

When Jules Verne wrote *Journey to the Center of the Earth* in 1864, there were many conflicting theories about the nature of the Earth's interior.

Some geologists thought that it contained a highly compressed ball of incandescent gas, while others suspected that it consisted of separate shells, each made of a different material.

Today, well over a century later, there is still little direct evidence of what lies beneath our feet.

Most of our knowledge of the Earth's interior comes not from mines or boreholes, but from the study of seismic waves - powerful pulses of energy released by earthquakes.

The way that seismic waves travel shows that the Earth's interior is far from uniform.

The continents and the seabed are formed by the crust - a thin sphere of relatively light, solid rock.

Beneath the crust lies the mantle, a very different layer that extends approximately halfway to the Earth's center.

There the rock is the subject of a battle between increasing heat and growing pressure.

In its high levels, the mantle is relatively cool; at greater depths, high temperatures make the rock behave more like a liquid than a solid.

Deeper still, the pressure is even more intense, preventing the rock from melting in spite of a higher temperature.

Beyond a depth of around 2,900 kilometers, a great change takes place and the mantle gives way to the core.

Some seismic waves cannot pass through the core and others are bent by it.

From this and other evidence, geologists conclude that the outer core is probably liquid, with a solid center.

It is almost certainly made of iron, mixed with smaller amounts of other elements such as nickel.

The conditions in the Earth's core make it a far more alien world than space.

Its solid iron heart is subjected to unimaginable pressure and has a temperature of about 9,000oF.

Although scientists can speculate about its nature, neither humans nor machines will ever be able to visit it.