

**OLDER THAN GOLD- SALT-
ALL YOU EVER WANTED TO KNOW-
AND PROBABLY MORE**

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Mr. President, Mr. Secretary, members of the society. During the past two opportunities I've had to address this assembly I chose as the subject, the California Gold Rush of 1849, and its subsequent effect on the state and the nation. As you recall, gold is a mineral, and this evening my subject is also a mineral, but in the scheme of things, one more valuable and important to mankind's well-being than gold. The subject of this evenings paper is entitled, "Older than Gold - Salt - all you ever wanted to know - and probably more".

The story of salt is complex and fascinating as well as very old, and its complete telling would require many hours to fully appreciate its global impact on man. Now before your eyes glaze over, let me say that as Fox News does when they announce "Around the world in 80 seconds", this presentation will go around selected countries of the world in about 30 minutes.

On your tables you will note salt shakers. It is doubtful there is a table anywhere where food is served that doesn't contain some type of salt container. Your table salt probably contains additive, iodine, for thyroid health, to ward off goiters. This block in my hand is 99.9% pure salt, and is from what was once a 50 pound block used for animal feed.

Salt is a chemical term for a substance produced by the reaction of an acid with a base. When sodium, an unstable metal that can suddenly burst into flames, reacts with a deadly poisonous gas known as chlorine, it becomes a staple food, sodium chloride, from the only family of rocks eaten by humans. There are many salts, and a number of them are edible and often found together, but the one we most like to eat is sodium chloride, which has the taste that we call salty. Other salts contribute unwelcome bitter or sour tastes, though they may also be of value to the human diet. Baby formula contains three salts: magnesium chloride, potassium chloride, and sodium chloride.

Chloride is essential for digestion and in respiration. Without sodium, which the body cannot manufacture, the body would be unable to transport nutrients or oxygen, transmit nerve impulses, or move muscles, including the heart. An adult human being contains about 250 grams of salt, which would fill three or four salt shakers, but is constantly losing it through bodily functions. It is essential to replace this lost salt.

A French folktale relates the story of the prince who declares to her father, "I love you like salt," and he, angered by the slight, banishes her from the kingdom. Only later when he is denied salt does he realize its value and therefore the depth of his daughter's love. Salt is so common, so easy to obtain, and so inexpensive that we have forgotten that from the beginning of civilization until about 100 years ago, salt was one of the most sought-after commodities in human history.

Ernest Jones, a Welsh psychologist and friend of Sigmund Freud published an essay in 1912, about the human obsession with salt- a fixation that he found irrational and subconsciously sexual. To support his theory, he cited the curious Abyssinian custom presenting a piece of rock salt to a guest, who would then lick it.

Jones states, "That in all ages, salt has been invested with the significance far exceeding that inherent in its natural properties, interesting and important as they are. Homer called it a divine substance, Plato described it as especially dear to the Gods, and we shall presently note the importance attached to it in religious ceremonies, covenants, and magical charms. That this should have been so in all parts of the world and in all times, shows that we are dealing with the general human tendency, and not within the local custom, circumstance or notion".

"Salt", Jones argued, "is often associated with fertility". This notion may have come from the observation that fish, living in the salty sea, have far more offspring than land-based animals. Ships carrying salt tended to be overrun by mice, and for centuries it was believed the mice could reproduce without sex, simply by being in salt.

Jones further built his case: "Celibate Egyptian priests abstained from salt because it excited sexual desire; in Borneo, when Dayak tribesmen returned from taking heads, the abstinence from both sex and salt was required; when a Pima killed an Apache, both he and his wife abstained from sex and salt for three weeks. In Behar, India, Nagin women, sacred prostitutes known as "wives of the snake god", periodically abstained from salt and went begging. Half their proceeds were given to the priests and half to buying salt and sweetmeats for the villagers".

Jones bolstered his argument by turning to Freud, who eight years earlier has asserted, “that superstitions were often the result of attaching great significance to an insignificant object or phenomena because it was unconsciously associated with something else of great importance”.

“Would not all this attention to salt the inexplicable”, Jones argument goes, “unless we were really thinking of more important things-things worthy of an obsession? Jones concludes, “There is every reason to think that the primitive mind equates the idea of salt, not only with that of semen, but also with the essential constituent of urine.”

Jones was writing in an age with a thirst for scientific explanations. And it is true that semen and urine- along with blood, tears, and sweat, and almost every part of the human body-contain salt, which is a necessary component in the functioning of cells. Without both water and salt, cells would not get nourishment and would die of dehydration.

