February 2006 Gemstone of the Month: Amber

This month's "mineral" is not a mineral at all, but a fossilized tree resin that is correctly classified as an organic nonmineral. Our specimens come from the classic Lithuanian amber locality on the southern coast of the Baltic Sea. Among the oldest of all gem materials, amber has a remarkable origin and a history and lore as rich as the golden colors of amber itself.

PHYSICAL PROPERTIES

Chemistry: Consists primarily of varying amounts of carbon, oxygen and hydrogen. (Not a mineral.)
Class: Organic nonminerals
Crystal System: None, amorphous structure.
Habits: Usually occurs in nodular form; also pulverulent (powder-like).
Color: Usually amber, brown-yellow, yellow-brown, yellow, golden, and orange; sometimes blackish-brown, brown, colorless, white, orange and reddish; rarely blue and green.
Luster: Resinous
Transparency: Transparent to opaque
Streak: White
Cleavage: None
Fracture: Tough to brittle, with conchoidal fracture
Hardness: 2.0-2.5
Specific Gravity: Average 1.05-1.15; as low as 0.95 with many included air bubbles.
Luminescence: Fluorescent
Refractive Index: 1.54
Distinctive Features and Tests: Best field indicators are softness; lack of crystal structure; very low specific gravity (floats in saline solutions); conchoidal fracture; nodular form; emission of a resinous, pine-like odor when burned.
Dana Classification Number: 50.0 Although amber is not classified as a mineral, it is included in the Dana mineral-classification system. Amber's Dana number of 50.0 is a general grouping of organic, nonmineral materials (50) that have not been assigned formal classification numbers (0).

NAME

Pronounced "AM-burr," the word derives from the Middle English *ambre*, which in turn stems from the Arabic *'anbar*, meaning "ambergris," a waxy, organic substance of somewhat similar appearance produced by certain whale species.

Other names for amber include "ambar," "ambroid," "ambroita," "chryselectrum," "copalite," "bernstein," "lyncurium," "lynx stone," "resinite," "scoopstone," and "sapstone." Amber's many variety names are based on colors, properties, localities, methods of recovery, and even the names of individuals associated with amber-mining ventures. In the Baltic region alone, amber has more than 200 folk names and 80 variety names, including "beckerite," "bone amber," "delatynite," "flom," "foamy amber," "gedanite," "gedano-succinite," "glessite," "kranzite," "schraufite," "succinite," and "stantienite." Variety names from other regions include "allingite," "almashite," "amabrite," "amekit," "burmite," "chemawinite," "hachettite," "loban," "retinite," "Mexican retinite," "rumanite," "simetite," and "valchorite."

COMPOSITION, FORMATION & OCCURENCE

By definition, a mineral is a naturally occurring, homogenous solid, usually of inorganic origin, having a definite chemical composition and an ordered crystalline structure. Amber is not classified as a mineral because it lacks both a definite chemical composition and a crystal structure. Technically, amber is an

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organic nonmineral—a natural substance of organic origin that satisfies neither the definition of a mineral nor that of a mineraloid (a mineral-like material such as opal that lacks a crystalline structure).

Amber is best described as an oxygenated hydrocarbon of variable composition and having an amorphous structure. It consists primarily of carbon (C), oxygen (O), hydrogen (H), and trace amounts of other elements. On average, amber contains about 80 percent carbon, 11 percent hydrogen, and 9 percent oxygen, percentages that can vary widely. Amber's description as a fossilized tree resin is valid only if the usual definition of the term "fossilized" is expanded. While most fossils are created through mineral replacement or molded impressions, amber is formed through the entirely different chemical process of molecular polymerization.

