

MEASURING

Measurement(s) in question

MARIE-ANGE COTTERET
Chair, Métrodiff Association

Introduction

I was introduced to metrology by Pierre Giacomo who at that time was Emeritus Director of the International Bureau of Weights and Measures (BIPM), and by my colleagues in a number of scientific, legal and industrial metrology laboratories. I defended my doctoral thesis "Metrology and education" in 2003¹.

I was originally a professional trainer and project leader in education and social work for over 20 years, and have interacted with groups of trainees, people in difficulty, young people and adults who organize and define their knowledge and skills. Together we have carried out an in-depth examination of questions of meaning, common sense, measurement and values that are of benefit to collective intelligence and benevolence.

With a group of metrologists, we founded the Métrodiff² Association in 2000, whose aim is to disseminate metrological culture to as many people as possible. Metrologists and scientists are often asked questions about metrology and its historical, social, philosophical and spiritual meanings; beyond that, we also put such questions to members of society, in which individuals and groups organize themselves to deal with the growing disorientation of value systems and develop new solutions to solve new problems that are arising in the present and which will arise in the future.

The birth of universal metrology

The equitable sharing of measurement concepts and values remains central to all civilized societies. Over long periods, documented historical evidence shows a recurring fact: *excess* generates *measurement* and curiously enough, this returns to the front of the stage when it comes to social unity and the redistribution of resources.

Measurements are part of our daily activities and have become so familiar that we forget to think about them, even though they structure decision-making in our societies. For thousands of years, metrology has earned its stripes of operational language with a universal vocation for science, technology and many elementary acts performed in our societies.

The word "metrology" was first coined in 1780. It is the science of measurement and its applications. The term now encompasses scientific, industrial and legal metrologies in their entirety, and has gradually replaced "Weights, Measures and Currencies", inherited from our Ancestors.

The decimal metric and decimal division measurement systems in France were born at the time of the *Declaration of the Rights of Man and of Citizens*. The decree of the Convention of the 18th of Germinal year 3³ (7 April 1795) stated that metric law had to be implemented in France. From that point on everyone, from the most powerful to the most humble, would use the same measurement system and would have been able to manage their own affairs and avoid metrological traps and fraud.

The Enlightenment project is universal. The claim of universalism, in the case of metrology, is not that this activity would naturally be imposed like universal gravitation on all humans, but that this timeless activity, ideally based on shared common values and references, would be intended for use by all humans beyond their political, cultural and religious affiliations.

The choice to share a common metric, later adopted by the world community in 1875, does not abandon identity, but rather opens a door to others for the benefit of all.

The Sanskrit root of the word measure is said to be *māa* – hence *maya*, illusion and magic. The first part *mé* in Indo-European is the word stem *med* – hence doctor, medical, meditate, etc. The same stem is seen in *met*, *mens*, *ment*, *mod* – cure, govern, think, reflect, weigh, judge, meditate, imagine, invent, evaluate, estimate, balance, etc. All of these action verbs are meaningful and relevant in the field of measurement.

Metrological pact, trust pact, recognition pact

The longevity of the Pharaonic civilization in Egypt has been based from the outset in the concept of "*maât*", which expresses at the same time *measure*, *trust*, *order*

¹ <http://mac.quartier-rural.org/these/these2.html> (2003)

² <http://www.metrodiff.org/>

³ http://www.metrodiff.org/cmsms/index.php/histoire/18_germinal_an_3.html

and fairness. To make “*maât*” intelligible and effective for everyone, the concept was deified and grew into a powerful symbolic organization that lasted for more than three millennia. The Great Goddess Maât, a pretty young lady depicted wearing an ostrich feather, energizes and personifies measure, fairness, order, solidarity, benevolence and overall prosperity. Each and all referred to her. During psychostasia or the weighing of the soul ceremony, Maât officiated with Thoth, the Grand Surveyor. Weighing one’s actions during life and being held accountable for these actions during the transition from life to death seems to be a universal funeral ritual.

Balance is the symbol of divine justice and of human justice

The metrological pact is based on agreement of a mutual trust contract. A pacified cultural context across the globe would recognize that all civilizations of the world for millennia have contributed, are contributing (and will continue to contribute) and helping to build this universal common language in order to agree on values and the ways to protect them.

