

The Many Facets of Salt



Salt. It's so common, we hardly think about it.

But salt is a vital ingredient—for the function of our nerves, muscles, and organs.

Humans used to get their salt from eating wild meat. But as we began to rely on agriculture, adding salt to our diets became more important.

For cultures that lived near the sea, getting salt was easy. But the farther inland humans lived, the more salt became a scarce commodity.

Wars were fought over access to it. And salt mines, when they were discovered, were strategic resources.

Salt reserves form when seas dry up and their salt is left behind as thick layers.

Salt is different than any other sediment layer: it flows like glaciers at Earth's surface and forms giant salt domes underground.

As early as 3500 BC, a salt reserve was found in Poland. It became a center of commerce, and eventually the city of Kraków was built on top of it.

By AD 1200, miners had dug the mine more than 1,000 ft down, to include nearly 2,000 chambers. The miners began to build religious chapels in them, especially where there had been accidents.

The grandest chapel has furniture, statues, and even chandeliers, all carved from salt. The chapels are now a UNESCO World Heritage Site, so if you're ever in Kraków, be sure to observe a quiet, if not salty, moment.

The chapel of St. Kinga, carved out of thrustured Miocene evaporites below Kraków, Poland. Even the chandeliers are made of salt crystals.

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Background: The Many Facets of Salt

Synopsis: Salt has been a symbol of power and wealth since the beginning of recorded history. Where deposits of salt were found, mines flourished for millennia. An especially rich deposit of salt occurs below the city of Kraków in southern Poland, with a vast network of subterranean tunnels and shafts, some of which have been converted into chapels and art galleries made entirely of salt.

- Human history is built around those tiny cubic white grains in your saltshaker.
 - We humans must have salt in order for our nerves, muscles, and internal organs to operate, but too much salt can create life-threatening chemical imbalances.
 - Historically, we got the salt we needed from hunting meat, but when we became an agricultural society, we had to supplement our food with salt.
 - Food preservation also depended on salt, so explorers and armies could not travel without it; military power depended on access to salt, and bitter wars were fought over control of salt resources.
- Salt is a remarkable mineral made up of sodium and chloride: NaCl.
 - Salt, perfectly cubic crystals formed from the evaporation of salt water, is usually layered with other evaporates like gypsum and sylvite.
 - Unlike most other types of sediment, salt changes shape and becomes mobile if it is subjected to enough pressure. It is also buoyant.
 - When it is compressed during mountain building, salt can provide a flexible layer along which stiffer rocks can slide, fold, and fault.
- Salt at the Wieliczka (veel-eetch-ka) Salt Mine of Miocene time (13.6 million years ago) accumulated in an inland sea as the Carpathian Mountains were forming.
 - The salt, caught up in the final stages of mountain building, was doubled in thickness by faults below the area that is now metropolitan Kraków, Poland.
 - Salt was exploited as early as mid-Neolithic times (3500 BC), but earliest records date from AD 1044, when Benedictine monks tapped saline springs and wells.
 - Rock salt was discovered in 1288. Millions of tons of salt were chipped by hand to excavate mine workings as deep as 1,000 ft, with a total length of more than 200 miles on seven operational levels, including about 2,000 chambers.
 - Gallery roofs were supported by salt pillars and neat stacks of logs, which fueled fires triggered by leaking methane. Crawling miners carrying torches burning on the end of long poles courageously ignited methane pockets in gallery ceilings.
 - Three thousand maps of the salt mines dating back to 1638 have survived.

References: The Many Facets of Salt

Jackson, M. P. A., and Hudec, M. R., 2017, Salt Tectonics: Principles and Practice: Cambridge, Cambridge University Press, 514 p.

[A Brief History of Salt | Time Magazine](#)

[Mine of the Past and of Today | Wieliczka-saltmine.com](#)

[Wieliczka Salt Mine | Wikipedia](#)

[Poland's Majestic Underground Salt Cathedral | Catholic News Agency](#)

Contributors: Drs. Martin Jackson and Mike Hudec (UT Austin), Juli Hennings, Harry Lynch



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- Chapels were carved into abandoned galleries by miners so they would have places of worship—especially where tragic accidents had occurred.
 - The chapel of St. Kinga is the most magnificent.
 - It lies about 330 ft underground and measures about 5,000 sq ft.
 - The chapel contains salt statues and furniture carved from rock salt over a period of 70 years, starting in 1896, and is lit by chandeliers that support chains of salt crystals.
 - It features magnificent bas-relief carvings of the Nativity, the Last Supper, and the Crucifixion on its 36-ft-high walls.
 - Salt chambers from the mine are also used as a health resort and hospital for respiratory patients.
- The mine now yields 230,000 tons of salt a year from saline seeps but runs at a loss because the main purpose of mining is to keep underground flooding—which used to occur every century—at bay.
- Without constant stemming of leaks and infilling of mined-out chambers, salt pillars would dissolve and chambers would eventually collapse beneath Kraków.
- The Wieliczka Salt Mine is now a UNESCO World Heritage Site that you can visit in southern Poland.



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