Amber is an alteration product of tree resin. The term "resin" refers generally to a large group of solid or semisolid organic materials of vegetable origin. Although resins vary widely in chemical composition, color, and fragrance, all are mixtures of organic acids, sugars, and esters (hydrocarbon compounds usually formed by the reactions of acids and alcohols with elimination of some hydrogen and oxygen as water). All resins also contain isomeric (unlinked) hydrocarbon compounds called terpenes, which are the key to amber's formation. Various tree species exude resins primarily as a defense mechanism against fungal or insect attack, or as a by-product of growth processes, a form of desiccation control, a reaction to physical injury, or a means of attracting insect pollinators.

Newly exuded resin is soft and tacky, and is exuded onto a tree's external surfaces, with lesser amounts deposited internally within the wood. Fossilization begins immediately, as the most volatile terpenes begin to evaporate. Next, the less-volatile terpenes begin to slowly polymerize, linking together to form molecular chains, a process that homogenizes and organizes the molecular structure to make the resin harder. Atmospheric oxygen, however, prevents further fossilization by causing the resin surface to oxidize, crack, and slough off as fine particles, leading to the rapid disintegration of the entire resin mass.

For resin to eventually become amber, further fossilization must occur within an anaerobic environment (one devoid of free oxygen). When buried in an anaerobic environment for thousands of years, the resin transforms first to copal (pronounced "KO-pul," or "ko-PAHL" in regional variations), a subfossil or partially polymerized resin similar to amber in color and appearance. Like amber, copal takes a high polish, but because it is only partially polymerized, it lacks amber's chemical stability. Copal's remaining volatile terpenes continue to evaporate, causing its surface to "craze" over time into a dense network of deep cracks. A drop of alcohol or similar hydrocarbon solvent will make a copal surface tacky, but will not affect an amber surface. Copal also melts at 350 degrees F., considerably below the melting point of amber, which is 480° F.

When anaerobically buried for long periods of time, terpenes will continue to evaporate or polymerize. Fossilization then progresses beyond the copal stage, and the resin will eventually become true amber. This process of evaporation and polymerization is a continuum, with no definite limits between what constitutes resin and copal, or copal and amber.

While amber is not rare, most occurs in small, scattered deposits. The formation of large, concentrated amber deposits requires specific conditions. First, dense forests must produce quantities of resins suited for fossilization. Then a drainage system must transport both resin and trees, concentrating them in shallow basins with high rates of sedimentation to assure anaerobic burial. These original deposits sometimes erode away, enabling the amber to reconcentrate in secondary deposits, usually in marine sediments near ancient coasts.

The oldest known fossil resins are said by scientists to be about 320 million years old. Because of the nature of the original resins exuded by primitive trees, these early fossil resins occur only as tiny fibers and differ chemically and physically from amber. The first true ambers originated as tree resins exuded some 230 million years ago during the Triassic Period of the Mesozoic era. Only during the more recent Cretaceous Period (65 million to 135 million years ago) of the Mesozoic Era, did resin-exuding trees thrive in sufficient numbers to produce the resin necessary for the fossilization of large quantities of amber. Paleontologists classify amber into two groups: Mesozoic amber, from resins produced 65 million to 240 million years ago, and Tertiary amber, from resins produced 20 to 65 million years ago. Paleobotanists are not yet certain which specific tree types produced amber-forming resins.

Inclusions in amber usually consist of such small animals and plant and animal parts as pollen, seeds, spores, wood fragments, leaves, flowers, insects, spiders, scorpions, bird feathers, and even small lizards. Because of its tackiness, newly exuded tree resin is a natural trap for such objects. But for preservation to occur, resin must be exuded in layers to completely cover the trapped objects. From the moment they are covered, the resin's hygroscopic sugars begin drawing away water to desiccate the object. Should this resin eventually become amber, the detail preserved in the inclusions, from internal and external organs and muscle fibers to individual cells, is remarkable.