What is this *International System*⁴ inherited from the work of our Ancestors, dedicated “at all times, to all people”? Only the market serves as an instrument of measurement; while it does not possess the necessary qualities in the face of instability and excess in today’s world, we must return to genuine measurements.

Evolution of the need for measurement

The English physicist Lord Kelvin (1824–1907), known for his work in thermodynamics, notes: “A *change of measurement system is not without consequences for systems of thought, unless it is rather the evolution of ideas that leads to an upheaval of measurement units.*”⁵

For thousands of years humans have been measuring the world around them with what is most readily available, their body. The foot, the hand, the palm, the capacity of one’s arms, the day’s work and the time it takes to walk are very useful references in everyday life. Today, the evolution of metrology unites with the senses, the singular.

We seek more and more to measure and assign a value to perception and feelings such as human development, territorial welfare or personal happiness, and even quantify our carbon footprint⁶. We increasingly use measuring instruments to continuously monitor our physical and energetic state, to establish our performance using indicators (the daily number of steps we take, our heartbeat, blood pressure, etc.) and when appropriate, decide to change our behavior.

“Personal Metrology”, of which I depicted the initial outline⁷, is a simple method: it is a vital function of human beings who learn to recognize and acknowledge themselves and their environment to survive, live and evolve.

“Collective metrology” allows one to organize one’s co-responsibility in the world and to go beyond the power-based relations that overwhelm the social fabric with their excesses and their egotism. The action-research work in which I participate shows that the exercise of co-construction of participatory evaluation systems has positive effects on the individual and collective well-being. These support measures, where *all* the stakeholders co-produce solutions, improve the moral and physical health of the participants and reflect back a positive image to the actors in the field.

The experience of social action campaigns in areas with fragile (or not) populations clearly shows that the co-construction of a common space where measurement tools (indicators) are rigorously and benevolently developed and transmitted also has the effect of articulating a political policy based on mutual and reciprocal trust around common practices.

This change in perspective reflects a cultural change: social action and personal care services become a recognition of others through the sharing of common values of solidarity and citizenship and the ability to equip themselves to co-act. This is a way of reconnecting with a type of metrology that not only serves the technical, scientific or economic powers, but feeds into the social space of relations of trust and goodwill.

Among numerous studies, impact measures, data quality and assessment schemes, the co-construction of indicators and new social values of governance are put into question. Agreeing on common values requires harmonization of methods and measuring processes in areas as diverse as social and solidarity-based economy (SSE), services, territorial social action, the metrological quality of performance indicators, etc.

⁴ <http://www.bipm.org/fr/measurement-units/>

⁵ Vedelago S. *Isotopes, Mesure et démesure*, no. 13, December 1995, p.38

⁶ See the book *Terre 2100* and the article by D. Bretelle Desmazières (2009)

⁷ M.A. Cotteret “Mesurez-vous ! De la métrologie à l’autonomie” (2008)

Conclusion

Certain traditional metrology procedures are probably transposable to feelings and subjectivity. They allow us to agree on what is a reliable measurement result. A prerequisite is indispensable: to acquire basic rules about metrological culture and the principles underlying “good” and accurate measurement.

Measurement operators, whoever they may be and whatever they measure, must be rigorous, honest, attentive, careful, methodical and patient. They must use methods and procedures that are validated and reproducible. They must check their measurement operations, repeatedly if necessary. They must assess uncertainty (an integral part of the result) and include it in the final results. They must record and report their data and how they obtained it. A measurement is not taken, it is given.

Finally, measurement sets a path of truth, as understood in the context of “Maât”, and establishes a path of lucidity.

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References

Marie-Ange Cotteret is currently a trainer and head of many educational and social projects. She holds a PhD in education. She is President of the Métrodiff Association², whose goal is to share and disseminate a base culture of measurement understanding. She is a member of the *Conseil Scientifique de Alliance pour l'innovation relationnelle* AIR Fund⁸ and is a Research Associate with Laboratoire DICEN⁹, Paris. Lastly, she is Entrepreneur Associate in the Business and Employment Co-operative Ozon¹⁰ and Author of “Mesurez vous ! De la métrologie à l'autonomie”, 2008¹¹.

⁸ <http://www.air-fund.net>

⁹ <http://www.dicen-idf.org/equipe/>

¹⁰ <http://www.ozon-cooperer.org/medias/webdoc>

¹¹ <http://culturemath.ens.fr/node/2262>



Marie-Ange Cotteret

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