In perhaps a better explanation for the human obsession with this common compound is the one offered a few years later in the 1920s, by the Diamond Crystal Salt Company of St. Clair, Michigan, in a booklet, “101 uses for Diamond Crystal Salt.” This list of uses included keeping the colors bright on boiled vegetables; making ice cream freeze; whipping cream rapidly; getting more heat out of boiled water; removing rust; cleaning bamboo furniture; sealing cracks; stiffening white organdy; removing spots on clothes; putting out grease fires; making candles dripless; keeping cut flowers fresh; killing poison ivy; and treating dyspepsia; sore throats and ear aches.

Far more than 101 uses for salt are well-known. The figure often cited by the modern salt industry is 14,000, including the manufacturing of pharmaceuticals, the melting of the ice from winter roads, fertilizing agricultural fields, making soap, softening water, and dyeing textiles.

Modern scientists argue about how much salt an adult needs to be healthy. Estimates range from two-thirds of a pound to more than 16 pounds each year. People, who live in hot weather, especially if they do physical labor, need more salt because they must replace the salt that is

lost in sweating. This is why West Indian slaves were fed salted food. But if they do not sweat excessively, people who eat red meat appear to derive from it all the salt they need. The Masai, nomadic cattle herders and East Africa, meet their salt needs by bleeding livestock and drinking the blood. But vegetable diets, rich in potassium, offer little sodium chloride. Wherever records exist of humans in different stages of development, as in 17th- and 18th-century North America, it is generally found that hunter tribes neither made nor traded for salt but agricultural tribes did. On every continent, once human beings began cultivating crops, they began looking for salt to add to their diet. How they learned of this need is a mystery. A victim of starvation experiences hunger, and so the need for food is there. Salt deficiency causes headaches and weakness, then light-headedness, then nausea. If the deprived long enough, the victim will die. But at no time in this process is a craving for salt experienced. However, most people choose to eat far more salt than they need, and perhaps this urge—the simple fact that we like the taste of salt—is a natural defense.

An important development that created a need for salt was the move to raise animals for meat rather than kill wild ones. Animals also need salt. Wild carnivores, like humans, can meet their salt needs by eating meat. While herbivores forage for it, and one of the earliest ways humans searched for salt was to follow animal trails. Eventually they all lead to a salt lick or a brine spring or some other source of salt. But domesticated animals need to be fed salt. A horse can require five times the salt intake of a human, and a cow needs as much as 10 times the amount of salt a human requires.

Where people ate a diet consisting largely of grains and vegetables, supplemented by the meat of slaughtered domestic farm animals, procuring salt became a necessity of life, giving it great symbolic importance and economic value. Salt became one of the first international commodities traded; its production was one of the first industries, and invariably, the first state monopoly.

The search for salt has challenged engineers for millennia and created some of the most bizarre, along with some of the most ingenious, machines. A number of the greatest public works ever conceived were motivated by the need to move salt. Salt has been in the forefront of the development of both chemistry and geology. Trade routes that have

remained major thoroughfares were established, alliances built, empires secured, and revolutions provoked—all for something that fills the ocean, bubbles up from springs, forms crusts in lake beds, and thickly veins a large part of the earth's rock fairly close to the surface.

Almost no place on earth is without salt. But this was not clear until revealed by modern geology, and so for all of history until the 20th century, salt was desperately searched for, traded for, and fought over. For millennia, salt represented wealth. Caribbean salt merchants stockpiled it in the basements of their homes. The Chinese, the Romans, the French, the Venetians, the Hapsburgs, and numerous other governments taxed it to raise money for wars. Soldiers and sometimes workers were paid in salt. It was often used as money.

In his 1776 treatise on capitalism, *The Wealth of Nations*, Adam Smith pointed out that almost anything of value could be used for money. He cited as examples tobacco, sugar, dried cod, and cattle and stated that “salt is said to be a common instrument of commerce and exchanges in Abyssinia.”

Chinese salt history begins with the mythical Huangdi, the Yellow Emperor, who invented writing, the bow and arrow, the cart, and ceramics. According to legend, he also had the distinction of presiding over the first war ever fought for salt.

One of the earliest verifiable salt works in prehistoric China was in the northern province of Shanxi. In this arid region of dry yellow earth and desert mountains is a lake of salty water, Lake Yuncheng. This area had known constant warfare, and all of the wars were over control of the lake. Chinese historians are certain that by 6000 B.C., each year, when the lake's waters evaporated in the summer sun, people harvested the square crystals on the surface of the water, a system the Chinese referred to as “dragging and gathering.”

The earliest written record of salt production in China dates to around 800 B.C., and tells of production and trade of sea salt a millennium before. It described putting ocean water in clay vessels and boiling it until reduced to pots of salt crystals. This was the technique that was spread throughout southern Europe by the Roman Empire, 1,000 years after the Chinese account was written.