Because amber consists primarily of polymerized hydrocarbons, it will burn in air, emitting a characteristic, pleasant, pine-like or resinous odor. Amber melts at about 480 degrees F. When rubbed with cloth, amber takes on a strong electrostatic charge. Because of its low density (average specific gravity 1.05-1.15), amber sinks in fresh water, but floats or is neutrally buoyant in highly saline seawater—the reason it collects on marine beaches. Amber's density varies primarily with the number of included air bubbles. The number and size of air-bubble inclusions also determine the degree of transparency. Amber with few air bubbles is generally transparent, while that with millions of tiny air bubbles is translucent or opaque. Accordingly, transparent amber is usually denser than translucent or opaque amber. Also, because of more complete polymerization, older, Cretaceous ambers are a bit harder than younger Tertiary ambers. Amber tends to craze after long periods of time, with severity depending upon the particular type of amber and its storage conditions.

Amber is usually found as nodules in irregular, rounded shapes ranging in size from tiny particles to masses weighing many pounds. Rounding results from mechanical wear incurred during deposition processes. While the average size of recovered amber nodules is perhaps only an inch, pieces a foot long and weighing 10 to 20 pounds are not uncommon. The largest known piece of amber weighs 150 pounds and measures four feet in length.

COLLECTING LOCALITIES

Although amber is widely distributed, major concentrations are uncommon. Fewer than 20 amber occurrences worldwide have ever been mined. The world's greatest amber source is a 125-mile-long section of the Baltic seacoast extending from Gdansk (Danzig) and the Vistula spit and lagoon in Poland to the Sambian (or Samland) Peninsula of Russia and on to the Curonian spit and lagoon of Lithuania. Baltic amber is also found along the Skanör shore in Skåne, Sweden; the German and Dutch coasts; and the eastern coasts of Denmark, England, and Scotland. Other European sources include Austria, where amber occurs at Wilhelmsburg, St. Pölten, Lower Austria, and at Sittenburg in the Saualpe Mountains of Carinthia. Amber with unusual red, blue, and green coloration is collected along the Simeto River near Catania on the Italian island of Sicily.

In Asia, amber occurs at Shymkent on the Southern Kazakhstan Oblast' (peninsula), Kazakhstan; at the Fushun coal mine near Liaoning, Manchuria, China; at Kuji in the Iwate Prefecture of northern Honshu

Island, Japan; along the beaches of the Taimyr Peninsula on the Arctic coast of Siberia, Russia; and at the Merit Pila coal mine in Sarawak Province, Borneo, Indonesia. Fine amber, including a very valuable, transparent red variety called “Burmite”, is mined at Maingkwan in the Hukawng Valley, Kachin State, Myanmar (Burma). In the Middle East, amber is collected at various sites in Israel, Lebanon, and Syria, most notably at Jezzine and Dahr-al-Baidha, Lebanon.

North America’s biggest source of amber was discovered in the 1940s in the mountains north of Santiago in the Dominican Republic on the island of Hispaniola. It is still mined today. Amber is also mined near San Cristóbal de las Casas in Chiapas state in southern Mexico. Canada claims the world’s northernmost amber deposits on Ellesmere and Axel Heiburg islands in the Arctic Ocean.

In the United States, amber is found in clay pits near Malvern and Peria, Hot Spring County, Arkansas; at Coffee Bluff, Hardin County, Tennessee; and near Alpine in Brewster County and Eagle Pass in Maverick County, Texas. In southern New Jersey, amber occurs at Vincentown in Burlington County, Harrisonville in Gloucester County, Sayerville and South Amboy in Middlesex County, and the Shark River near Belmar in Monmouth County. New York City’s Borough of Staten Island was an important amber source in the late 1800s. A significant amber deposit is also located near Goldsboro, Johnston County, North Carolina. In Wyoming, amber is associated with the Wyodak coal deposits in Campbell County and the Hanna Basin coal deposits in Hanna County.

