

Measurements in Commerce

Can you imagine a world without trade? Ever since time began, man has traded: one village grew potatoes, another fruit; trade and exchange benefited both. Even then, trade raised living standards and created wealth. As every economist knows, trade is essential to economic stability and growth, as well as to the alleviation of poverty. It's an essential component of life today, just as it was millennia ago. We don't need to look back far – just a short few months – to see how the financial crisis has led to a decrease of confidence in companies of all sorts, resulting in a fall in national revenue, and to a predicted downturn in world trade of some 9% in 2009.



In this year, the sixth in the series of World Metrology Day celebrations, we join in marking the contribution metrology pays to trade as an engine of economic growth.

Looking at all the histories of metrology, I'm struck by the clear message that metrology and trade are inter-linked. The early trading nations – like the Greeks in the Mediterranean – kept copies of the standards of the countries with which they traded, and even the markets of mediaeval times all had local standards of length, mass and volume. Kings and Queens, Sultans and Emperors authorized national measures, and made declarations and laws about national measurement standards, because they saw them as a vital part of the framework of a stable society. Governments taxed trade, and "weights and measures" became part and parcel of daily life. It's no surprise, therefore, that many of today's National Metrology Institutes (NMIs) saw their beginnings in National Weights and Measures Offices – many of which survive today. Traders went to gaol for false measures. Throughout society, man strove towards more precise measures and for a system of measurement which was ever-improving and which met the needs of their national and international economies. Scientists' efforts were harnessed to improve matters. Many were deeply involved in systems of units, aiming for the most precise measurements possible and, even over two hundred years ago,

there are records of comparisons of standards taking place regularly. Indeed, comparisons of the English and the French weights in the early 18th century were largely held responsible for stimulating the emergence of the metric system in France, over which there had been scientific debate for nearly a century.



A sample of the 2009 World Metrology Day poster

Explicit recognition of the importance of international trade and measurement was stimulated by the discussions which took place throughout the London Great Exhibition of 1851 and the Paris World Exhibition of 1867. Here, engineers and businessmen rubbed shoulders with each other and with the Great and the Good of the time. All showed their latest inventions and innovations. The public swarmed to see them and newspapers were full of the successes of science and engineering. Our own [Metre Convention](#) resulted, and was formally signed in Paris in 1875 by representatives of seventeen nations, on what we now celebrate as [World Metrology Day](#) - the 20th May.

The significance of trade was again recognized, at the turn of the 19th century, when the industrialized world realised that accurate measurement was vital to the international competitiveness of companies and, in consequence, created national laboratories dedicated to its pursuit. Many of these were the first publicly funded laboratories and I've always been fascinated to see how task after task, and scientific challenge after scientific challenge, were added to their role. Many of the world's NMIs have, therefore, a proud history of scientific invention and development.

Globalization is far from a new phenomenon. It started in the 19th century and grew rapidly in the 20th. Apart from the depression between the two World Wars, growth in world exports has always exceeded growth in the world's GDP. Companies became multinationals, and markets for new products – cars, electrical goods, aerospace – became open to all. Food exports became a major element in international trade, and governments set up the World Trade Organization ([WTO](#)) in the 1980s to regulate tariffs and trade. The WTO now recognizes the importance to its work of standards, particularly in the light of technical barriers to trade ([TBT](#)) caused by non equivalence of measurement standards or an inability to demonstrate an acceptable level of conformity with written standards. We all know that there must be some way of showing that the measurements made in our own country are equivalent to those in another. If not, goods are rejected, trade is impossible, living standards fall, and consumers are denied trust in, and access to, the goods they want.

So is trade and the national commitment to industrial competitiveness always beneficial? Certainly it stimulates competition and competitive products, which incorporate good measurement practice. Better measurement stimulates innovation through an ability to make new or higher quality products, and so opens up new markets. But, within the last decades, we are starting to see some of the downsides of an all-consuming commitment to industrial growth and, simply, to higher and higher volumes of traded products. We now, belatedly some say, realize the damage done to our environment by rampant industrialisation and a headlong race for growth at all costs. Society has, rightly, become aware of the effect it has on itself. Climate change features daily on our television screens and in our newspapers. As metrologists, we are fortunate that we can play our part in setting the absolute standards against which small, but vital, changes in our climate can be measured. As a result, meteorologists can construct better models and help us understand what we can do to reduce our negative effects on the planet.