About 1,000 B.C. iron first came into use in China, though the first evidence of it being used in salt making is not until 450 B.C. Where it was believed that salt was made by boiling brine in iron pans, an innovation which would become one of the leading techniques for salt making for the next 2,000 years.

More than a gastronomic development, the salting of fowl and especially of fish was an important step in the development of economies. In the ancient world, the Egyptians were leading exporters of raw foods such as wheat and lentils. Although salt was a valuable commodity for trade, it was bulky. By making a product with the salt, a value was added per pound, and unlike fresh food, salt fish, well handled would not spoil. The Egyptians did not export great quantities of salt, but exported considerable amounts of salted food, especially fish, to the Middle East. Trade in salted food would shape economies for the next four millennia.

About 800 B.C., when the Phoenicians first settled on the coast of what is today to Tunisia, they founded a seaport, Sfax, which still prospers today. Sfax became, and has remained, a source of salt and salted fish for the Mediterranean trade.

Inland from the port of Sfax are dried desert lake beds where salt can be scraped up in the dry season. This technique, the same as was used thousand of years ago on Lake Yuncheng in China, and referred to as “dragging and gathering”, was the original Egyptian way of salt gathering.

The Egyptians made salt by evaporating seawater in the Nile Delta. They also procured some salt from Mediterranean trade. They clearly obtained salt from African trade, especially from Libya and Ethiopia. And they also had their own desert of dried salt lakes and salt deposits. It is known that they had a number of varieties of salt, including a table salt called “Northern salt,” and another called “red salt”, which may have come from a lake near Memphis.

Long before 17th-and 18th-century chemist began identifying and naming the elements of different salts, ancient alchemists, healers, and cooks were aware that different salts existed, with different tastes and

chemical properties that make them suitable for different tasks. The Chinese had invented gunpowder by isolating saltpeter, potassium nitrate. The Egyptians found a salt that, though they could not have expressed it in these terms, is a mixture of sodium bicarbonate and sodium carbonate with a small amount of sodium chloride. They found this salt in nature in a wadi, a dry riverbed, some 40 miles northwest of Cairo. They called the salt Natron. Natron is found in "white and red," though white natron is usually gray and red natron is pink. The ancient Egyptians referred to natron as "the divine salt." And it was used extensively in the preparation of bodies placed in tombs, those royal mummies.

The Fezzan region, an area in southern Libya, had contact with Egypt and the Mediterranean. And by the third century B.C., Fezzan was noted for its salt production. Fezzan producers had moved beyond simply scraping salt from the crusts. The crust was boiled until fairly pure crystals had been separated, and then they were molded into three-foot-high white tapered cylinders. Traders then carried these oddly phallic objects, carefully wrapped in straw mats, by caravan across the desert. Salt is still made and transported the same way today in parts of the Sahara.

Because a profitable salt shipment is bulky and heavy, accessible transportation has always been the essential ingredient in salt trade. In most of Asia, Europe, and the Americas, waterways have been the solution. Salt was traded either through seagoing ports, or by a sprawling river system. But in the African continent, where a wealth of salt was located in the wadis and dry lake beds of the waterless Sahara, another solution was found—the camel.

The earliest known journeys across the Sahara, in about 1,000 B.C., were by oxen and then by horse-drawn chariots. Trans-Saharan commerce existed in ancient times, but crossings were rare events until the third century A.D., when the camel replaced the horse. Once the domestic camel made its Sahara debut, its use spread quickly. By the middle ages, caravans of 40,000 camels carried salt from Taoudenni to Timbuktu, a 435-mile journey taking as long as one month. Since then, continuing to this day, caravans of camels have moved bulk goods across the Sahara to western and central Africa. As salt moved south, gold, kola nut, leather and cotton from Hausaland, in present-day

Nigeria, was traded north. Later, products for Europe, including acacia gum, which was needed for fabric sizing, and melegueta pepper, the seeds an orange West African fruit that were a Renaissance European food craze, were also brought north. Slaves, too, were taken on this route and even at times traded for salt.

The city of Taghaza in the Western Sahara was a city built of salt. Taghaza is imagined as a sparkling white city, but it was swept by Saharan sands, and the pockmarked salt turned a dingy gray. Though it's salt construction impressed travelers, salt blocks were the only material available for building, and Taghaza was probably a miserable work camp, inhabited mostly by the slaves forced to work it, who depended completely on the arrival of caravans to bring them food.

In Taghaza, salt was quarried from near the surface in 200-pound blocks loaded on camels, one block on each side. The powerful animals carried them 500 miles to Timbuktu, a trading center because of its location on the northernmost crook of the Niger River, which connects most of West African. In Timbuktu, the goods of North Africa, the Sahara, and West Africa, was exchanged, and the wealth from trade built a cultural center. Timbuktu became a university town, a center of learning. But to the locals back at Taghaza, salt was worth nothing except as a building material. They lacked everything but salt.