JEWELRY & DECORATIVE USES

Despite its softness (Mohs 2.0-2.5) and tendency to eventually craze, amber was among the first materials ever used as a gemstone, and still serves extensively as a gemstone and decorative material today. Apart from its pleasing colors, amber is especially appealing because, unlike mineral gemstones, it is very light and warms quickly in the hand. Even multi-strand necklaces with large amber beads are lightweight. With the exception of faceted gems, amber has been fashioned into every imaginable gem and decorative form, including beads, pendants, cameos, intaglio, cabochons, bas-relief panels and tiles, inlay, figurines, chalices, and religious icons. The preferred colors for amber in jewelry vary by geographic region. In North America, warm, transparent yellow-oranges are favored. But Europeans prefer lighter yellows, while Asians favor richer orange-reds.

Worked amber is sometimes enhanced to improve its appearance. Amber enhancement dates back to Roman times, when clouded amber was immersed in oil and slowly heated, a process still in use today. The oil filled the tiny air bubbles near the surface to create an illusion of greater transparency. In another process, amber containing air bubbles is covered with hot sand. The trapped air expands, fracturing the adjacent solid amber into highly reflective, discoidal rings that add glitter and brilliance.

Amber is often processed into “ambroid.” In this process, small, otherwise unusable amber bits and chips recovered during mining or carving operations are heated in a vacuum (to prevent oxidation) to 400 degrees F. until soft, then compacted and cooled to harden into blocks. During this process, the amber can be dyed, usually to rich orange or red colors. Ambroid blocks are used in the mass-production of standard-form objects such as large beads or simple figurines. Although ambroid appears very similar to natural, solid amber, it does have faint but discernible flow lines created during the compacting process that are not seen in solid amber.

Amber is perhaps the most widely imitated of all gem materials. East African copal has been passed off as true amber since Roman times. In the 1800s, partially baked, synthetic industrial resins were used to imitate amber. Then, in the early 1900s, the introduction of synthetic polymers (plastics and related materials) provided unprecedented opportunity to mass-produce very realistic-looking amber imitations. The first synthetic polymer to imitate amber was Bakelite™, followed by cellulose acetate, cellulose nitrate, acrylic resins, and, today, polyester resins. Polyester resins imitate amber in every color; sometimes air bubbles and various tiny inclusions are added to the resin mix to further enhance the realistic appearance. Nevertheless, these imitations are easily differentiated from true amber by simple tests. When touched by a red-hot needle, true amber emits a pine-like, resinous odor, while polymer imitations emit the acrid smell of burning plastic. And, as explained previously, alcohol will quickly differentiate true amber from copal or baked industrial resins.

Mineral collectors place great value on amber nodules for display and study purposes, especially those with interesting or unusual inclusions. Many amber collections are specialized by color, type of inclusions, or geographic origin. Nodules are often polished to provide greater transparency and reveal their interiors. But even when acquiring polished but otherwise unworked amber specimens, buyers must beware, for very clever fakes, in which modern insects and other objects are encased in amber imitations made of treated or partially baked industrial resins, often reach the market.

HISTORY & LORE

Amber has been known since antiquity and has an extraordinarily rich history and lore. The oldest known amber artifacts, recovered from cultural sites in England, are about 11,000 years old, and were fashioned from Baltic amber that had washed onto English shores. Because of amber's abundance in the Baltic regions, it initially had no great local value. But in distant lands, amber's lightness, warm colors, pleasing appearance, and ability to take a high polish made it a valuable trade commodity. As one of the first items of long-distance trade, Baltic amber had already reached Greece by 600 B.C. The Greeks imagined amber to be the frozen tears of the gods. Later, the Greek biographer and moralist Plutarch (ca. 46-120 A.D.) wrote that amber formed from lynx urine, hence its Greek name, *lyncurium*. Well aware of amber's electrostatic properties, both the Greeks and the Romans believed that this attractive force drew misfortune away from the wearers of amber.

During the height of the Roman Empire, the most valuable trade items were Ethiopian ivory, Indian pepper spices, Chinese silk, and Baltic amber. During his reign, the Roman emperor Nero (Nero Claudius Caesar Drusus Germanicus, 37-68 A.D.) ordered his legions to find and control the source of Baltic amber. Once they succeeded, large shipments of amber soon regularly supplied Rome's large amber-carving industry.

