



# THE HOT SPRINGS OF BATH

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The city of Bath holds in its centre a geological feature unique within the UK in the form of three naturally forming 'hot' thermal springs. These springs have been named the King's Spring, the Hetling Spring and the Cross Bath Spring. Collectively, the springs displace about 1,250,000 litres of water per day, or 15 litres per second. The water temperatures are typically between 45° and 46°C when they reach the surface, but can range from 41° to 47°C. It is thought that the springs first formed in Bath between 200,000 and 500,000 years ago.

The formation of the Bath hot springs is primarily due to the properties of the rock types present in the area. The features of these rocks allow them to be either highly permeable (can store and transmit water) and/or are prone to fracturing, through which water can flow. These properties allow water to transmit easily through the rock, picking up minerals on its way to become a mineral-rich spring.

There is some debate surrounding the exact source of the water that supplies the hot springs of Bath. The most widely accepted theory is that rain that fell on the Mendips Hills thousands of years ago has infiltrated and percolated through the Carboniferous limestone rock outcrop in this hilly region south of Bath, before descending deep underground through this outcrop of limestone to a depth of at least 2.5km. Then, the water makes its way back to the surface through fractures and faults in the rock and emerges where erosion has brought the Carboniferous limestone to the surface, which happens to be where the centre of the city of Bath is today. Figure 1 shows the process that forms the three Bath springs.