It is said that in the markets to the south of Taghaza salt was exchanged for its weight in gold, which was an exaggeration. The misconception comes from the West African style of silent barter. In the gold-producing regions of West Africa, a pile of gold would be set out, and a salt merchant would counter with a pile of salt, each side altering their piles until an agreement was reached. No words were exchanged during this process, which might take days. The salt merchants often arrived at night to adjust their piles and leave unseen. They were extremely secretive, not wanting to reveal the location of their deposits. From this it was reported in Europe that salt was exchanged in Africa for its weight in gold. But it is probable that the final agreed-upon two piles were never equal weight.

And to the north in Europe, in 1666, the Salzburg Chronicle described the following incident:

“ In the year 1573, on the 13th of the winter months, a shocking comet-star appeared in the sky, and on the 26th of this month a man, 9 hands spans in length, with flesh, legs, hair, beard and clothing in a state of non--decay, although somewhat flattened, the skin a smoky brown color, yellow and hard like codfish, was dug out of the Tuermberg mountain 6,300 shoes lengths deep, and was laid out in front of the church for all to see. After awhile, however the body began to rot and was laid to rest.”

He was found by salt miners in the Durnberg mountain mine near the Austrian town of Hallein, a name which means “salt work,” near Salzburg, which means “salt town.” The perfectly preserved body, dried and salted “like codfish,” was that of a bearded man with a pickax found near him, evidently a miner, wearing pants, a woolen jacket, leather shoes, and a cone-shape felt hat. The bright colors of the patterned clothing-plaid twill with brilliant red- were striking, not only because how well the salt conserved the colors but also because Europeans were not thought of as a people dressed in such a flaming palate. In 1616, a similar body had been found in nearby Hallstatt, which also means “Salt town”.

Inside these alpine mountains of salt, the weight of the rock overhead causes walls to shift, opening cavities and closing up shafts. Water running over the rock salt turns to brine, which then crystallizes, sealing over cracks. Three prehistoric miners have been found, trapped in their dark ancient worksites, and many tools, leather shoes, clothes in their original bright colors-the oldest color preserved European textiles ever found-leather sacks for hauling rock salt on their backs, torches made of pine sticks bundled together and dipped in resin, and a horn, possibly used to warn of cave-ins-all well preserved in salt. The bodies were dated to 400 B.C., but some of the objects found in the remains of the log cabin thatched- roof village on the mountainside may date back to 1,300 B.C.

The colorfully dressed salt miners of Hallein were Celts. As were the mummies found in the 1990’s near the Tarim Basin, west of Tibet, between China and Central Asia along the Silk Road, the principal trade route between the Mediterranean and Beijing. It was the road of Marco Polo, but these people had lived more than three millennia earlier, about 2,000 B.C. As with the early Egyptian burials that are

1,000 years older, the corpses have been preserved by the naturally salty soil.

The condition of the bodies and their bright colored clothing was spectacular. The men wore leggings striped in blue, yellow, and crimson. They appeared to be tall with blonde light brown hair, sometimes red beards, and the women's hair woven in long blond braids. These unknown people were in appearance notably similar to the large blue-eyed blonde Celtic Warriors described by the Romans almost two millennia later. The conical felt hats and twill jackets bore a close resemblance to those of the salt miners in Hallein and Hallstatt—not unlike the much later plaids of the Scottish Highlands. The red- and -blue pinstripes were almost identical to fabrics found in the Durnberg mine. Textile historian Elizabeth Wayland Barber concluded that even the weave was nearly identical workmanship. Why Celts might have been in the salty desert of Asia many centuries before there were known to be Celts, remains a mystery.

In the centuries when the Celtic culture was documented, beginning 1,300 years after these seemingly Celtic bodies were buried in Asian salt, they did trade and travel great distances, usually selling salt from their rich central European mines. Like the Egyptians, they learned it was not as profitable to trade and transport salt as salted foods.

According to the Greeks and Romans, who not only wrote about Celts but traded Mediterranean products for their salt and salt products, Celts ate a great deal of meat, both wild and domesticated. Salted meat was a Celtic specialty.

Mining and archaeological digs in the vicinity of Hallstatt, Hallein, and the Durnberg mines has revealed a society living off of salt mining, secluded on remote and rugged mountains at an altitude of 3,000 feet, and yet trading to the far ends of the continent.

To continue this discourse on salt, allow me to say that among the ancients, as with ourselves, Sol and Sal, the Sun and salt were known to be two things essential to the maintenance of life. Soldiers, officials, and working people were paid either wholly or in part in salt, which was in such general use for this purpose that any sum of money paid for labor

or service of whatever kind was termed a salarium, or salary, that is, the wherewithal to obtain one's salt.

