs to be wrong and counter to basic logic. People are often born to such wrong global beliefs and ordinary people are often unable to follow correct basic logic.

So, there are some global mistakes that remain unrecognized by masses and societies.

Here we point to 3 such unrecognized global mistakes:

- Fundamental Illegitimacy Of The Western so-called Intelectual Property Rights Regime
- Ill Conception of The Metric System
- Backwards-ness Of Internet Domain Notation

In PLPC-120005 we address "Domain Notation is Backwards".

In PLPC-120033 we address:
The Nature of Poly-Existentials:
Basis for Abolishment of The Western Intellectual Property Rights Regime

In this document we focus on the fundamental mis-design of the metric system.

Such global mistakes often result in entrenched vested interests. Such deep economic interests often prevent people's willingness to hear and follow basic logic.

Some such global mistakes are not very harmful – they result in sub-optimum human environments. "Ill Conception of The Metric System" and "Backwards-ness Of Internet Domain Notation" are some such examples.

Some global mistakes can in due course put humanity in danger. The Western Intelectual Property Rights Regime is one such example.

In all cases, it is good to follow basic logic and understand these basic global mistakes.

Those to whom recogniation of falsehood of such global beliefs is difficult, can profit from remembering the history of American slavery of Africans.

2 About The Metric System

Used in nearly every country in the world, the Metric System was devised by French scientists in the late 18th century. The goal of this effort was to produce a system that used the decimal system rather than fractions as well as a single unified system that could be used throughout the entire world.

The metric system is a fundamental mistake because it forces the measurment system to be based on the counting system.

Counting and measuring are fundamentally different.

3 Counting Vs Measuring

Count in base 10.

Measure in whatever makes more sense for what you are doing.

A measuring system is more than just numbers. It is also being able to visualize and know what those numbers represent in the real world. For that, I'm all imperial (except for a few metric measurements for bike parts).

What already uses a power of base 12 as it's base?

1. Geometry: 360 degrees in a circle: 12*30 = 360

2. Time: 60 seconds in a minute, 60 minutes in a hour, 24 hours in a day: 12*2 = 24, 12*5 = 60

3. Imperial: 5,280 ft in a mile (12 * 440 ft), 12 inches in a foot

4. Eggs: 12 eggs in a dozen: dozen = 12 * 1 egg

Consider the distance between stars. We have light years – not some metric number!

3.1 Counting and Grouping – Not Measuring

From `https://en.wikipedia.org/wiki/Metric_system`

Logic dictated that such a system should be based on the radix used for counting.

Their report of March 1791 to the Assemble nationale constituante considered but rejected the view of Laplace that a duodecimal system of counting should replace the existing decimal system; the view such a system was bound to fail prevailed.

Consider dozen as a grouping system (not measuring) – not of any particular units.

Consider bits, bytes and kilo, mega and giga bytes used for counting, numbering, grouping and measuring.

4 A Common International Standard

Forcing a standard over what is established only works if the new standard is better. Metric is inferior to Imperial. US/UK will likely never change.

5 To Be Absorbed In

Why everything you know about the Metric System is wrong and what it means for Identity Systems February 26, 2008 2 Comments

http://idlogger.wordpress.com/2008/02/26/why-everything-you-know-about-the-metric-system-is-wrong-and-what-it-means-for-identity-systems/

Recently as part of my work with Cub Scouts I had to prepare a lesson on the Metric System. That started me thinking about the myths and misconceptions of the Metric System, why it isn't used in the United States, and what that all means for Identity Systems.

First let me say I am a big fan of the metric system (I have a MS in Aerospace Engineering). And living in the United States, I almost never use it. And those not contradictory statements. The reason that I never use it is that for my day to day life outside of work it simply offers no advantages to me. When studying engineering in college I used the Metric System almost exclusively. However after going into the software industry I havent used it professionally since.

Here are some myths and misconceptions:

Myth #1 - The Metric System is a base10 system which is far superior to base 12 systems. The metric system has been adopted world-wide (except for those crazy stuborn Americans) because of the inherent superiority of base10 mathematics in every day use.

