

# The Story of the Tossers

Angus S. Macdonald

January 1994

## Abstract

The actuarial profession in the U.K. has invented “The Actuarial Philosophy” and “The Actuarial Scientific Method”. This is a story about another profession which had a similar idea.

**Once upon a time**, there was a country whose main economic activity was tossing coins. It wasn't that it had a Conservative government - its only natural resource was coins, and there really was nothing else to do with them. They were simple people.

All day long, small groups of people could be seen industriously tossing their coins. Much money would change hands (paper money of course), because the people were compulsive gamblers. Some people became very rich - even more became very poor.

Coin-tossing in this country had some unique aspects. These were not honest coins such as you are used to. Coins grew on all sorts of trees, and coins from different trees behaved in very different ways. They each had a head and a tail, but that was about all they had in common. Some would nearly always come up heads, some would nearly always come up tails, and some were in between. The most prized were the coins grown in a certain inhospitable part of the country. For some reason these seemed to come up heads or tails equally often. Their owners were envied by all the others, despite the fact that they were almost always very poor. They were unusually simple people.

Then one day a pioneer made the brilliant discovery that any coin, tossed a large number of times, displayed a remarkably regular proportion of heads and tails. All you had to do was watch a coin being tossed for long enough,

and then you could tell which way to bet. Here was a way to make money! This pioneer didn't want everyone to know the secret, however, so he set up a profession to work out all the hard sums. The profession was called the Association of Tossers.

Students who wanted the letters FAT after their name had to study coin-tossing in depth. Only the cleverest candidates were accepted, those who could count to ten. (They really were remarkably simple people). They began by learning how to make observations of coin-tossing, and how to decide which way to bet. Their financial calculations were aided by a useful tool called the "coin table". Here is an example of a coin table. Its radix is 1,000, which means that it is based on 1,000 tosses of a particular coin.

Head	700
Tail	300

People who could understand coin tables were very rare, so the profession was very exclusive, and Tossers were paid lots and lots of money. Soon, qualified Tossers were the highest paid people in the whole land. Such was their fame, that the other people began to give their coins to Tossers to toss for them, and mutual tossing societies sprang up in every corner of the land, mostly managed by Tossers. Tossers acquired more and more influence, and became very wealthy.

Now obviously the key to this success was the coin table. Tossers liked to wrap the coin table in a fog of mystery, and they were very possessive of their knowledge. They even managed to get their parliament to pass a law saying that only an FAT could do coin table calculations for the tossing societies.

The first Tossers had initiated a study of the properties of coins from all over the land - the Continuous Tossing Investigation Bureau - and once their work was completed very few Tossers found much need to observe coin tossing any more. Indeed, they found themselves dealing with the day-to-day problems of managing a tossing society rather more than actually using their coin tables. This they tended to delegate to recently qualified Tossers. Many Tossers began to think that it was a pity that student Tossers started their studies with the observation of coin-tossing. This just stopped them from getting to grips with the coin table, which after all was the sharp end of

the business. So they formed an Education Working Party and changed the syllabus. Now students got stuck into the coin table on day one. Only much later, by which time they could be working away at their coin tables, earning money for their societies, did they study the observation of coin tossing.

Well, you can guess what happened. The subject of observation languished somewhat. No-one was interested in observing coin-tossing any more. The financial calculations of the coin table seemed more *useful*, more *practical* - and Tossers prided themselves on being practical people. And the Tossers began to think again - don't we require students to know an awful lot about the coin table? Will this knowledge help them to manage a tossing society? After all, that is what being a Tosser is all about. So they formed another Education Working Party, and once more hacked away at the syllabus. And the student Tossers were happy, because they had found the previous coin table exams pretty hard, and they were keen to earn the sort of money that senior Tossers earned.

But the times were changing, though few Tossers seemed to realise it. A few years back, the six-sided die had been discovered. At first no-one could think of anything useful to do with it, and the die was dismissed as "too theoretical" by the Tossers. Then someone (not a Tosser, obviously) tried the experiment of rolling the die along the ground. Amazing! It came up with a different number each time, and you couldn't guess which it would be. It was left to the scientists to discover the new techniques needed to understand the die. The breakthrough came when they noticed that by observing a die rolling many times, a pattern could be found. Indeed, it could be described in a table - a rolling table. The Tossers were even sniffer about this than they had been about the die itself. A table with six numbers in it! How they laughed! Any Tosser with a bit of practical experience knew that tables with two numbers were perfectly adequate to solve real life problems - problems of tossing society management for instance. Anyway, the last thing the Tossers wanted to have to do was to learn about them.

Alas, the Tossers had overlooked one important fact. Here was the first new economic activity in a thousand years! People were going to love the new kind of work. And they did. Soon factories were churning out dice at a terrific rate. Naturally, each die-maker had different ideas about how to make a die, and remembering just how simple these people were, you will realise that the dice were mostly what we would call "loaded", but no-one worried about that. Except the Tossers, that is. It seemed to them that

die-rolling with variable dice was rather like coin-tossing with their kind of coins, and they were alarmed by the threat of competition. Before long, their fears were realised and rolling societies began to appear, where people could bring their dice to be rolled professionally for them. The Tossers protested that they had been entrusted by parliament with the coin table calculations for tossing societies, and that Tossers should also be allowed to supervise the rolling societies. They knew that the managers of rolling societies were using rolling tables in their work, and this they said was far too complicated and quite unnecessary. Coin table techniques could do all that. To make their case sound more impressive, they invented the “Tosser’s Philosophy” and the “Tosser’s Uniquely Perfect Method”, both of which boiled down to coin tables if you read between the lines.

But parliament wasn’t impressed. “If you think that coin table methods will work, show us how” they said, “then we’ll think about it”. So the Tossers had to think again, and this time they dreamed up a “Wider Fields Project”. The idea was that the Tosser’s Uniquely Perfect Method could solve lots of different problems, not just coin-tossing problems. And what better subject for the Tossing approach than die-rolling? At once, the Tossers set up a very high-level Working Party to look at the problem (their invariable response). Members of the Working Party were asked how to apply the Uniquely Perfect Method to die-rolling.

And do you know, they couldn’t do it! The older members had forgotten what to do, and the younger members had never learned. The oldest member had a vague idea that observation might come into it somewhere, but inexplicably, observation had been left out of the Uniquely Perfect Method, so he suppressed his disloyal thought with a shudder. At least they could all agree that the most important thing was to come up with a *practical* solution.

We have nearly reached the end of this tale. The Association of Tossers doesn’t cut much ice any more. The younger Society of Rolling Analysts, being more open minded about using tools invented by other people, simply started constructing rolling tables and got on with the job. I’m told that the Working Party still meets, though I’m pretty sure that the oldest member has dropped off his twig by now. After all, I’m an actuary, and actuaries know everything worth knowing about mortality.

Don’t we?