Although used as barter from the earliest times, the use of common salt as a condiment is hidden in the mazes of antiquity. There is abundant proof that it was highly esteemed as a seasoner or food long before the Christian era. In a Greek translation of a Phoenician author, who is said to have lived before the Trojan War, the discovery of the uses of salt is attributed to certain immediate descendents of Noah, one of whom was his son Shem.

The earliest biblical mention of salt appears to be in reference to the destruction of Sodom and Gomorrah. When King Abimelech destroyed the city of Shechem, an event which is believed to have occurred in the 13th century B.C., he is said to have "sowed salt on it," this phrase expressing the completeness of its ruin. It is certain that the use of salt as a relish was known to the Jewish people at a comparatively early period of their history. For in the sixth chapter of the book of Job occurs this passage "Can that which is unsavory been eaten without salt?"

Owing to its antiseptic and preservative qualities, salt was emblematic of durability and permanence; hence the expression "Covenant of Salt." it was also a symbol of wisdom, and in this sense was doubtless used by St. Paul when he told Colossians that their speech should be seasoned with salt.

Cicero in his treatise on Friendship, wrote that age increased the value of friendships, even as it improved the quality of certain wines; and he added further that there was truth in the proverb, "Many pecks of salt must be eaten together to bring friendship to perfection."

Pythagoras said that salt was the emblem of justice; for as it preserves all things and prevents corruption, so justice preserves whenever it animates, and without it all is corrupted. He therefore directed that a salt cellar should be placed upon the table at every meal, in order to remind men of this emblematic virtue of salt.

In olden times bread and salt were reckoned the simplest and most indispensable articles of diet, and were offered to guests as a guarantee

of hospitality and friendliness. The universal reputation of salt as a symbol of good-will is shown in the proverbs and current sayings of many nations.

Among the Jews the covenant of salt is the most sacred possible. Even at the present time, Arabian princes are wont to signify their ratification of an alliance by sprinkling salt upon bread, meanwhile exclaiming, "I am the friend of thy friends, and the enemy of thine enemies" So likewise there is a common form of request among the Arabs as follows: "For the sake of the bread and salt which are between us, do this or that."

In a treatise on the "Dignity and Utility of Salt," this mineral is likened in value to the four elements recognized by the ancients, - earth, air, fire, and water; and indeed, on account of its importance to the maintenance of health in the animal economy, salt has been termed a "fifth element." So highly did the Thracians of old prize this commodity that they bartered slaves in exchange for it, whence originated the phrase, *Sale emptum mancipium*.

In eastern countries it is a time-honored custom to place salt before strangers as a token and pledge of friendship and goodwill. The phrase "to eat some one's salt" formally signified being in that person's service, and in this sense it is used in the Book of Ezra, where the expression "we have maintenance from the king's palace," means literally, "we are salted with the salt of the palace," which implies being in the service of the king. And from the idea of being in the employment of a master and eating his salt, the phrase in question came to denote faithfulness and loyalty.

Macrobius wrote in the fifth century A.D., that the ancients did not consider themselves as either welcome or safe at a banquet unless the salt and the shrines of their gods were placed upon the table; the former indicating a cordial greeting, and the latter being a guarantee of protection.

Salt currency was in use in Africa in the Sixth century; and Marco Polo wrote that salt was a common medium of exchange among certain Asiatic peoples in the 13th century. In Tibet, pieces of salt shaped in a mold and weighing about half pound each, served as small change;

eighty such pieces were equal in value to fine gold worth about three dollars.

In the region of Accra on the coast of Guinea, salt is said to rank next to gold in value. And West African tribes whose members use the phrase "flavoring one's food with salt," implies the possession of wealth.

Salt and bread, representing the necessities of life, are the first articles taken into the dwelling of a newly married pair in Russia. And in Pomerania, at the close of a wedding breakfast, a servant carries about a plate containing salt, upon which the guests place presents of money.

Among the peasants of the Spanish province of Andalusia the word "salt" is synonymous with gracefulness and charm of manner, and no more endearing or flattering language can be used in addressing a woman, whether wife or sweetheart, than to call her "the salt-box of my love." The phrase "May you be well salted," is also current as an expression of affectionate regard.

Gypsies sometimes used bread and salt to confirm a solemn oath. A member of a gypsy band in western Hungary had been robbed of money, and so informed his chief, who summoned the elders of the camp to counsel. On an upright cross formed of two poles was placed a piece of bread sprinkled with salt, and upon this each gypsy was required to swear that he was not the thief. The real thief, refusing to take so solemn an oath was thus discovered.

