



# Mohammed Karaji

The eastern world has always been an important place of learning. This was especially true in the tenth century. It was a time of many new ideas and new achievements. In the Middle East, the studies of math and science were especially important. Scientists were honored. The people valued new knowledge.

One important area of knowledge came from the Persians. They made discoveries about water beneath the ground. Such water is called **groundwater**. It is water that has seeped through the soil and flows slowly beneath the ground surface. Groundwater is different than a river. You cannot see groundwater until it comes to the surface as a spring.

One Persian scientist named Mohammed Karaji lived during this time. He wrote a book called *The Extraction of Hidden Waters*. Extraction means “pulling out.” His book was especially important because of where he lived. The Middle East does not have a great deal of water that is easy to reach. Knowing how to find water in such areas is very valuable knowledge.

↓ The Mustansiriyah School in Iraq is the first-known university in the world. It was established early in the thirteenth century.



↑ Karaji studied at learning centers like the Library of Hulwan in Baghdad.

Baghdad is now in →

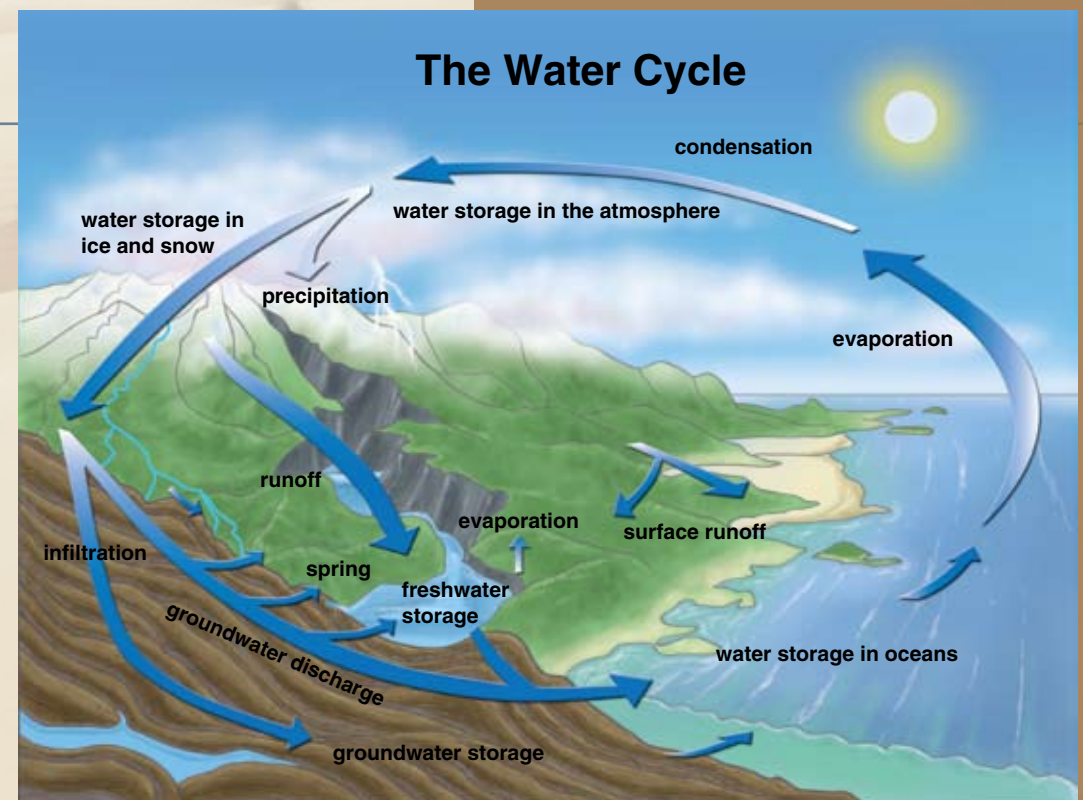


↓ Europeans learned of Karaji’s techniques through trading centers like Enisala in Romania.



Karaji spent most of his life working in Baghdad. He was mainly a mathematician. He wrote many books on math topics. When he was much older, he needed to make some extra money. He decided to write and publish a book about water. This book shows that Karaji had a deep understanding of groundwater. In the western world, this knowledge wasn't gained for nearly 700 more years!

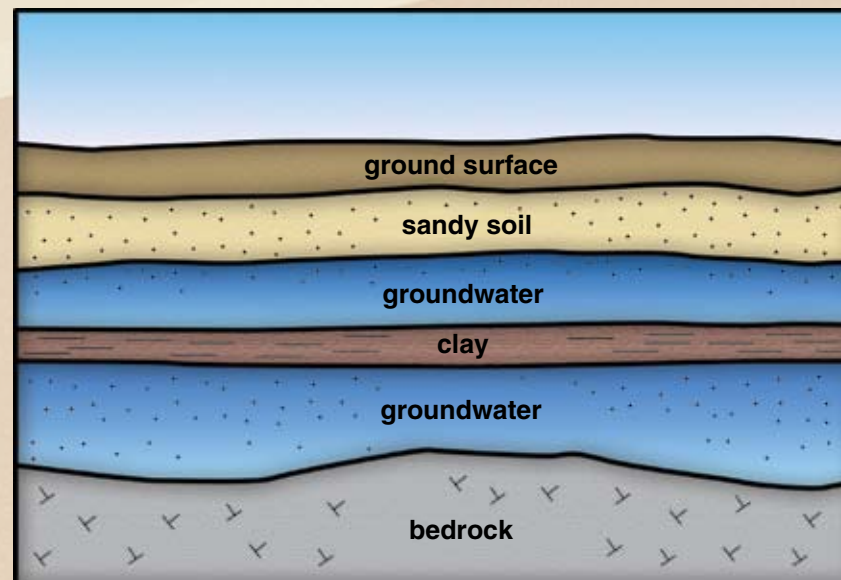
Karaji's book shows that he was familiar with the main ideas of the water cycle. In his book, he tells about each part of the cycle. He also shows a strong understanding about soil and the best places to find **freshwater**. He knew how water moves underground. He also invented new and brilliant ways to dig underground and find water. The methods he figured out are still in use in many parts of the world.



Karaji's book is the oldest known book on groundwater. The information in the book is mostly the same as what scientists know today to be true.

← Karaji's methods are still used today.

Areas with groundwater are really layers of soil and rock through which water flows. →



## The Water Cycle

Water on Earth is always on the move. It's moving from one place to another and one form to another. Water is **evaporated** from the ocean and from the land. It forms clouds in the sky. It falls to Earth as rain, snow, sleet, and hail. It runs off into rivers, streams, and lakes. It seeps into the ground. Living things use it for many purposes. Eventually, the water flows back to the ocean and the process starts again. This is called the water cycle.

