

# TRENDS IN OLYMPIC AND COMMONWEALTH GAMES RECORDS FOR THROWING EVENTS

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**Abstract.** Throwing events have been an integral part of the track and field program in both Olympic and Commonwealth Games since their inception. Most scientific studies of these events have concentrated on biomechanical analysis or the physical capacity requirements of the athletes. This paper examines and compares the trends over time of the gold medal results of three throwing events in the Olympics and the Commonwealth Games for male competitors. Data was collected from the 'Athletic's Almanac' web-site, for the period since inception of these games until the present day. The data was examined to identify the linear trends that exist for all three events. Similarities between results in the shot-put and hammer of a steady increase in distances thrown over time were evident. Whereas, the discus records showed a steeper positive relationship over time. In addition, critical world-wide incidents, trends in social expectations and increase in sports science and technical knowledge were concluded to have an effect on the results of these athletic pursuits in terms of acceleration periods and plateaus of results. In summary, trends in general for records in these throwing events showed a steady rise from the outset of competition until the late 1960s to early 1970s. Since this period, there has been considerable tapering off of improvements in distances achieved. These trends were seen in both the Olympic Games and the Commonwealth Games.

**Keywords:** shotput, discus, hammer throw

## INTRODUCTION

Throwing events have been an integral part of the track and field program in both Olympic and Commonwealth Games since their inception. Most scientific studies of these events have concentrated on biomechanical analysis or the physical capacity requirements of the athletes. This paper examines and compares the trends over time of the gold medal results of three throwing events in the Olympics and the Commonwealth Games for male competitors. Dapena et al. (2003) predictions of distance a hammer would travel in physics terms. Both technological change and globalization have plausibly contributed to improving track and field records over this period - Munasinghe et al. (2001). Home advantage in Winter Olympics 1908-1998 Balmer et al. (2001). Ueya, K. (1992) The men's throwing events - However, despite the fact that winning marks in the Shot Put, Hammer Throw and Discus Throw were lower than those achieved at the II World Championships in Rome - a fact which may be attributable to the increase in anti-doping measures taken by the IAAF. Dickwach, H. and Scheibe (1993) Performance developments in the throwing events - This means that a long term 'steep' improvement in performance, that incidentally also existed before this 26 year period, has been interrupted or temporarily limited. It may be assumed that the stagnation and decline in performance levels are the result of more advanced doping controls during competitions, the introduction of

out of competition dope testing and socio-political changes. Terpstra, J. and Schauer, N. (2007) A simple random walk model for predicting track and field world records. this article introduces a model that can be used to predict records for periodically observed record sequences; in particular, yearly track and field world records. Linthorne, N. (2001) Optimum release angle in the shot put - Simple models of shot-putting were developed to explain the relations between release speed, height and angle in terms of the anthropometric and strength characteristics of the athlete.

## **METHOD**

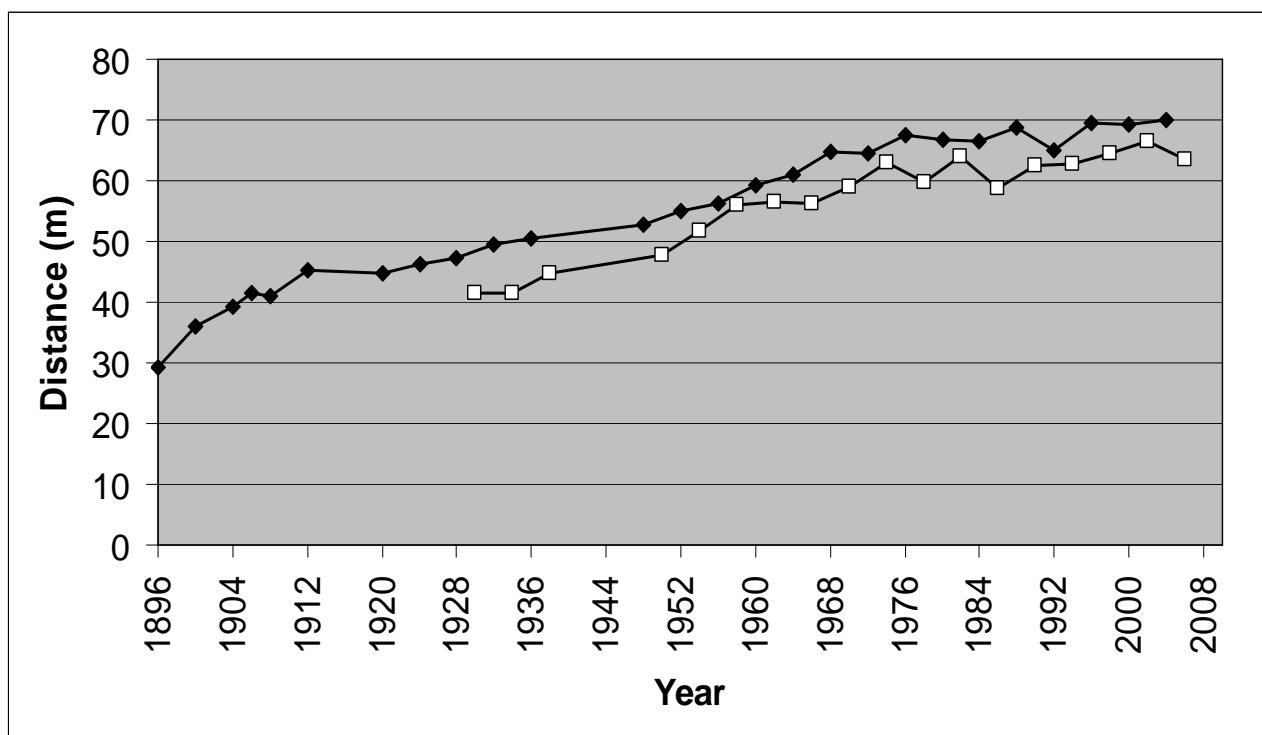
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## RESULTS