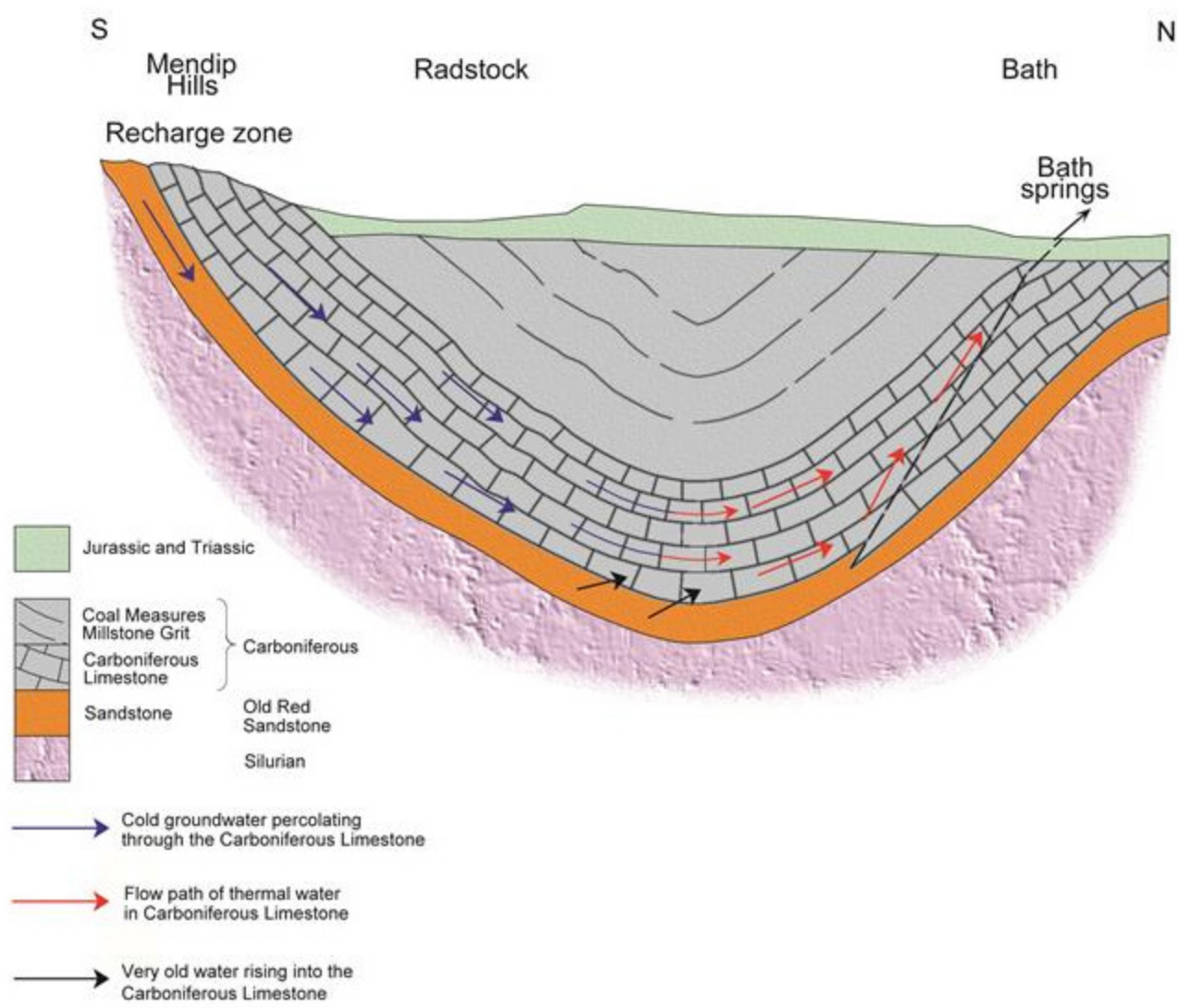



Fig 1. Path of water through Carboniferous Limestone to form hot springs in Bath (Groundwater UK)



It is only when the water has reached the deeper parts of its course through the limestone that it is heated to temperatures of between 64° and 96°C. While it is not exactly known how the water is heated up to such high temperatures, it is widely accepted by scientists who have researched the surrounding geology of the area that the heating occurs from the rocks at great depth (geothermal heating), and most likely occurs at the deepest part of the water's journey. Another reason that the hot springs of Bath are so unique is because they are limited to such a small area, within 150 metres of each other. This is highly unusual, and it is thought that this is due to multiple geological events occurring in this area (which in combination have produced the hot springs in such a small confinement).

Not only do the hot springs make Bath unique in a geological sense, they were also an important factor in shaping Bath into the city it is today. During the Iron Ages (around 1st century AD), the Dobunni tribe were present in this area of the UK and it is thought that they built a temple near the hot springs to the goddess Sulis. This goddess represented curative powers and the tribe felt these mineral springs were sacred to this goddess.

When the Roman empire stretched into Britain, they named the settlement Aquae Sulis, and dedicated a bathing house complex to their goddess Minerva or Sulis Minerva. This is where the city gets the name Bath from. These bathing houses were built around the year 75AD and used the water from the hot springs, becoming a popular European destination for healing and socialising for centuries. Nowadays, the baths have been preserved as the Roman Baths and are an important part of the local and tourist culture for the city.


The baths fell into ruin after the collapse of the Roman Empire. According to legend, the hot springs themselves were re-discovered during the 9th century by Celtic prince Bladud, who found that his severe leprosy was cured from bathing in the mineral-rich waters of the springs. It is said that Bladud dedicated a temple near the springs to the goddess Sul, who was the Celtic goddess of medicine amongst other things.

By the 18th century, there were reports of the waters having the ability to cure a plethora of ailments, specifically rheumatic and skin conditions. This eventually led to the establishment of the Royal Mineral Water Hospital in the city. Nowadays, bathing in the untreated spring waters is not permitted due to the presence of pathogens in the water, but the city is still strongly connected to the springs culturally, through the Thermae Spa and the Roman Baths museum.

It is possible to see how the geological features that make Bath unique have actually contributed to how the area has been used over the past few thousand years, and how the people who have passed through this space have interacted with the natural features very closely. Therefore, the geology of this landscape (the Bathscape) has shaped the formation and cultural associations of the city of Bath, creating a city with a close relationship with its landscape.

## ABOUT THE AUTHOR

Rebecca is a Geography graduate who has lived in Bath for over 15 years. She has a keen interest in understanding our complex relationship with the natural environment.





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