

Coatings Xperience

The True Age of Painting

The paint and coatings industry formally began in the late 1860s with the first commercial sales of paints in reclosable metal cans. The introduction of this packaging technology made it possible to manufacture large quantities of paints and ship them to large numbers of different stores. Paint, of course, had been used for thousands of years prior to this commercial development. In fact, the first paints were applied to cave walls as much as 30,000 years ago.

Many places across the world have been found to contain prehistoric art, including paintings on cave walls, painted rocks, and carved and sculpted figurines. More than 200 cave sites have been identified in southern France and northern Spain alone. Other sites across Europe and Africa have been identified as well. Thousands of rock paintings have been discovered in northern Australia. Most experts believe numerous other sites remain hidden, buried under mountains of earth or lying deep beneath the sea.

The creators of these artworks were Cro-Magnon hunter-gatherers living in the Upper Paleolithic Period (35,000-12,000 B.C.). The shades of red, yellow, black, and brown found in their paintings are all derived from pigments based on carbon or mineral

oxides of iron and manganese. Limonites and hematites (ochres and siennas) provided for shades from reddish brown to straw. Manganese ore and charcoal were used for black.

Clay lumps containing iron oxide were most likely shaped into crayon-like sticks or made into a liquid paste after being ground with large animal bones. Analysis of paint samples has identified various binder materials including albumen, animal fat, blood, bone marrow, urine, vegetable juices, and water.

It appears that several methods were used to apply the paint to cave walls. Moss or fingers were likely used to smear and dab paint onto large areas. There is evidence that brushes made of horse hair, twigs, and feathers were used to make distinct marks or for blending. Spraying of paint was done either directly with the mouth or by blowing through hollow bones.

The predominant images in these Paleolithic cave paintings are those of animal figures—bison, cattle, horses—that were typically hunted by Cro-Magnon people. Caves at Lascaux, France (17,000 years old) and Altamira, Spain (12,000 years old) contain prime examples. The oldest paintings on record (about 32,000 years old), which are located at Grotte Chauvet, France, depict carnivores such as lions, panthers, rhinoceroses, and bears in addition to their prey. In eastern Spain, the walls of shallow rock shelters have been found to contain scenes with human and animal figures that reflect various aspects of the life of the people who painted them.

The true meaning and significance of these paintings remains a mystery. Often the caves that contain paintings are accessible only through tiny openings and at the end of long tunnels. Many speculate that the paintings had religious and

ceremonial import and were only viewed by a select few. The fact that there are, in many cases, depictions of animals pierced by spears suggests that the paintings may have been used in hunting ceremonies. The details, the hint of movement, and the overall manner in which the animals were painted indicates an intimate knowledge of the



Photo courtesy of Wikimedia Commons.

subjects. The artists were quite skilled in using the three-dimensional features of the rock walls to their advantage as well.

In addition to their beauty, the Paleolithic cave paintings also provide much information about the life and social organization of the people that created them. Cro-Magnons were the first group of hominids classified as *Homo sapiens* and possessed a large frontal lobe capable of associative thinking. This mental ability made it possible for these prehistoric people to understand and use symbols in their communication of ideas. They were the first group to extend art from personal decoration to permanent display, where it was placed in a shared environment and introduced visual communication as a part of their way of life.

Unfortunately, many of these priceless collections of cave paintings, after having survived thousands of years, have in the short time since their discovery suffered severe damage. Exposure to varying temperatures, humidity, and air flow and composition can lead to changes in cave climates, resulting in the growth of destructive organisms that damage the artwork. The story of the Lascaux Cave reflects the dangers of exposing these treasures to the world of today.

The paintings in the Lascaux Cave were discovered accidentally by four French boys in 1940. By 1950, an air conditioning system was installed and around 125,000 people visited the caves each year. In 1960, a green mold-like substance spread rapidly throughout the caves, even after they were completely closed off. Analysis determined that the algae *Palmelloccoccus* was feeding off sweat, pollen, and bacteria nutrients even with little light present. Treatment with antibiotics and a formaldehyde/detergent spray killed the nutrients and the algae without damaging the paintings.



Photo courtesy of Wikimedia Commons.

After careful evaluation, a new air conditioning system was installed in 1968 that utilized the natural air flow in the cave to condense water in a cold spot rather than on the walls. It was only needed during the wettest periods of the year. For the next 30 years or so, five visitors a day were permitted in the cave for 35 minutes each, five days a week.

In April 2001, this system was replaced, after significant controversy, with another consisting of two very large fans theoretically designed to replace and improve upon the older one. Shortly thereafter, white tufts of the fungus *Fusarium solani* appeared, and by August the cave was covered with it. The use of formaldehyde as a foot wash to prevent fungal infections may have played a role, possibly killing off other organisms that might have controlled the growth of *Fusarium solani*.

Treatment involved placement of bandages soaked with antibiotics on the walls and the use of quicklime on the floors. The infection has been largely brought under control, and fungal removal is now accomplished mechanically by scientists dressed in hooded biohazard suits, booties, and face masks. There are signs that an ecological balance

is returning to Lascaux, and the possibility of admitting a limited number of visitors is under consideration.

The experience at the Lascaux Cave demonstrates the fragility of prehistoric cave paintings when exposed to foreign conditions. The beauty and historical record presented by these works of art makes them invaluable and irreplaceable. Hopefully, those responsible for maintaining these priceless treasures and any who discover new ones will carefully consider the best ways to preserve these paint wonders for the next several thousands of years. [G](#)

Errata

The following statement erroneously appeared in the article, "Pigment Market Still Performing but Challenges May Impact Intensity of Growth," (third paragraph on page 100, October 2006, JCT CoatingsTech):

"The company has also developed reflective pigments in various shades that can reduce air conditioning use by up to 30%."

We are sorry for any confusion this error has caused.—T&L