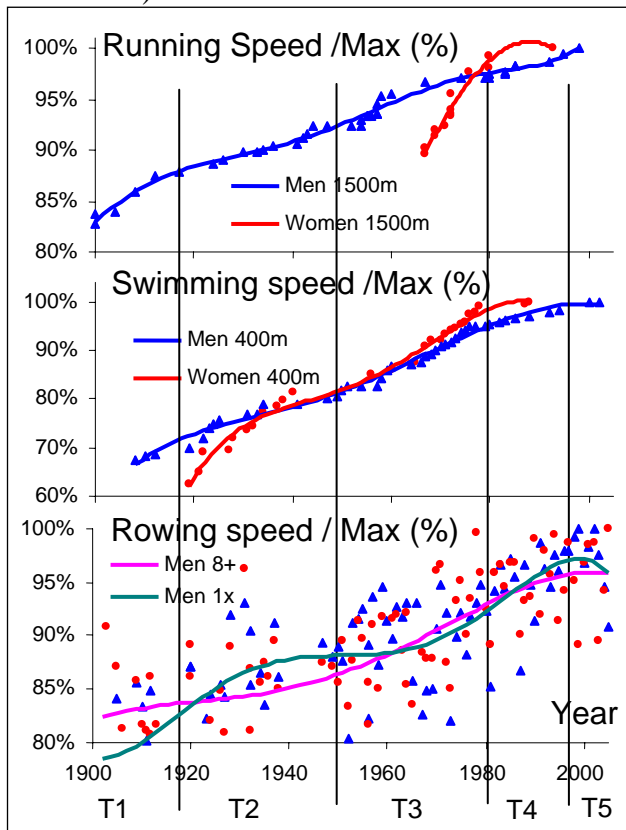


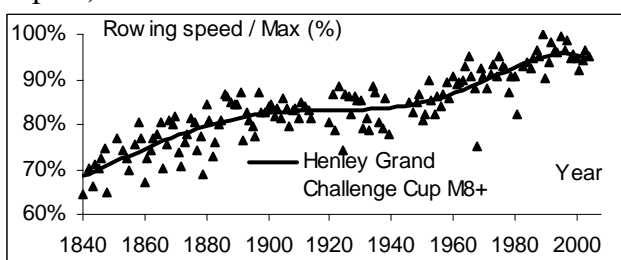
Long term trends of performance

✓ This is a brief summary of one of the topics presented on the World Rowing Forum (<http://www.worldrowing.com/news/fullstory.sps?iNewsid=272187&itype=&iCategoryID=0>). Long term performance in rowing is difficult to analyse, because it is significantly affected by weather conditions. Therefore, we analysed long term 1900-2005 trends of world records in similar endurance events, such as 1500m running (1) and 400m freestyle swimming (2) and compared them with the world winners times in rowing (the data is courtesy of Milan Bacanovic):



It is quite obvious that the trend lines in all analysed sports have quite similar patterns. We can define five common periods:

T1 before 1920. Fast growth of performance 1-1.5% per year, which can be explained by **initial development** of sporting technique and training methods. It is interesting that the trend in M8+ is already quite flat during this period and initial development occurred before 1900, which can be seen from the records of the Royal Henley Regatta (<http://www.hrr.co.uk/archive/records.htm>, digitised by Nick Caplan):

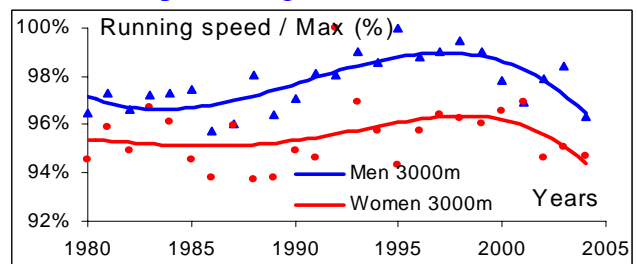


T2 1920 – 1950. Slow growth (0.5% per year) caused by two World Wars, amateur status of the athletes and lower competition due to separation of the East and West sport systems.

T3 1950 – 1980. Very fast growth of performance 1-2% a year. Eastern block joined Olympic sport in 1952. Sport became a political factor and professional activity, which boomed development of training volume, methods and use of drags in sport. This performance growth was even faster in women, because it coincided with initial development in some women's events.

T4 1980 – 1996. Slower growth 0.5-0.8% a year. Training volume approached its biological limit; effective training methods became widely known, improvement of the drag control. Rowing performance continue to grow relatively faster (1.5% a year) than in athletics and swimming. We can speculate that the reasons were equipment development (plastic boats and oars replaced wooden ones, big blade, etc.) and active FISA position in wider promoting of rowing and popularisation of modern training technologies.

T5 1996 – now. Stable period and even decreasing of performance, which can be seen in the latest trends of the yearly world best times in athletics (<http://www.gbrathletics.com>):



We can speculate that the reasons could be further development of doping control methods (such as blood doping test) and sociological factors. Professors Nevill and Whyte (1) recon that "many of the established ...endurance running world records are nearing their limits. ...the athletic and scientific community may continue to explore greater performance gains through use of pharmacology and the evolving science of gene doping" We hope that the room for improvement in rowing is a bit wider than in athletics, and its significant part can be fulfilled by biomechanics.

Literature

1. Nevill A., Whyte G. 2005. Are there limits to running world records? *Med.Sci.Sports Exerc.* 37, No.10, pp.1785-1788.
2. Volkov N., Popov O. 1999. Current development of sport records. RGUFK, Moscow, p.82

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