Again, ecologically and environmentally, we know that pesticide residues and the use of harmful food additives wreak havoc on humanity and on our countryside. Metrologists again play their part and, with bodies such as the World Health Organization ([WHO](#)), the Food and Agriculture Organization ([FAO](#)) and the United Nations ([UN](#)), we can demonstrate how to make measurements at the subtle and challenging low levels needed to monitor and regulate foods.

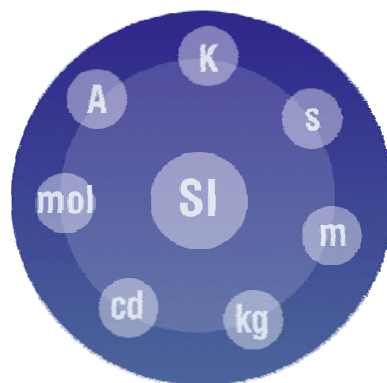
Our 2009 theme highlights the importance of metrology to trade. We can all be proud that metrology has made such a vital input. However we can – and should – be enormously proud of the major revolution in the way we now ensure that our national standards are equivalent. Much has been, and will continue to be, written about the [CIPM MRA](#) which was launched by the International Committee of Weights and Measures ([CIPM](#)) in 1999. Its birth was not easy, as those of us who were involved will remember all too well. Nevertheless, the NMIs of 72 States now participate. An ability to sign the CIPM MRA and to demonstrate an internationally recognized and accepted national measurement competence to all is one of the major stimulants to those States which are now considering whether to become [Members of the BIPM](#), or [Associates of the General Conference on Weights and Measures](#). Together, we indeed launched a revolution from which there is no turning back. Through



taking part, NMIs of all sizes and ages worldwide have learned more about themselves and their skills and abilities. For many, it was a cultural challenge as well as a new way of working.



Directors of NMIs – many of whom were the original signatories in 1999 – will gather together in October this year to mark a decade of the CIPM MRA's existence. We shall, of course, look back and assess what we have done. We'll hear from some of the international and intergovernmental bodies that see the relevance of our commitment to the CIPM MRA as something which provides an essential support to their own mission. We'll hear from users in industry, and we'll hear from the laboratories themselves about their experiences. But we shall also look forward. We've had many successes in encouraging national and international regulators to use the CIPM MRA, so that technical barriers to trade can be avoided. The United States Federal Aviation Authority ([FAA](#)) has been advised to accept traceability from laboratories worldwide that can show traceability to an NMI which is a CIPM MRA signatory. As a result, NMIs are no longer bombarded with cases in which their own calibration certificates for users in aerospace are challenged. The BIPM's initiative to tackle the measurement requirements of the [European Union Directive 98/79/EC on in vitro diagnostic medical devices](#) has resulted in a [database of reference materials](#) maintained and supported by the BIPM, the International Laboratory Accreditation Cooperation ([ILAC](#)) and the International Federation of Clinical Chemistry and Laboratory Medicine ([IFCC](#)). In addition, the World Meteorological Organization ([WMO](#)) took part in a comparison of the greenhouse gas, methane, and found that the scales that it has maintained for many years needed to be adjusted in order to comply with the world mean and therefore the best approximation we have to the International System of Units ([SI](#)).



A decade of success and a bright future is at the same time a source of pleasure and a continuing challenge. Trade and measurement have, as we have seen, become inextricably combined. Our early successes were in physics and engineering, in manufactured products, and in stimulating innovation and competitively produced goods. The BIPM's involvement in regulation, through the EU Directive on in vitro diagnostic medical devices and environmental standards has led us into the different worlds of chemistry, food, performance-enhancing drugs, and many more. Together, we strive for a fair trading system and a better, safer planet. Metrology doesn't bring many quick results - our business is painstaking and thorough. But the success of the CIPM MRA and its increasing acknowledgement by governments and international authorities has indeed proven to be a quick success. It shows the value of linking the measurement work which we all do in our laboratories to grand international challenge – something to which metrologists have always risen. You will, I am sure, continue to do so.

May I wish you all a Happy World Metrology Day, and every success in your local and national celebrations of this event.

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