Ancient China and Japan also made extensive use of amber. Amber is first mentioned in Chinese literature in 85 A.D. The Chinese quickly adapted their classic styles of jade carving to amber, working with material mined in Burma. Many early Chinese legends addressed the origin of amber; one cited burned bees' nests, another the petrified souls of tigers. Yet despite the many myths regarding fanciful origins of amber, both Europeans and Asians recognized amber's botanic origin by the end of the first century A.D.

According to modern metaphysical beliefs, amber removes energy blockages, strengthens the physical body, transmutes negative energy into positive energy, and instills an inner sense of warmth. Early physicians believed that amber beads worn as necklaces alleviated throat and neck pain, while amber bracelets eased the discomfort of rheumatism, arthritis, and general fatigue. Physicians also administered elixirs prepared from powdered amber to remedy respiratory, bladder, bowel, and heart disorders.

In 1998, amber was featured on the 600-franc postage stamp of Central Africa and on the 1125-franc stamp of the offshore African island nation of Comoros.

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TECHNOLOGICAL USES

Since the 1850s, large amounts of low-grade amber have been used as resin to make varnishes, shellacs, and lacquers. Manufacturers grind the amber to a fine powder, then mix it with varied amounts of hydrocarbon solvents to achieve the desired viscosity and drying characteristics.

The study of amber inclusions has greatly advanced the science of paleontology. The desiccated but otherwise intact life forms included within amber provide far greater detail of physiological and botanical features for paleontological study than is found in other type of fossils. For study, inclusions are first "exhumed," or cut free of their amber matrix with a very fine surgical saw. Still encased in thin walls of amber, the inclusions are then split open along a body wall, thus exposing the insects or plant parts for close study under optical or scanning electron microscopes. Because this is a destructive process, it is employed only with common types of inclusions.

Technical advances in the late 1980s enabled researchers to sequence the amino acids in protein nucleotides taken from fragmented DNA (*d*eoxyribo*n*ucleic *a*cid, the molecular basis of heredity in most organisms). In 1993, researchers extracted ancient DNA sequences from a 130-million-year-old weevil included in amber. In cases of genetic mutation, the comparison of DNA from modern and ancient species makes it possible to reconstruct the history of that particular lineage. Since then, DNA sequences have been recovered from leaves, fruit flies, wood gnats, fungus gnats, and leaf beetles, all included in amber. But because these DNA sequences are so fragmented, decades of work and greatly advanced technology will be needed to reconstruct complete genomes—entire DNA chains of particular organisms. Your plans to start your own Jurassic Park will have to wait! Researchers are also reviving ancient cysts and spores that have remained dormant and long-lived in the extreme desiccation conditions typical of amber.

ABOUT OUR SPECIMENS

This month's mineral—or in this case nonmineral—comes from one of the world's classic amber localities along the southern coast of the Baltic Sea in northern Europe. Amber localities are found along the Baltic coast from Sweden in the north to Latvia, Lithuania, Russia, Poland and Germany on the south and Denmark, England, and Scotland in the west. The greatest concentrations occur along the "Amber Coast," which includes parts of Lithuania, Russia, and Poland. Our specimens come from the Curonian Lagoon and Curonian Spit, Neringa, Neringa Rajonas (administrative district), Republic of Lithuania.

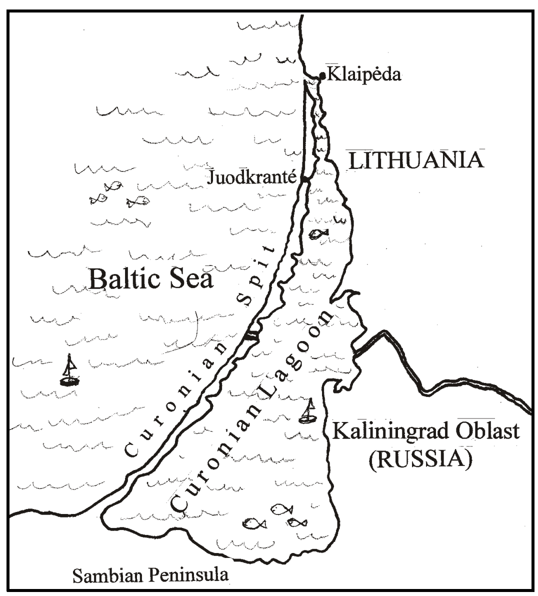

Figure 1. Curonian Lagoon map.

