



## The Bells of St.Peter's Cathedral Peals and the Long-Length

The bells at St.Peter's are hung for the English style of full-circle change-ringing, so for each time a bell sounds that bell swings a full 360 degrees. Because of this each bell can only ring every 2-3 seconds, which means normal music cannot be played, so instead we ring 'methods'. We start the bells ringing in sequence from the highest note (the 'treble' or #1 bell) to the deepest note (the 'tenor' or #8 bell) i.e. 12345678.

When a method is rung bells swap their position in the sequence with an adjacent bell. If all 8 bells are changing position the method is a 'major' method. The other option for methods on 8 bells is to always leave the tenor in 8ths place, and have the other 7 bells swap with each other. These methods (with 7 bells swapping) are 'triples' methods.

With 7 bells changing order with each other, there are 5040 possible unique sequences, or 'changes' as they are called. This is  $7!$  (7 factorial) for any mathematicians. A 'peal' is when all of these 5040 unique changes are rung, without repetition and without a break, and on the St.Peter's bells this takes over 3 and a half hours. Ringing a peal is the bellringing equivalent of running a marathon. Any ringing attempt longer than a peal is referred to as a 'Long-Length'.

The attempt on the 29<sup>th</sup> is intended to be 10080 changes of a method called Stedman Triples, a triples method (so with 7 bells swapping) named for the ringer who composed the method, Fabian Stedman (1640-1713). Overleaf is the diagram and chart showing what is called the 'plain course' of Stedman Triples.

The band includes a conductor, one of the ringers, who as well as ringing their own bell, calls periodic instructions to add extra swaps of the bells, in order to extend the plain course to the desired length. Most of the band memorise the pattern traced out by their bell in the plain course, the 'blue line', but the conductor also has to memorise the order of calls to make the attempt reach the desired number of changes.

As mentioned, the attempt on the 29<sup>th</sup> is intended to be 10080 changes of Stedman Triples, so each unique change will be rung exactly twice, and will take over 7 hours, and so is equivalent to running 2 marathons, one after the other.

The bells at St.Peter's are a scale in C Major, with the lightest bell weighing 350kg and the heaviest bell weighing 2000kg. There is one ringer per bell, and there are no breaks or exchanges during the attempt, so (for example) the ringer of the tenor will be ringing that 2 tonne bell for over 7 hours without a break, and with all of the band ringing the method with no (significant) mistakes over the 7+ hours. If they manage it, it will be the longest ringing event yet rung on these bells.

Long-lengths have been rung at other towers. There have been a few heavier long-lengths, with the heaviest being at Southwark Cathedral in 1998, where the tenor weighs 2477kg, and was 12675 changes, on 12 bells. There have also been longer long-lengths rung, including 17280 changes at St.Cuthbert's, Prospect in 1994, on 8 bells, and 40320 changes at the Loughborough Bell Foundry, UK, 1963, also on 8 bells.

Most ringers consider peal-ringing a significant achievement. It takes a special sort of crazy ... ummm ... dedication to the art ... to want to attempt a long-length.

## Stedman Triples

	1	2	3	4	5	6	7	8		
38	2	1	3	5	4	7	6	8		①
18	2	3	1	4	5	6	7	8		
78	3	2	4	1	6	5	7	8		
38	2	3	4	6	1	7	5	8		
18	2	4	3	1	6	5	7	8		
38	4	2	3	6	1	7	5	8		
	4	3	2	1	6	5	7	8		
	3	4	2	6	1	7	5	8		
	4	3	6	2	7	1	5	8		
	4	6	3	7	2	5	1	8		
	6	4	3	2	7	1	5	8		
18	6	3	4	7	2	5	1	8		⑦
	3	6	4	2	7	1	5	8		
	3	4	6	7	2	5	1	8		
	4	3	7	6	5	2	1	8		
	3	4	7	5	6	1	2	8		
	3	7	4	6	5	2	1	8		
	7	3	4	5	6	1	2	8		
	7	4	3	6	5	2	1	8		
	4	7	3	5	6	1	2	8		
	7	4	5	3	1	6	2	8		
	7	5	4	1	3	2	6	8		
	5	7	4	3	1	6	2	8		
	5	4	7	1	3	2	6	8		④
	4	5	7	3	1	6	2	8		
	4	7	5	1	3	2	6	8		
	7	4	1	5	2	3	6	8		
	4	7	1	2	5	6	3	8		
	4	1	7	5	2	3	6	8		
	1	4	7	2	5	6	3	8		
	1	7	4	5	2	3	6	8		
	7	1	4	2	5	6	3	8		
	1	7	2	4	6	5	3	8		
	1	2	7	6	4	3	5	8		
	2	1	7	4	6	5	3	8		
	2	7	1	6	4	3	5	8		

	2	7	1	6	4	3	5	8		
	7	2	1	4	6	5	3	8		③
	7	1	2	6	4	3	5	8		
	1	7	6	2	3	4	5	8		
	7	1	6	3	2	5	4	8		
	7	6	1	2	3	4	5	8		
	6	7	1	3	2	5	4	8		
	6	1	7	2	3	4	5	8		
	1	6	7	3	2	5	4	8		
	6	1	3	7	5	2	4	8		
	6	3	1	5	7	4	2	8		
	3	6	1	7	5	2	4	8		
	3	1	6	5	7	4	2	8		②
	1	3	6	7	5	2	4	8		
	1	6	3	5	7	4	2	8		
	6	1	5	3	4	7	2	8		
	1	6	5	4	3	2	7	8		
	1	5	6	3	4	7	2	8		
	5	1	6	4	3	2	7	8		
	5	6	1	3	4	7	2	8		
	6	5	1	4	3	2	7	8		
	5	6	4	1	2	3	7	8		
	5	4	6	2	1	7	3	8		
	4	5	6	1	2	3	7	8		
	4	6	5	2	1	7	3	8		⑤
	6	4	5	1	2	3	7	8		
	6	5	4	2	1	7	3	8		
	5	6	2	4	7	1	3	8		
	6	5	2	7	4	3	1	8		
	6	2	5	4	7	1	3	8		
	2	6	5	7	4	3	1	8		
	2	5	6	4	7	1	3	8		
	5	2	6	7	4	3	1	8		
	2	5	7	6	3	4	1	8		
	2	7	5	3	6	1	4	8		
	7	2	5	6	3	4	1	8		
	7	5	2	3	6	1	4	8		

	7	5	2	3	6	1	4	8		
	5	7	2	6	3	4	1	8		⑥
	5	2	7	3	6	1	4	8		
	2	5	3	7	1	6	4	8		
	5	2	3	1	7	4	6	8		
	5	3	2	7	1	6	4	8		
	3	5	2	1	7	4	6	8		
	3	2	5	7	1	6	4	8		
	2	3	5	1	7	4	6	8		
	3	2	1	5	4	7	6	8		
	3	1	2	4	5	6	7	8		
	1	3	2	5	4	7	6	8		
	1	2	3	4	5	6	7	8		