BTW, what time is it where you are? What coordinates does your GPS show? How steep is that incline? Have you ever tried to saw a 1 meter board into 6 even pieces?

The point is while base10 is much better for doing calculations with a calculator, base12 is better for some calculations you need to do in your head. That is because 10 is divisible by only 5 and 2, where as 12 is divisible by 2,3,4, and 6.

Myth #2 You shouldnt use the English (Customary) System for technical purposes because the conversion between feet and inches and pound and ounces is much harder than converting between meters and kilometers and liters and milliliters.

When doing technical work you dont ever need to convert between feet and inches. You really every need to convert between meters and kilometers either. Once you are using scientific notation it doesnt matter. 10,000 feet is 110E6 feet and 10,000 meters is 110E6 meters. Neither unit system is easier than the other in scientific notation.

Myth #3 The Metric System is superior because all units are derived and reproducible from the properties of natures. For instance the Celsius 0 and 100 are freezing and boiling point of water. The meter is derived from a Meridian of the Earth.

While the Metric System was once naturally derivable, it was long ago discovered that physical properties that they originally used vary too much to give an accurate definition. For a while they where defined against physical models (for instance a certain platinum bar was used to define the meter). That was eventually viewed as too risky. Now all units are defined in purely arbitrary, but reproducible terms.

Myth #4 The stubborn Americans will eventually convert when enough are educated sufficiently. Its only ignorance that keeps the Americans from converting willingly like the rest of the world.

The Metric System originally became accepted only at gun point. The point of Napoleon's guns to be exact. The real telling point comes from the Wiki entry:

As of 2007 only three countries, the United States, Liberia, and Myanmar (Burma) had not mandated the metric system upon their populace.

Ah, breathe in the Orwellian goodness of that statement. The Metric System is so superior to other forms of measurement it has been mandated on the people by the force of law. All for their own good of course.

The point is while there is a huge advantage to everyone being on the same system of measurement, the choice of Metric versus Customary is purely an arbitrary choice. Since people make these choices based on personally perceived value combined with a natural resistance to change, most will not willingly convert to a new system without being forced to under threat of punishment. Or put simply:

Change is hard. Inches are easy.

6 Absrob From http://www.jefflewis.net/metricsystem.html

Why I Don't Like the Metric System

(or why It's No Better Than the Standard System)

To start off with, it's not that I disklike the metric system. I dislike the belief that people have that it is inherently better than the standard system, and that everyone in the world should use it.

The metric system is really just a simplified system that only has one basic unit of measure for each fundamental property. Length is meters, mass is grams, and time is seconds. To keep from having to say really big or really small numbers, prefixes are added to the units to indicate multiplying or dividing the number by a power of ten.

So, even if you don't agree with any of the following paragraphs in this essay- there is no reason to switch to the metric system to get a measuring system based on powers of ten (a decimal measuring system). We could do it without any fundamental changes to our measuring, just by making feet, slugs, and seconds our standards. (Many other units, such as weight, power, energy, speed, volume, etc. are really just derivatives of those fundamental units.) So if we really wanted to, we could have all of our units relate to each other by multiples of ten, without the expense of changing all of our tooling, machines, infrastructure, etc.

But now, let's look to see if there really is an advantage to only having one unit for each fundamental property, or having all of those units relate by powers of ten? Does it make measuring inherently easier, and will the system stay that way in the centuries to come?

To begin with, any measurement system is going to be arbitrary to some degree. You have to start off somewhere and say, here, this is my standard. For example, one of the basic units of measurement is length. In the standard system, this is the inch, which was originally based off of the length of a person's thumb, which varies from person to person. In the metric system, it's the meter, which was originally based off an erroneous estimate of the Earth's diameter, which also varies over time. Once you've picked your standard, you find some good, unchanging way of defining it. Originally, these were done with metal bars, but have since been updated to wavelengths of light in a vacuum. But what if we were on another planet, or had bigger hands? Our length units would have been different.