The 125-mile-long Amber Coast extends from the Lithuanian city of Kleipëda in the northeast to the Polish city of Gdańsk in the southwest. Moving southwest from Kleipëda, the Amber Coast includes the Lithuanian and Russian sections of the Curonian Spit, Russia's Sambian Peninsula, and Poland's Vistula spit and lagoon and adjoining parts. The most productive amber areas are the Curonian spit and lagoon and the adjacent Sambian Peninsula, as seen in the map in Figure 1. The Curonian Spit (Courland Spit on older maps) is a gently curving, narrow, 60-mile-long peninsula of sand dunes that parallels the Lithuanian and Russian mainland.

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A shallow bay called the Curonian Lagoon, separates the spit from the mainland. The northern half of the Curonian Spit is part of Lithuania, while the southern half belongs to Russia. The spit, which varies in width from one-quarter-mile to more than two miles, has Europe's largest sand dunes, some nearing a height of 180 feet. It originated some 5,000 yeas ago, when the forces of wind, waves, and tides began forming a series of sandy shoals. Since then, the continuing accumulation of sand has built up the present-day Curonian Spit, which is similar topographically to the "false coast" formed by North Carolina's Outer Banks.

Scientists believe the amber of the Curonian Spit originated as tree resins produced some 35 to 40 million years ago and 400 miles to the north in dense pine forests that than covered what is now southern Sweden and Finland. Vast numbers of pine trees thrived in the much warmer and wetter climates of the Oligocene and Eocene epochs, when many trees, along with their masses of exuded resin, were swept southward by large rivers coursing through major geological fault systems. Both trees and resin then accumulated in shallow, broad basins that were subject to heavy sedimentation. Rapid burial of the resin provided anaerobic conditions for eventual transformation into amber. Many millions of years later, after this resin had become amber, new rivers subsequently eroded away the original deposits, reburying the amber nodules downstream to form a secondary deposit at what is now the Amber Coast.

This secondary amber deposit is known today as the "blue-earth" ("blau Erde") stratum. It is named for its color (actually more green than blue), which is due to a concentration of greenish mica-group minerals that are not related to amber. On the floor of the Baltic Sea, sections of the blue-earth strata, now exposed and eroding away, are the source of the amber nodules that wash up in quantity on the beaches of the Curonian Spit and other parts of the Amber Coast. The blue-earth stratum extends from the floor of the Baltic Sea beneath the Curonian Lagoon, where it is rather shallow, and beneath the Sambian (or Samland) Peninsula, where it about 100 feet below the hills.

Paleolithic cultures first collected amber on the Baltic beaches about thousands of years ago, carving it into talismans and simple jewelry forms. Initially, Baltic amber was traded only regionally, but by 3000 B.C., it had reached the British Isles, Greece, Phoenicia, and Egypt. The amber trade reached its peak during Roman times. Although the fall of the Roman Empire sharply curtailed the trade, various Germanic cultures in northern Europe continued to produce exquisite amber carvings.

In medieval times, amber became the preferred material for rosary beads throughout Catholic Europe. Recognizing the growing demand for amber and the potential profits of the amber trade, the Teutonic Knights (Deutschen Ritter), a German-Roman Catholic military order, took control of the Baltic amber sources, establishing a mining and trading monopoly that would last for centuries. As amber prices rose steadily, controls became ever more stringent; by the year 1600, illegal (unlicensed) amber collecting on the Baltic beaches was punishable by death. By that time, hundreds of tightly controlled European and Russian guild workshops were busy carving amber into every conceivable shape to supply growing markets.

