Old Calculators & Democracy

a new life for old instruments: ensuring the future by preserving the past

Science on Stage 2015 - Queen Mary University of London, 17/20 June

This was the world *before computers*, how they designed it?

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The modern world, with its landscape framed by skyscrapers, was designed with calculators conceived in the 17th century, but the youth ignore these instruments that anticipated our technology.

This attitude has no future, something must be done.

This is my effort to preserve the memory of the analog and mechanical calculators, through exhibits and conferences where they can be tested by the public.

With my free e-book *"Was There Life Before Computer?"* and my educational material, the teachers can illustrate the old computing instruments in their class.

Since 2008 I show every year at *Cagliari Festival Scienza*, an Italian science fair sponsored by the U.N.E.S.C.O., a brief history of computing.

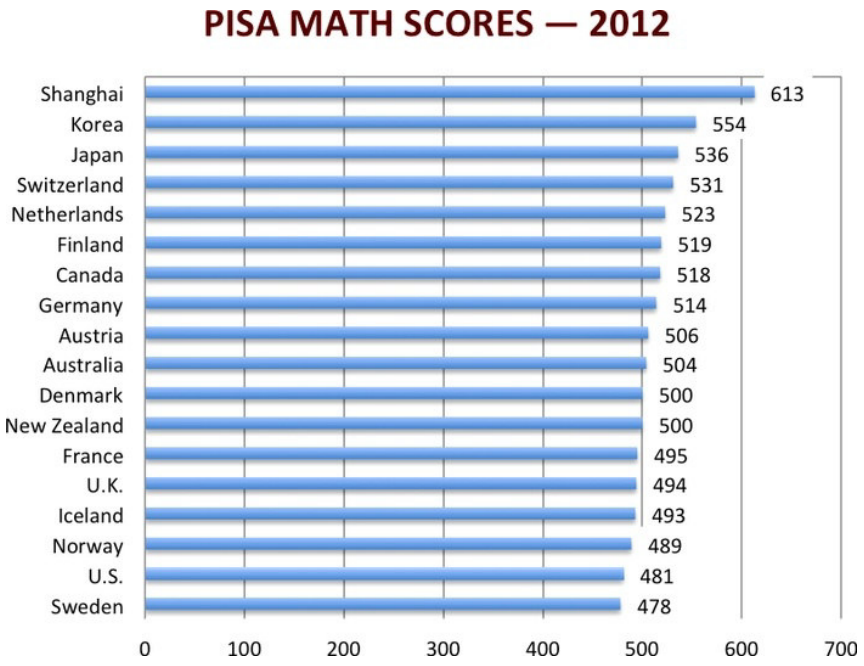
The opportunity to try the calculators has made the difference and I have always more than 2,000 visitors at an average of three shows per hour. No time to rest!

In 2013 and 2015 my projects were presented, as official representatives of the Italian teaching, at the Europe-wide education festival *"Science on Stage"*.

The old calculators are still alive: the examiners decided that awakening the mind this way is beneficial to the students. A great satisfaction for me.

The theoretic program

Nowadays calculations are delegated to electronic devices and the results uncritically read on the display, without any idea of how they are produced.

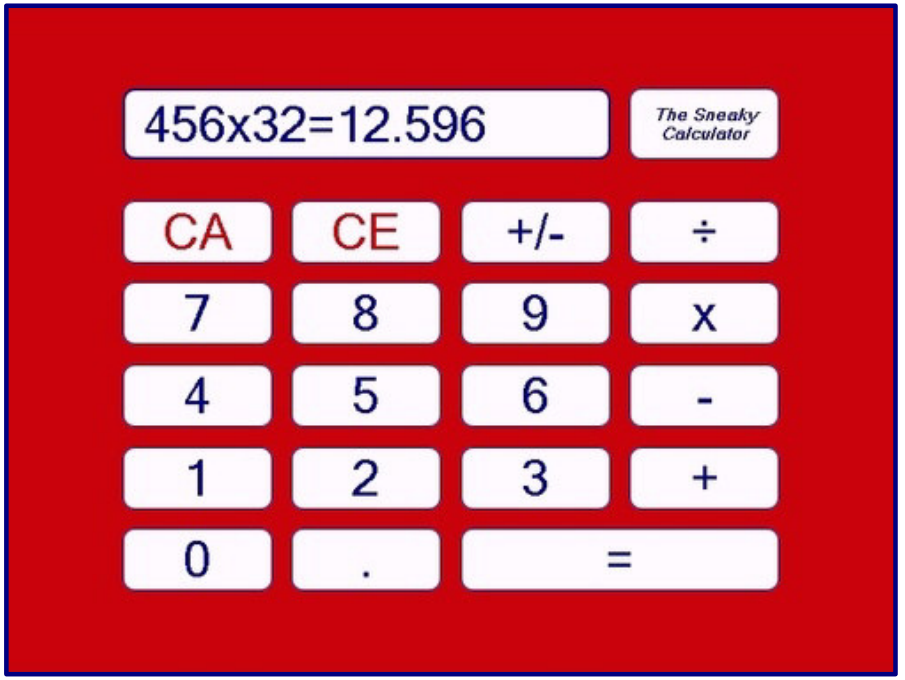


People punch numbers into a calculator and expect it to provide the correct answer: the *Art of Numeracy* is no longer practiced, the world before computers almost forgotten.

