

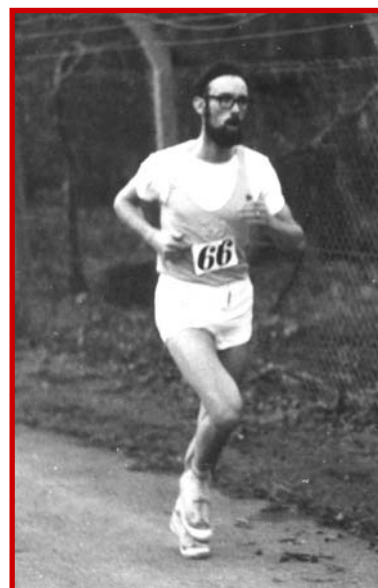
World Metrology Day

Message 2008

No games without Measurement

Dear Metrology Friends and Colleagues world-wide,

As a young man, I was a half-mile[†] runner. Then, aged eighteen, the only metrology which concerned me was whether my time was below 2 minutes... with the occasional brief anxieties about the friction between the track and my running shoes. Today, metrology matters more than ever before in all sports. As 2008 is an Olympic year, for our World Metrology Day this May, we must all aim to bring home the message that precise measurement is vital in today's sports and genuinely important to today's sportsmen and women.



*Andrew Wallard
running the 1/2 mile in
1970.*

We are all currently aware of the increasingly vigorous competition at every level of sport – amateur as well as professional - as athletes coax their minds and muscles to deliver continuously improved performance. Measurements, as well as photographic images, play a big role in judging their performance: races can be lost by hundredths of a second or field events by fractions of a millimetre. A photo finish may capture that fractional moment pictorially, and can be used to decide the winner, but it does not help us to compare one athlete's performance with his/her own personal best or with someone else's in previous competition. Indeed it is accurate measurement which inspires our confidence in fair play. Local conditions need to be factored in, for example, so that athletes don't gain an unfair advantage through wind speed or temperature. The equipment used – whether weights, racing bicycles or even footballs - needs to be checked precisely. We can attribute improved track times to better shoes, better track surfaces, better training – yes – but no-one would suggest that the second is longer now than in the past or that the metre is shorter. We take it for granted that our units are stable in space and time.



The metrology behind the Games, of course, varies in its difficulty and in its impact, as the posters prepared for this year's World Metrology Day show all too clearly. Perhaps the most difficult and controversial problems of all involve the monitoring of performance-enhancing drugs. Careers can be destroyed and medals humiliatingly withdrawn if an athlete is proved to have been taking such drugs or is found cheating. Here at the International Bureau of Weights and Measures ([BIPM](#)) we have worked with the World Anti-Doping Agency ([WADA](#)) and the National Measurement Institute of Australia ([NMI](#)) to allow a number of National Metrology Institutes (NMIs) to participate in international comparisons of measurements of the levels of performance-enhancing drugs. This activity has confirmed that high levels of confidence in the testing process can be achieved if such measurements are carried out carefully in accredited and well managed laboratories. The necessity for drug testing is, unfortunately, one of the more unpleasant and "un-sportive" aspects of contemporary competition. Random sampling of blood and urine has become commonplace – something never even contemplated amongst my contemporaries. With better measurement and more sensitive testing processes we can all hope that this aspect of sporting life can be greatly reduced or, even one day, eliminated.



Australian Government
National Measurement
Institute

However, the message of World Metrology Day 2008 (WMD 2008) reaches even more deeply into the fundamentals of sport. Fairness and comparability of performance are the two basic

[†] 1/2 mile = 804.672 metre

criteria on which competition is based. At the heart of this is careful measurement of almost every aspect of sport. Clearly the basic concepts of time, height and distance are obvious elements of track and field athletics, swimming, cycling, to name just a few. We may believe that the basic metrology is self-evident but we all need to take account of a number of extra factors which influence the results. The temperature of water in a swimming pool has a significant influence on a lane length. A light javelin used by one athlete, rather than another, may increase the distance of a throw by an amount which may make all the difference between a Gold medal and a Silver one. As we know from Formula One motor sport, advanced materials can make huge differences. The skill of the driver is enhanced by the skill of the engineer. In recent years, we have seen the use of advanced materials in the manufacture of the pole used in a pole vault, of oars and boats used in rowing events, or in a lightweight bicycle where engineering design has created machines which are as elegant as they are fast. Sport has always provided a warm welcome for new and challenging materials – carbon fibres, for example, found one of their first applications in golf clubs during the nineteen eighties.