In Russia there is a superstitious prejudice against helping one's neighbor to salt at table on account of the liability to quarrels thereby incurred. For in so doing one is thought to have the air of implying, "Well, you have received your allowance of salt, now go away." But if in proffering the salt one smiled amicably, all danger of a quarrel is happily averted, and the act is wholly relieved of its ominous character.

In many lands however, it is only common courtesy to help a friend to salt at table. But in Italy this delicate attention was formally thought to be a mark of undue familiarity, and when salt was offered by one gentleman to the wife of another, it was a sufficient cause for jealousy and even quarrel.

The custom of placing salt upon the table before all else is thought to have originated in the ancient conception of this substance as the symbol of friendship; and indeed no banquet, however elaborate, was complete without it. The salt was, moreover, the last article to be removed from the hospitable board.

It was as though our forefathers thereby intended that the guests, seeing salt on the table, might realize that they were "invited in love and were loved before they came," and the fact that it was allowed to remain after the other dishes had been removed might serve to remind them that while feasts, like many other good things, come to an end, love and friendship may be perpetual.

From an early period until the close of the 17th century, the rank of guests at a banquet in wealthy households, as in the halls of country Squires in England, was indicated by the situation of their places at table with reference to the massive silver center pieces which contained the salt, sometimes called the "salt-vat" or "salt-foot".

At the head of the table which was called the board's end, and "above the salt," sat the host and his more distinguished guests; and during the reigns of Henry VII and VIII, it was enjoined upon the ushers to see that no person occupied a higher place than he was entitled to. Probably no penalty was imposed upon guests who unwittingly selected a more honorable seat than their rank warranted, other than removal to a lower position. But in the less civilized era of the 11th century, the laws of King Canute provided that any person sitting at a banquet table above his position should be "pelted out of his place by bones, at the discretion of the company, without the privilege of taking offense".

In the houses of the well-to-do farmers along the Scottish peasantry in the latter part of the 18th century, a linen cloth was sometimes spread over the upper portion of the dinner table, where sat the farmer and the members of his family. Quite commonly however, a chalk line divided this end of the board from the lower portion where the hired laborers were seated; and in the more pretentious households the salt-dish served as a boundary.

Pagans were wont to sanctify or hallow their tables by setting salt-cellars thereon. For owing to the fact the salt was employed at every sacrifice as an offering to the gods, and owing moreover to its reputed divine attributes, receptacles containing salt were also held sacred. Indeed, the salt-cellar partook of the nature of the vessel, associated with the temple in general, and more particularly with the altar.

The Romans considered salt to be a sacred article of food, and it was a matter of religious principle with them to see that no other dish was placed upon the table before the salt was in position. A shell served as a receptacle for salt on the table of the Roman peasant, but at the repast of the wealthy citizen the silver salt-cellar, which was usually an heirloom, was placed in the middle of the table; and the same custom prevailed in England in medieval times.

In medieval England the chief salt-cellar was sometimes in the form of a silver ship, thus suggesting both the briny deep and the craft which sails thereon.

In the year 1243, King Henry III, ordered 20 silver salts. And in the room containing the crown jewels in the Tower of London, are to be seen 11 magnificent golden salt-cellars, the oldest dating from the reign of Elizabeth. Of these, the so-called state salt-cellar, which is a model of the White Tower, was presented to King Charles II, by the city of Exeter, and was used at coronation banquets.

And finally, regarding customs of the table, the Honorable Horace Walpole published an account of the formalities observed at the "setting" of Queen Elizabeth's dinner table, as described by a German traveler who was present on such an occasion. After the tablecloth has been spread two gentlemen appeared, one bearing a rod and the other having a salt-cellar, a plate, and bread. After kneeling three times with the utmost reverence, they placed these three articles upon the table and withdrew. Later in the ceremony came an unmarried lady dressed in white silk, and a matron carrying a tasting-knife. The former, having thrice prostrated herself, approached the table in the most graceful manner, and rubbed with bread and salt the plates provided for the guests. After this the yeomen of the guard, clad in scarlet, and each with a golden rose upon his back, entered bare-headed, bringing a course of four-and-twenty dishes. In households of the English nobility

a similar custom prevailed. A rhythmical code of instructions to servants of the 15th century required that the salt should always be the first article placed on the festive board after the cloth was laid.... .

Well now gentlemen, let me present you with some facts closer to home.

The United States is both the largest salt producer and the largest salt consumer. It produces over 40 million metric tons of salt a year, which earns more than \$1 billion in sales revenue. The production leaders, behind the United States, in order of importance are China, Germany, Canada, and India. France has fallen to eighth place and the United Kingdom to ninth.

But little of this is table salt. In the United States, only 8% of salt production is for food. The largest single use of American salt, 51% is for deicing roads.