The standard system has evolved over a long time- hundreds, if not thousand, of years. Units were invented that were convenient to the applications in which they were being used. Granted, over the amount of time that the system has evolved, it has generated a proliferation of units. But each of those units is very well suited to the application it is meant for. There tend to be several units that are used for each property- several on a human scale, one at a much larger scale, and one at a much smaller scale. For example, the common units for length are thousandths of an inch, inches, feet, yards, and miles. Since length is such a commonly measured property, there exist many more specialized units (rods, nautical miles, hands), but most people could spend their whole lives using only those few. For weight, there're pounds, ounces, and tons. The point is, when a measurement's on a human scale, there are units for that. Once it gets much bigger or much smaller than the human scale, we really have a hard time comprehending it, anyway. So, although metric may have an easier mathematical conversion than say 50 tons to 1,600,000 oz., it doesn't aid our comprehension of just how big of a number 1,600,000 is.

When looking at temperature, this is one area where metric has absolutely nothing on the standard system. Yes, centigrade is based on 100 degrees between the freezing and boiling point of water, but who cares? This is still an arbitrary standard, since water is only one of the substances on the Earth. Granted, it's ubiquitous, but why does a temperature scale have to be based on it? Yeah, it's easy to remember that water freezes at 0C, which is pretty useful in cold climates. But it's not that hard to remember that it freezes at 32 F. And it's also pretty nice to know that above 0F, salt will cease to melt ice, meaning that the roads will be frozen no matter what (By the way, Fahrenheit was originally based as 0 being the temperature of a solution of water, ice, and salt, the coldest stable temperature that could be achieved in a lab at the time). And once you get up to boiling, who cares. First of all, there's enough pressure variation in the atmosphere around the Earth that this temperature varies by several degrees (either scale), but it's really not important to have to know it anyway. It't not like freezing, where a thermometer in our window will tell us when the roads might be dangerous. Nobody ever looks at a thermometer to see what temp their water's boiling at, and the air temperature rarely gets above 120F on the Earth, anyway.

Okay, so say you read the above two paragraphs, and you still say that we should switch to a base 10 measuring system (you probably want SI and not my proposed base 10 standard system). You probably want it for the ease of the calculations. Well, even though human history has demonstrated that people invent new units for their particular application, you may think that the metric system, with its higher degree of standardization than any previous system, will do away with that. Well, for interesting anecdotal evidence, read Metric Land by Joan Pontius. She was living in Belgium, a country that had switched over to the metric system. She found people were already starting to invent new units for everyday use. For example, they'd order a "small pint" of beer, instead of asking for 250 ml. And she found that lumber did not come in nominal decimal lengths, but rather in lengths based off of 120 cm, to make it easier to do the math when cutting the lumber. New units have been invented in other places, as well. The French use a unit of area based off of half of a square kilometer. So even though the metric system is young, people are already starting to invent new units for their particular applications.

As an engineer, at times it would seem easier to switch to metric. I have to change all my units to feet, pounds, seconds before doing any calculations, then switch them all back to mph, hp, or whatever makes sense to interpret them. But in the age of computers, it's really not that big of a deal, and using metric doesn't make you immune to mistakes, anyway. At my last job, we used metric. Sometimes I'd make a spreadsheet, look at the answers, and they just wouldn't make sense- they'd either be too big or too small. Well, if it just turned out to be a case of forgetting to convert kilometers to meters, I'd just modify that part of the spreadsheet to divide by 1000. Now, at my new job, we do everything in standard. If I find a similar error in a spreadsheet here, I just modify the spreadsheet to divide by 5280. No big deal.