In the 1850s, when much of the Amber Coast was part of Prussia, fishermen made a fascinating discovery near the town of Juodkrantë on the northern end of the Curonian Spit. While untangling nets from a bottom snag, they recovered what is now known as the "Juodkrantë Amber Treasure." This included more than 400 amber amulets, figurines, and items of jewelry fashioned by craftsmen of the Neolithic Narva Culture some 5,000 years earlier.

About the same time that fishermen found the Juodkrantë Amber Treasure, geologists realized that the blue-earth stratum was the source of most Baltic amber. Until that time, amber had been collected only by hand-sorting beach gravels, digging shallow pits, or screening sediments scooped from the bottoms of the

Baltic Sea or the coastal lagoons. Than, in 1854, Curonian Spit innkeeper Friedrich Wilhelm Stantien (1817-1891) began using steam dredges to dig 35 feet beneath the bed of the lagoon to reach the amber-rich blue-earth stratum, a single cubic yard of which contained about two pounds of amber. Stantien, with 22 steam barges and a 1,000-person workforce, was soon dredging the beds of both the Curonian and Vistula lagoons. During 1868 alone, he recovered 185,000 pounds (92.5 standard tons) of amber—far more than had ever been recovered in a single year.

By 1870, Stantien had joined forces with local merchant Mortiz Becker (1830-1901). To eliminate the difficulties and production limitations of marine dredging, Stantien and Becker began digging a huge open-pit mine on the Sambian Peninsula near the town of Palmnicken (now Yanatarniy, Russia). When the mine reached the blue-earth stratum at a depth of 100 feet, annual amber production soared to a half-million pounds. Another record was set in 1895 when miners, working only with picks and shovels, recovered more than one million pounds (500 standard tons) of amber.

After issuing strict orders for workers to save all amber with insect inclusions, Stantien and Becker quickly amassed the first great and scientifically valuable collection of included Baltic amber. This huge collection attracted attention from paleontologists in both Europe and the United States, who documented all amber inclusions by type. Their results showed that insects comprised 88 percent of all inclusions, arachnids (spiders) 10 percent, other small life forms 1.5 percent, and plant parts 0.5 percent.

Mass mining also revealed a wide range of amber varieties. Ninety percent of all Baltic amber was found to contain about eight percent succinic acid (dicarboxylic acid, $C_4H_6O_4$), from which the variety name “succinite” originated. A variety lacking in succinic acid was called “gedanite.” Light-yellow amber that was softer than succinite was named “glessite.” Succinite itself had several sub-varieties. Pieces with froths of large air bubbles were called “foamy amber,” attractive pieces with a white-to-yellowish color caused by millions of microscopic bubbles became “bone amber,” and the intermediate variety was called “flom.” And two dull, opaque brown and near-black varieties were named “stantienite” and “beckerite,” after the world’s two greatest amber miners.

After the Palmnicken mines on the Sambian Peninsula were mechanized in the early 1920s, large steam shovels loaded railcars with amber-rich sediments from the blue-earth stratum. These railcars dumped the gravel onto processing screens to be washed with high-pressure water jets. Workers first collected large amber pieces by hand, then skimmed the small pieces that constituted the bulk of production from the surface of a muddy slurry. In 1925, the Palmnicken mines achieved their all-time, annual production record—1.2 million pounds (600 tons) of amber. Ten percent of that amber was suited for jewelry or decorative uses, or contained insect inclusions for the collector and scientific markets. The remainder was fractionally distilled into a variety of products, the largest being a quality varnish called amber colophony. Other products included amber oil, a light hydrocarbon compound used to manufacture special varnishes, along with small amounts of acetic, valeric, and butyric acids for chemical use.