American salt sources are many and varied. The Great Salt Lake, which is the fourth largest lake in the world without an outlet, produces salt, some by Morton. Cargill operates a rock salt mine 1,200 feet below the city of Detroit. It covers more than 1,400 underground acres and has 50 miles of road. The mine began with a disaster. In 1896, a 1,100 foot shaft was sunk, but became flooded with water and natural gas, killing six miners and losing the investors their money. Subsequently, in 1907s the mine was successfully restarted.

Cargill also operates a salt mine on Avery Island, Louisiana. The McIlhenny and Avery families of Tabasco fame, lease the salt mine to Cargill, and the oil and gas to Exxon, and still make the pepper sauce themselves.

After one post- Civil War failure, salt mining began in earnest on Avery Island in 1898. Cargill took over in 1997. The current operation can mine nineteen tons of salt in a minute and a half and takes in 2.5.million tons a year. Down in the mine more equipment is seen than actual miners. Bulldozers, tractors, jeeps, pickups, trucks, train carts, tracks, and other equipment are brought down piece by piece in a 5 by 7 by 10foot shaft elevator and assembled in the mine. Below, it looks like a busy night time construction site. A scaler, a huge machine that

resembles a brontosaurus, steadily munches away at the white walls. When equipment is no longer useful, it is not considered cost effective to take it apart and bring it back up, so the mine leaves a trail of abandoned equipment, a junkyard on the side of some of the wide checks. Salt mining has always been like that. The mules lowered by rope underneath Detroit never came back up either.

One of the older miners said that his father had worked 52 years under Avery Island, carrying salt blocks and loading them on mules. Today the salt is trucked to crushers that break it into small enough pieces for the conveyor belts to move the salt to barges that carry it along the bayou and up the Mississippi River. A barge holds 1,500 tons of salt.

The mine is dug in rooms called benches that are 60 feet by 100 feet with 28 foot ceilings. Once a bench is mined, a new road is dug through the floor down to another level and another bench. The salt dome that is being mined is a column of solid sodium chloride, crystal clear, thought to be 40,000 feet deep-almost eight miles. The floors, the walls, the ceiling, and the uncut depths below are all between 99.25 and 99.9 percent pure. Under the miner's lamps the benches appear to be black rooms. But a freshly cut bench, without the soot of machinery, is crystalline white, a room of pure salt crystal.

The vehicles are all four wheel-drive, because the salt floor is as slippery as ice. Driving jeeps and trucks deep in the earth is like driving through a snow blizzard, at night. But it is darker than night. "It's so dark it hurts your eyes," one miner said.

The mine is currently operating at a depth 1,600 feet, and with 38,400 feet to go, it might seem that this salt dome is an inexhaustible resource. But as the miners dig, to withstand added stress from the weight above them, the benches must be made smaller. Another problem is that salt is a good conductor of heat. The earth gets hotter closer to its center, and as they dig deeper into the earth the temperature will rise from the current 90 degrees. The heat will require more ventilation and more efficiency in machine-cooling systems. Also, the conveyor belt will get longer and longer. So the deeper they go, the more expensive the salt becomes, and salt must be cheap to be

profitable. It is thought that the dome will offer another 40 or 50 years of cost-effective mining, but that is a guess.

In nearby New Iberia, a town canalled by bayous and draped in swaying moss, Avery Island salt used to be the salt of Cajun food. Ted Legnon's father was a salt worker on Avery Island and he brought home blocks of salt for a locally made sausage called boudin and for currying meat. Now, Ted is a butcher, and he still makes boudin, though he uses Morton's and not local salt.

One pound of salt is used for 250 pounds of boudin, along with ground pork meat, pork liver, cooked rice, onions, bell peppers, and powdered cayenne pepper. It is all stuffed in hog's intestines and gently poached. Legnon's Butcher Shop in New Liberia sells 300 pounds of boudin per day, except between Christmas and New Year's, when sales rise to 500 pounds per day.

In recent years, scientists and engineers have been drawn to the ability of the salt mines to preserve, because they usually have a low and steady humidity, and if not drilled too deep, and even, cool temperature. Also, salt seals. Crystals will grow over cracks. This was how the Celtic bodies had been sealed in the mine at Hallein. It is also why soy sauce makers formed a crust of salt on the top of the barrel, to make a perfect seal.

In March 1945, American troops passing through the German town of Merkers discovered a salt mine 1,200 feet underground. In it was 100 tons of gold bullion, twenty-nine rows of sacks of gold coins, and bales of international currency, including 2 million U.S. dollars. They also found more than 1,000 paintings, including Raphael's and Rembrandts. Among the booty were things of little value, such as the battered suitcases of people deported to concentration camps. The total value of the treasures preserved in the perfect stable environment of a salt mine, was estimated at \$3 billion in 1945 dollars.