Then there's the issue of computers. Once again, new units are being introduced for the sake of convenience that do not conform to decimal. For example, a byte is 8 bits, a kilobyte is 1024 bytes, a megabyte is 1024 kilobytes, etc. It is done this way because computers function in binary, so using powers of 2 makes everything work out roundly. However, this just serves to add to the confusion, because the accepted prefixes, which used to be standard for every unit of measure, are no longer standard. Sure, 1024 is close to 1000, but it's not exactly the same so precision is lost. And when this error is compiled to larger numbers, the error just keeps growing. Computers probably should use powers of 2 as their standard, and probably should be using the accepted prefixes, because an educated person will know the difference between kilo when it is being applied to a byte, and when it is being applied to a meter, but it just goes to show that trying to make everything work out to decimal units is not always practical.

As proof that base ten is not necessarily the best base for counting, take a look at a unit-less number- one dozen. Seeing as how this term has survived for so long, not in association with any unit, is testament to the fact that people like using bases other than ten. There are no units tied to the term "dozen." There is no standard measurement system that forces people to use the term. People use it simply as a convenience. It wouldn't be that hard to say "twelve", "twenty-four", "thirty-six", "one hundred and forty four", or any other multiple of twelve. But people find it easier to say "a dozen," "a couple dozen," "three dozen", or "a dozen dozen" or "a gross." And look at that. People have even invented a term analagous to "hundred." Just like a "hundred" is ten times ten, a "gross" is a dozen times a dozen. Now I would never seriously entertain the idea that people would switch to a base twelve number system, but this goes to show that it can be useful to use groups of twelve, instead of ten, so useful that it has its own word.

For further evidence that base 10 isn't necessarily the best fit to the human mind, read this transcript of Arthur Marcel. He lives in Australia, another country that has adopted the metric system. He talks of his experiences trying to build a shed. He started off using the metric system, but abandoned it midway through the project to make all his measurements in standard. He said that it was easier to remember the numbers in standard, so he made less mistakes cutting boards that way. He also mentions the fact that tape measures in Australia are sold with one side reading metric, and the other side standard, because that's what the customers want. Granted, some of this is probably due to unfamiliarity, but it's probably in large part due to the way that we think. In a similar vein as his essay, consider this: people like fractions. For example, a glass is either half full or half empty. People don't say "50% full." And people think in terms of half and quarter hours, not 50%, or 25%. Usually, it's in informal situations, such as taking a quick look at something and determining how much of it there is, but that's just the way we think. And the standard system has evolved to complement this.

The most important aspect of a measuring system in a technological society is standardization. You can't have one machine shop mill a part to what they say is 2.107 inches, and not have it mate to a part produced at another machine shop, because one foreman's thumb was longer than the other's and that's what they were using for their standard for an inch. But both SI and standard have that standardization. An inch is very clearly defined, as is a meter, and all other units in both systems. Both systems are just as accurate, provided that measuring devices are calibrated properly. But the other side of standardization is that it's nice to use the same units. It would be easy for one machine shop to machine a male part to 25.3 cm, giving .1 cm clearance into a female part machined at another shop to 1 inch, but it would be a whole lot easier to compare if both shops used either inches or centimeters. For this reason alone, I think that we will switch to metric. Most of the world has already done it, so to ease comparison of measurements, we will follow suit. But it didn't have to be this way. If emerging technological nations had stopped and thought about measuring, and really decided that they wanted to use a decimal measuring system, they could have just as easily modified their already existing systems, rather than adopting a foreign system that nobody understood. But alas, it's too late to look back and wish that had happened. So we can either accept the fact that we will eventually adopt the metric system, or we can invent a decimal standard system, and try to force that on the rest of the world. But metric already has a head start, with a much larger percentage of the world's population using it, so I know where I'd put my money. But just remember that decimal is not necessarily an advantage, and it's probably only a matter of time, a few hundred years, maybe, until SI starts to get all types of new units that make it a non-decimal system, as well.

Finally, as a footnote, if you look on the web, you'll find several pages of people zealously supporting one system or the other, and just as zealously denouncing the other system. I'm not that passionate about it. I can adapt to use either system, and really I already do. So, if you want to send me e-mail about this page, please, nothing too zealous.

References