Lithuania fell under the control of the Soviet Union in 1940 and World War II abruptly halted the Baltic amber-mining and amber-working industries. Post-war recovery was slow, largely because of resistance to Soviet control and resentment in seeing local amber fashioned into objects marked “Made in the USSR.” After the Soviet Union disbanded on January 1, 1992, Lithuania and Poland reestablished their independence, and their amber industries have since made a comeback. Several small amber-dredging operations now operate in the Curonian Lagoon in Lithuania and the Vistula Lagoon in Poland. Also, the open-pit mines in Yanatarniy, Russia, operated by the Kaliningrad Amber Industrial Complex and controlled by the state-owned Amber Combine, currently operate on a market-demand basis and produce about 300 tons of amber per year. Most of this amber is polished for use as gemstones and beads, rather than being made available to the specimen market.

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Today, the Curonian Spit is Lithuania's most popular resort area. In 1961, the original Curonian Spit towns of Alksyne, Juodkrantë, Pervalka, Preila, and Nida were administratively consolidated into Neringa which, with a length of 50 miles, ranks as the world's longest town. In 1992, the Lithuanian government designated much of the Curonian Spit a national park. Boating, summer swimming, and sightseeing are popular activities, as is searching the beaches after storms for pieces of Baltic amber. Many local shops feature amber jewelry and decorative objects. And in the Nida section of Neringa, the Amber Gallery of Kazimieras and Virginija Mizgariai is a museum with superb displays of natural and worked local amber, including artifacts from the Juodkrantë Amber Treasure.

Without question, the most spectacular creation ever made from Baltic amber was Russia's famed Amber Room. In 1701, King Frederick I of Prussia (1657-1713) ordered the construction of a banquet room lavishly decorated with panels consisting of 100,000 pieces of Baltic amber set into mosaics of floral designs and royal heralds. Then, to commemorate the Russo-Prussian Alliance of 1716, the Prussian government presented all the worked amber to Czar Peter I of Russia (Peter the Great, 1692-1725), who reestablished the Amber Room in the Ekaterininsky Palace in St. Petersburg. For the next half-century, master amber carvers from several Baltic nations contributed additional objets d'art that included small chests, candlesticks, tables and table settings, crowns, tabernacles, and crucifixes, all made of Baltic amber. Entering the Amber Room has been described as "stepping into a fairy tale."

But in 1942, invading Nazi forces dismantled the entire room and, under pretense of returning it to its rightful home (the amber had originated in Prussia) moved the priceless amber work to Köenigsberg (now Kaliningrad, Russia) on the Sambian Peninsula. Later, under the threat of Allied bombing, the amber was again moved, this time to become lost in post-war history. But in 1979, Russian artisans, working under Soviet control, began replicating the amber works from old Amber Room photographs, using amber mined at Yanatarniy and the Curonian Lagoon. In 1992, a major financial grant from the German firm Ruhrgas A.G. enabled the project to continue. The work was finally completed in 2003, when the new Amber Room reopened in the Tsarskoye Selo Museum in Tsarskoye Selo near St. Petersburg, Russia.

As was the case with December 2005's clinochlore specimens, it was the collapse of the Soviet Union in the early 1990's that set the stage for amber in quantity to reach the world market. With the Russians no longer controlling the Baltic amber supply, visitors to Lithuania had access to this unique material. A Hollywood producer/amber nut spent much time on location in Lithuania, making contacts, and gradually procuring a large collection of amber, sharing pieces with friends and children. He was the one who found us at a show and supplied our pieces from Neringa.

As always, we examined our specimens under ultraviolet light, noticing slight yellow fluorescence under shortwave light and a more intense fluorescence under longwave UV light. In our research, we could not find the cause for fluorescence in Baltic amber, though one reference suggested the presence of sulfur as the trigger. Our contact insists that each amber piece has small insects trapped inside, but in most cases a powerful microscope would be needed to observe them. Of course, amber with large, easily identifiable insects are much more valuable, out of our Deluxe- and Junior-size price range. We hope this overview will enhance your appreciation for one of the most prized natural materials on Earth!

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