The supporting posters and booklets, which have been produced for WMD 2008, highlight many more, sometimes less expected, influence-factors which have to be monitored and checked against references. Whilst sport metrology may not always be as sophisticated or as demanding as in other areas where measurement is important, it nevertheless requires the core cultures of precise measurement: accurate and calibrated reference standards and an appreciation of uncertainty. Today, indeed, reference standards do seem to be widely accepted as important, but that only constitutes part of the equation: uncertainty poses more of a problem. A judge wants to be given a yes/no answer to questions about whether a wind-speed, a weight, a possible level of drugs is within the acceptable limits or not. This is a difficult challenge for us metrologists who always tend to build in the acceptance of an uncertainty with our measurements. We know that no measurement can ever be without error but it is often hard to persuade – or even educate – legislators, regulators or others, that lack of precision is a natural fact of life. In sport, perhaps, the levels of acceptable precision may be such that the highest levels of metrology may not be needed, but we must aspire to it, nevertheless. Elsewhere in legislation and regulation, the case may be clearer cut.

On this broader front, the BIPM is working hard with other intergovernmental organizations. We want to see how we can help, especially by using the data on accuracy and uncertainty which we glean from international comparisons and the uncertainties which NMIs, and those laboratories which depend on them, associate with their calibration services. We work with the accreditation community and specialised bodies such as the International Federation of Clinical Chemistry ([IFCC](#)), the World Meteorological Organization ([WMO](#)), the Food and Agriculture Organization ([FAO](#)), and many others who have specialised knowledge of their application areas to encourage greater attention by them, and the communities they represent, to traceability and uncertainty. We have already achieved significant successes and have attracted new partners and collaborators but more needs to be done. We welcome contacts and collaborations with all who wish to improve measurement practice in their areas of specialist expertise. I hope we are not over-confident in saying that we have very nearly achieved this goal in most areas of physics and engineering. The new challenges for us all lie in chemical metrology, and in traceability of measurements in nutrition, forensic science, and medicine, for example.



Last year, the theme "Measurements in our Environment," attracted a huge amount of attention from NMIs and other international bodies. Some 85 national events to mark WMD were held in 63 Member States and Associates, as well as in States which have, as yet, no formal links with the BIPM. In partnership with the *Physikalisch-Technische Bundesanstalt* ([PTB](#)) in Germany and the National Metrology Institute of South Africa ([NMISA](#)), the BIPM prepared an initial poster for WMD 2007 which, with the collaboration of a number of other NMIs, was translated into 18 languages, giving 32 versions of the poster. I know that we shall greatly exceed this number of languages for the poster for 2008. This is an unprecedented level of success, far exceeding anything of which I ever dreamed when my first World Metrology Day message was launched in 2004.





2007 World Metrology Day poster



2008 World Metrology Day poster



National Physical Laboratory



中国计量科学研究院
National Institute of Metrology (NIM), China

Our new partners for 2008 include the National Physical Laboratory (NPL) in the UK who have updated a previous brochure on "Measurement in Sport" and intend to promote it to a general public. Their brochure, as with other WMD material, is available for translation. We are also delighted to be working with the International Organization of Legal Metrology (OIML) and the National Institute of Metrology (NIM) in China, and we wish our Chinese colleagues every success in their hosting of the Olympic Games.



These new partners have come to join in the increasing success and impact of World Metrology Day in previous years and I am sure that the 2008 event will be followed by tens of thousands of metrologists world-wide, as well as by many others through national days or other initiatives.



Individual pages/posters from the 2008 World Metrology Day brochure

Our motto for 2008, "No games without Measurement," may be stating the obvious but we all know that measurement is important to nearly all aspects of society. So let us use WMD 2008 to

press our message home to a particular group of people with whom we may normally have little contact, in the hope that they will appreciate what we do for them! Let us all hope they may go on to appreciate the importance of good measurement in its broadest contexts in our world.

I wish you all a happy and successful World Metrology Day... Now, where did I put those old running shoes?

A handwritten signature in black ink that reads "Andrew Wallard". The signature is written in a cursive, flowing style.

Andrew Wallard
Director of the BIPM