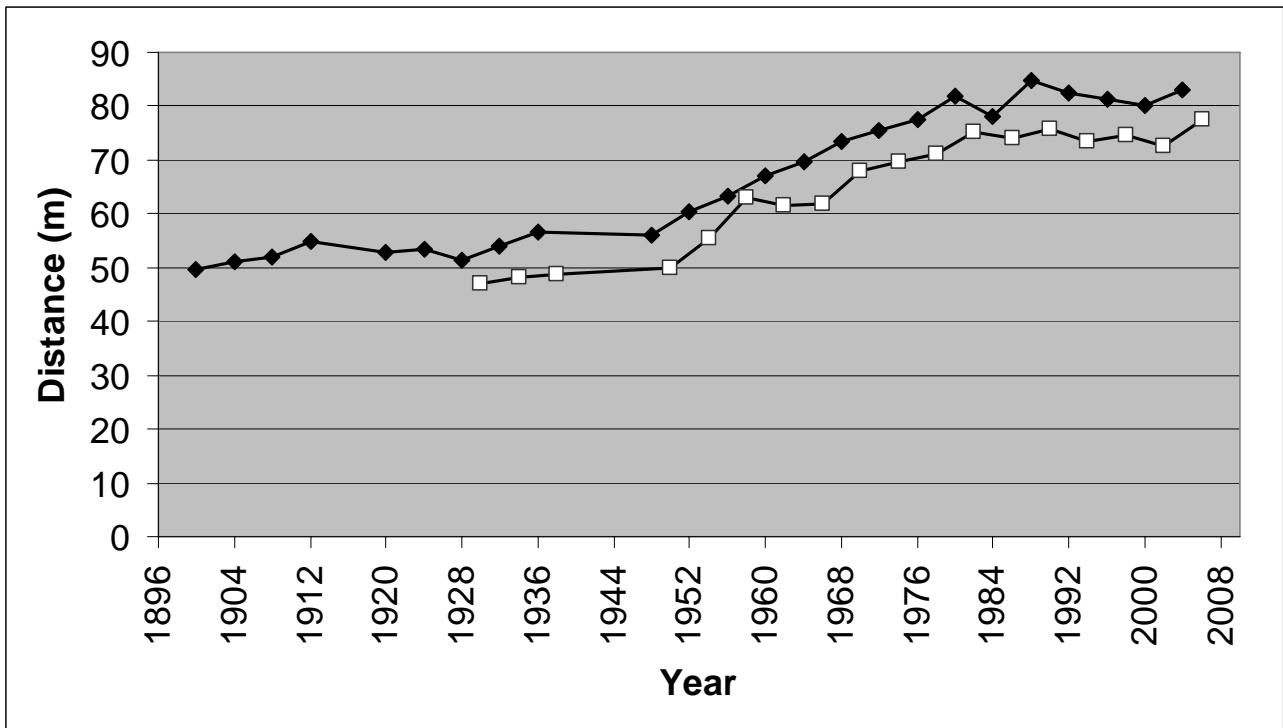
Comparison of the trends between the Olympic and Commonwealth games within all three throwing events provides a clear indication as to the increases in athletic performance since the inception of both games. Both the discus throw and the shot put have shown constant increases in performance up to the late 1970's, the hammer throw has equally shown large increase in performance up to the late 1970's however the performance improvements over the first 40 years till the early 1970's was much more gradual.

After the late 1970's the rate of increase within athletic performance within the discus and the hammer throw tapers considerably. However the shot put fails to show any marked increase within performance since this period, with the exception of the 1988 Olympics which showed a large increase of the 1984 games, since this point performance has shown a steady decline replicating similar performances to that of the late 70's and early 80's that has not been matched since. The performances within the shot put for the commonwealth games showed a marked decline in performance since the 1974 games up until the 1986 games were subsequent performances have increased back to the level of 70's.