Because of the sealing ability of salt, it has also occurred to engineers that salt mines might be the safest place to bury nuclear waste. A Carlsbad, New Mexico, mine is being prepared for plutonium-contaminated nuclear waste that will remain toxic for the next 240,000

years. Salt will close over fractures come but how do we warn people 100,000 years from now not to open the mine? What language can be used? Suggestions include a series of grimacing masks

The U.S. government has also stored an emergency reserve of petroleum in salt domes throughout the Gulf of Mexico area. The idea of the strategic oil reserve was first proposed in 1944. In the 1970s, it was decided to store at least 700 million barrels of oil in a select few of the 500 salt domes that been identified in southern Louisiana and eastern Texas. But, ominous for the nuclear waste program, the domes don't always seal. The Two Weeks Island salt dome, not far from Avery Island, was part of the U.S. Strategic Petroleum Reserve until signs of water leakage led to fears of flaws in the dome. The oil was pumped out and the dome abandoned.

Fashionable people are now divided into two camps. One is passionate about being healthy and eating less salt, the other is passionate about salt. The argument has been continuing since ancient times between those who think salt is healthy and those who think it is unhealthy. They both may be right. Unarguably, the body needs salt. A great deal of research indicates a relationship between high blood pressure and cardiovascular problems and eating large quantities of salt. The Yellow Emperors Classic of Internal Medicine, a Chinese book from the first or second century A.D., warned that salt can cause high blood pressure, which can lead to strokes. Not coincidentally, one of the fatal symptoms of salt deficiency is low blood pressure. But there are also studies that refute a link between high salt intake and high blood pressure. Some studies even indicate that low-salt diets are unhealthy. The kidneys store excess sodium, and in theory someone with healthy kidneys could eat excess of salt with impunity. Sweating and urination, by design, relieve the body of salt excesses. The problem lies in the balance of sodium and potassium. But it seems that an imbalance cannot be adjusted simply by eating more or less potassium-rich vegetables versus sodium-rich salt.

The theoretical debate continues, but clinical evidence shows that people who consume large quantities of salt are not as healthy as those who don't.

Meanwhile, fashionable chefs are cooking with more salt-or more noticeable salt. It has become stylish to serve food on a bed of salt, cook it in a crust of salt, and make it crunchy with lots of large crystals. More than 1,000 years ago, the Chinese were cooking in a salt crust. Chicken cooked in a crust of salt is an ancient recipe attributed to the Cantonese, but may have originated with a south China mountain people known as the Hakka. Today, fish is cooked this way in Italy, France, Spain, and many other places. Even a fish farmer with a small restaurant by the Dead Sea in Israel cooks fish in a salt crust. The salt seals, in the same way that cooking in clay does, but it does not make the fish or chicken salty. French chefs sometimes leave the fish unscaled to avoid salting flesh.

After thousands of years of struggle to make salt white and of even grain, affluent people will now pay more for salts that are odd shapes and colors. In the late 18th century, British Captain James Cook reported that the Hawaiians made excellent salt. However, he complained that on the island of Atooi, today known as Kauai, the salt was brown and dirty. The cause of this was a tradition of mixing the salt with local volcanic red clay, alaea, which is brick red from high iron content. Cook did not seem to understand that this “dirty salt” was not intended to be table salt. The salt was made for ritual blessings and religious feasts. It was also used to preserve marlin and as a medicine, especially for purification during periods of fasting. But today this dirty salt, “alaea red salt,” is widely available, sought after by fine chefs and would-be gourmets.

And now gentlemen, let me bring this saga of salt to a close, as I will require a second presentation to fully discuss its importance and impact in the development of these United States since our declaration of independence.

Today, thousands of years of coveting, fighting over, hoarding, taxing, and searching for salt appears picturesque and slightly foolish. The 17th-century British leaders who spoke with urgency about their dangerous national dependence on French sea salt seem somehow more comic than contemporary leaders today concerned over dependence on foreign oil. As always, in every age, people are certain that only the things they have deemed valuable, have true value.

In closing, allow me to tell you that Frank Nash called me earlier this week to say he had read I would be presenting this evening, and voiced his regret that he would be at his time share on the beach in South Carolina and would miss this educational experience. Therefore, considering that other members might also be committed this evening, I have prepared a compact disk that contains the entire text of my presentation and can be read by using Microsoft Word. As always, this disk was prepared at no expense to the Society and will self destruct within 15 seconds after viewing.

Thank you.

Sources/References:

- 1. Salt: A World History, by Mark Kurlansky, Published by Walker and Company, New York, Copyright 2002**
- 2. WWW. Various web sites**