Now students learn mathematics while being illiterate about its history, which is a false start.

The electronic aids should not blindly be trusted: the thinking that *"if an expert says it, then it must be true"* is the base of the Authority Principle, which leads to mental slavery.

With a calculator, modified to give *incorrect* results, I show how easy one can make and no notice errors.

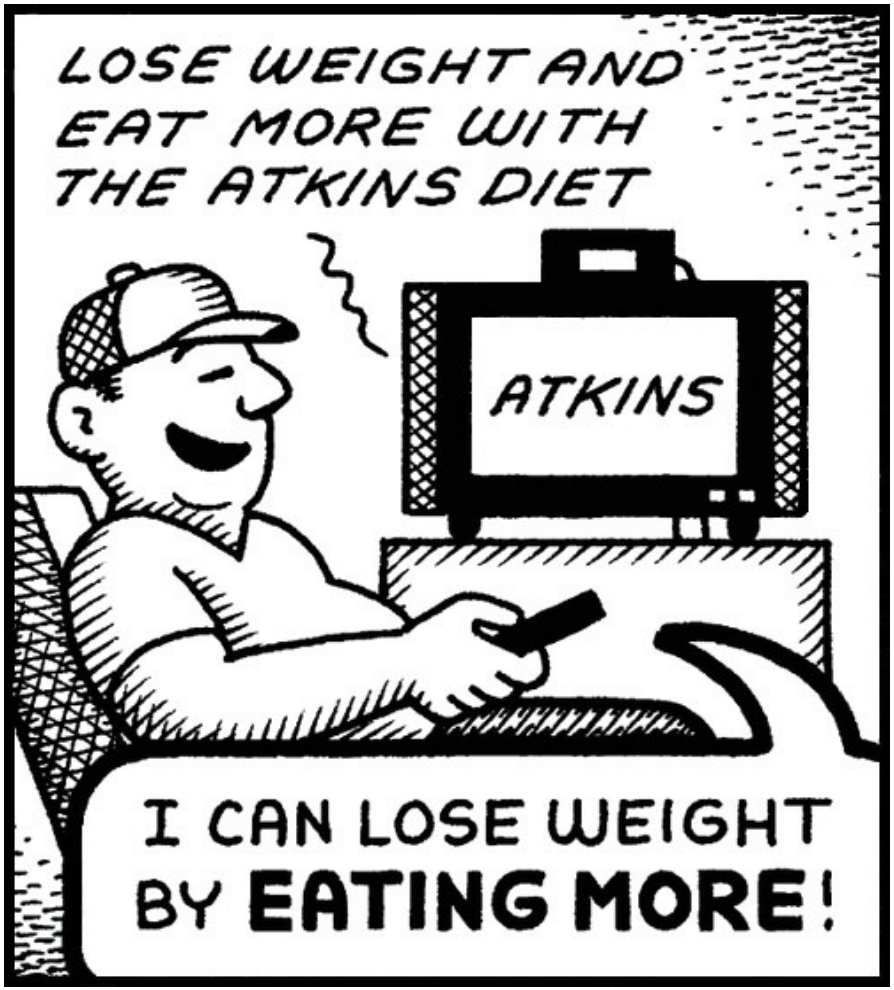


Teaching the use of the old calculating instruments as a school of democracy may seem an overstatement, but nobody can be a free citizen if unaware of what he does or not willing to discuss it.

Not by chance democracy was born in the same country in which maths and geometry were born: scientific thinking and independence of ideas are not a *natural* product of intelligence, they must be *cultivated* steadily. An uncritical use of the computer can lead people to press buttons mindlessly.

A simple lesson about traditional calculation may help: a rational mind produces better decisions, better citizens and a better world. But instead ...

... a torpid brain can easily believe in anything, as you can see in these amusing cartoons, both courtesy of Andy Singer – *www.andysinger.com*.



In brief, my exhibits aim to:

- arouse curiosity about ancient calculators;
- illustrate their history and use;
- demonstrate the need to use computers critically.

Without memory the technology may become insane: to build a better future we have to know our history.