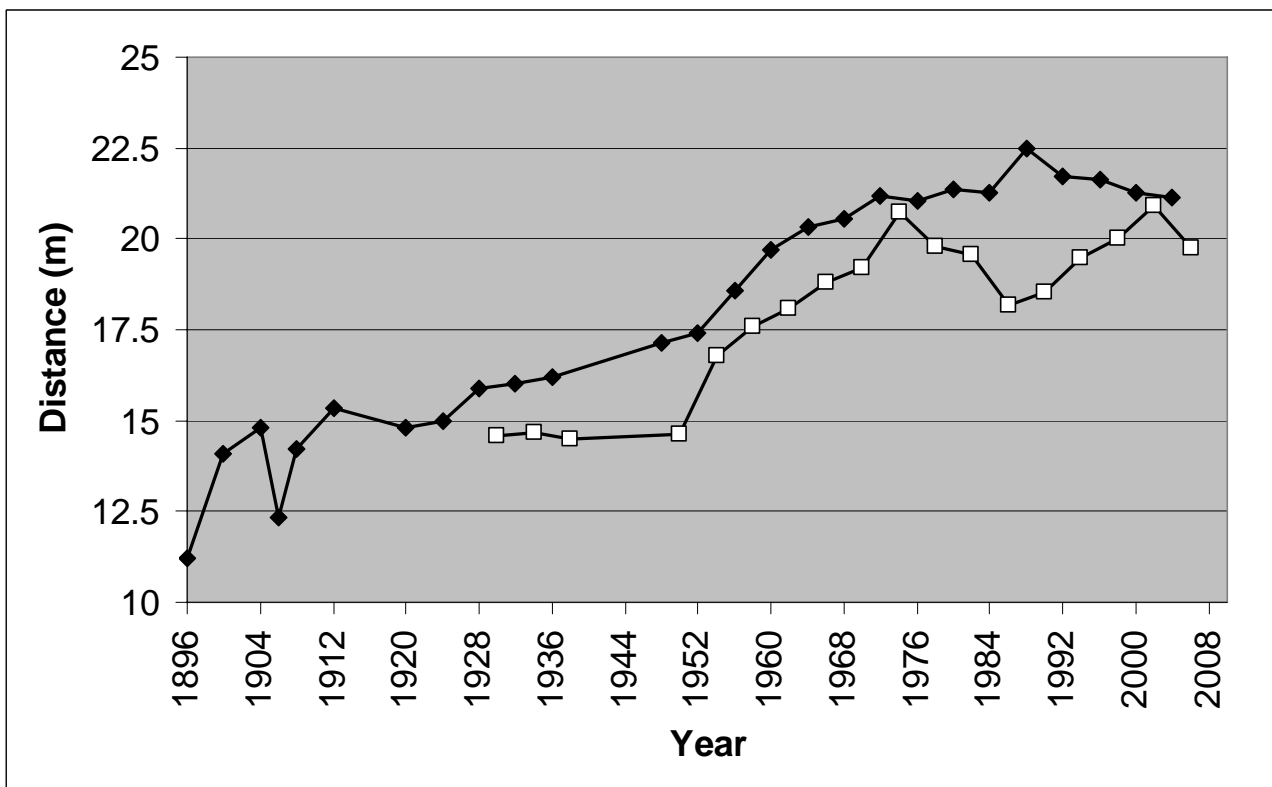
**FIGURE 1.** Trend of the discus gold medal performances since inception in the Olympic (◆) and Commonwealth games (□).



**Figure 2.** Trend of the hammer throw gold medal performances since inception in the Olympic (◆) and Commonwealth games (□).



**Figure 3.** Trend of the shot put gold medal performances since inception in the Olympic (◆) and Commonwealth games (□).



**Table 1.** Percentage improvement of the gold medal performances for the Hammer and Discus throw and the shot put from the period of 1928 – 1938 against 1996 – 2006.

<b>Event</b>	<b>Olympics</b>	<b>Commonwealth</b>
<b>Hammer</b>	<b>52%</b>	<b>56%</b>
<b>Discus</b>	<b>49.1%</b>	<b>52%</b>
<b>Shot</b>	<b>33%</b>	<b>38.8%</b>

*To calculate the percentage improvement within the three disciplines the three games within the period of 1928 – 1938 were averaged against the three most recent games within the period of 1996 – 2006.*

The discipline that has shown the most improvement over the 70 year period was the hammer throw, however the discus throw has shown similar comparable levels of improvement, both disciplines have continued to show a steady rate of improvement to the present day. The shot put however has shown a considerably less rate of improvement over the same time period, with approximately 15 – 20 % less improvement demonstrated.

Within all three disciplines since the period of 1928 – 1938 the commonwealth games has shown an increased rate of improvement of around 3 – 5% over the Olympics. It is therefore possible to predict that performances within the Commonwealth are becoming more comparable to the world class standard of the Olympics.

## CONCLUSION

In summary, trends in general for records in these throwing events showed a steady rise from the outset of competition until the late 1960s to early 1970s. Since this period, there has been considerable tapering off of improvements in distances achieved. These trends were seen in both the Olympic Games and the Commonwealth Games.

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Shot 7.260kg

Discus 2.000kg

Hammer 7.260kg

The inside diameter of the circle shall be 2.135m ( $\pm 5$ mm) in the Shot Put and the Hammer Throw and 2.50m ( $\pm 5$ mm) in the Discus Throw.

The rim of the circle shall be at least 6mm thick and shall be white.

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## **COMPETITION RULES**

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