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Julian Havi! Nonplussed!

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Introduction



Alice laughed: 'There's no use trying,' she said; 'one can't believe impossible things.'

'I daresay you haven't had much practice,' said the Queen. 'When I was younger, I always did it for half an hour a day. Why, sometimes I've believed as many as six impossible things before breakfast.'

'Where shall I begin,' she asked.

'Begin at the beginning,' the king said, 'and stop when you get to an end.'

Lewis Carroll

It does not take a student of mathematics long to discover results which are surprising or clever or both and for which the explanations themselves might enjoy those same virtues. In the author's case it is probable that in the long past the 'coin rolling around a coin' puzzle provided Carroll's beginning and a welcome, if temporary, release from the dry challenges of elementary algebra:

Two identical coins of equal radius are placed side by side, with one of them fixed. Starting head up and without slipping, rotate one about the other until it is on the other side of the fixed coin, as shown in figure 1.

Is the rotated coin now head up or head down?

Within a random group of people both answers are likely to be proffered as being 'obviously true', yet one of them is false and a quiet experiment with two coins quickly reveals which. We must prove the fact though, and too much knowledge is dangerous here: fix on a point on the circumference of the moving circle and we have an epicycloid to consider (or, more precisely, a cardioid) – and there could be hard mathematics to deal with.

Chapter 1



THREE TENNIS PARADOXES

So that as tennis is a game of no use in itself, but of great use in respect it maketh a quick eye and a body ready to put itself into all postures; so in the mathematics, that use which is collateral and intervenient is no less worthy than that which is principal and intended.

Roger Bacon

In this first chapter we will look at three examples of sport-related counterintuitive phenomena: the first two couched in terms of tennis, the third intrinsically connected with it.

Winning a Tournament

The late Leo Moser posed this first problem during his long association with the University of Alberta. Suppose that there are three members of a club who decide to embark on a private tournament: a new member M, his friend F (who is a better player) and the club's top player T.

M is encouraged by F and by the offer of a prize if M wins at least two games in a row, played alternately against himself and T.

It would seem sensible for M to choose to play more against his friend F than the top player T, but if we look at the probabilities