To carry out my project, I first have to face reality. I performed a test in the streets, showing a slide rule: most people did not know it and cannot believe that such simple tool made possible the journey to the Moon.

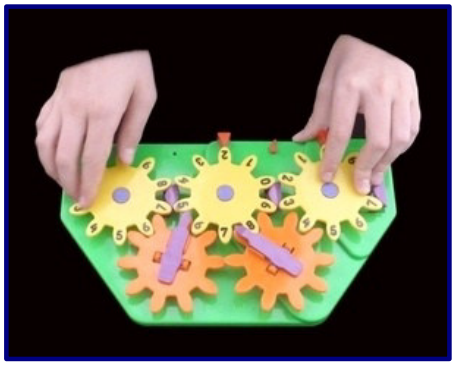
They think to be on Candid Camera, a TV program that searches for idiots.

Often the attitude is negative:

- I don't like old tech;
- I don't like boring topics.

New ideas must be found to wake up their interest!

My practical solution



I start by showing how to calculate with a classic pascaline: the task is easy and people can see that I am often faster than a modern calculator.

After I make the comparison between a metric and a log scale, then I use the nomograms to introduce the slide rule.

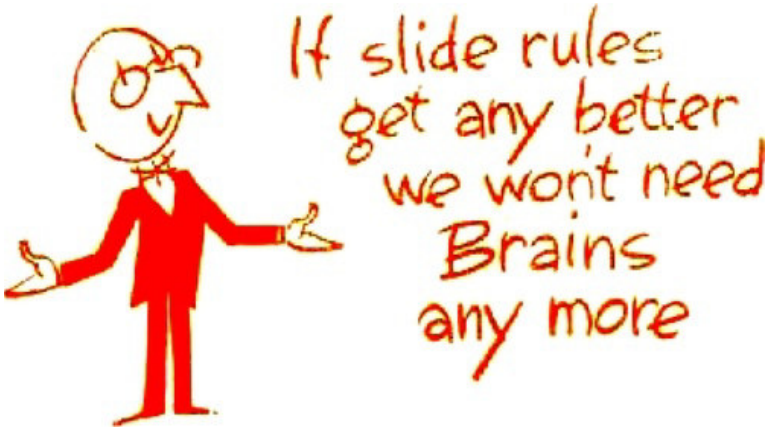
I use a paper E6-B: it can be assembled in few minutes and solves easily many practical problems that captivate the youngsters. A classic slide rule could be difficult for students who ignore logs.

Of course I can only show simple problems: no time for the graphic wind triangle, this can be done later by the teacher or by themselves.

My paper E6-B is a real instrument, that can be used on an aircraft, and once I had the support of the Italian Air Force to teach it!

It is also important to highlight how the design methods have changed over time. To compute with slide rules the forces for the Golden Gate Bridge, the engineers must have had in mind from the beginning the entire project.

Instead, today we can input to a computer a 1,000 generic ideas and see the optimum solution in just a few minutes: that's why in the past there were *many* experienced engineers; now there is just *one* programmer and *many* simple users.

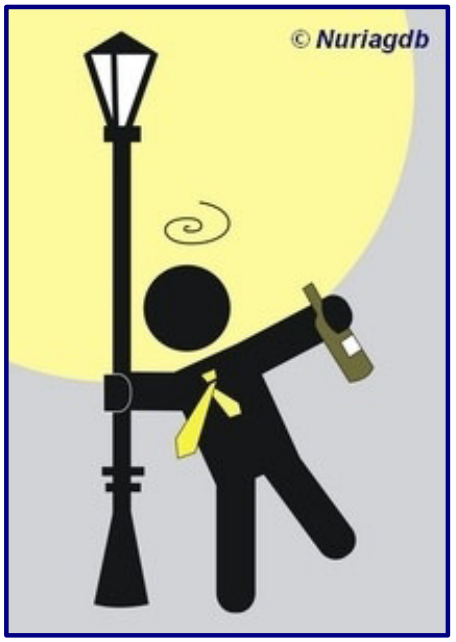


Again a simple lesson about traditional calculation can help in keeping the Brain's sophisticated capabilities.

I think teaching mathematics without teaching how calculations were made in the past is useless. This would be like to teaching history only from 1970.

For this reason is essential my course where teachers can learn about the old calculators: is their duty to transmit their history to the next generations.

Conclusion



I hope my work will help to remember the old calculators and those who created the modern world *using* technology, not *depending* on it for survival.

Today, instead, we often use electronic aids as a drunkard relies on lamp posts: for support rather than illumination!

I'm just an amateur, there are no organizations supporting me: all I can do is to awake the interest of the public, but the old calculating systems can be correctly taught only in schools, included in the official program.

Download the full program from www.nicolamarras.it