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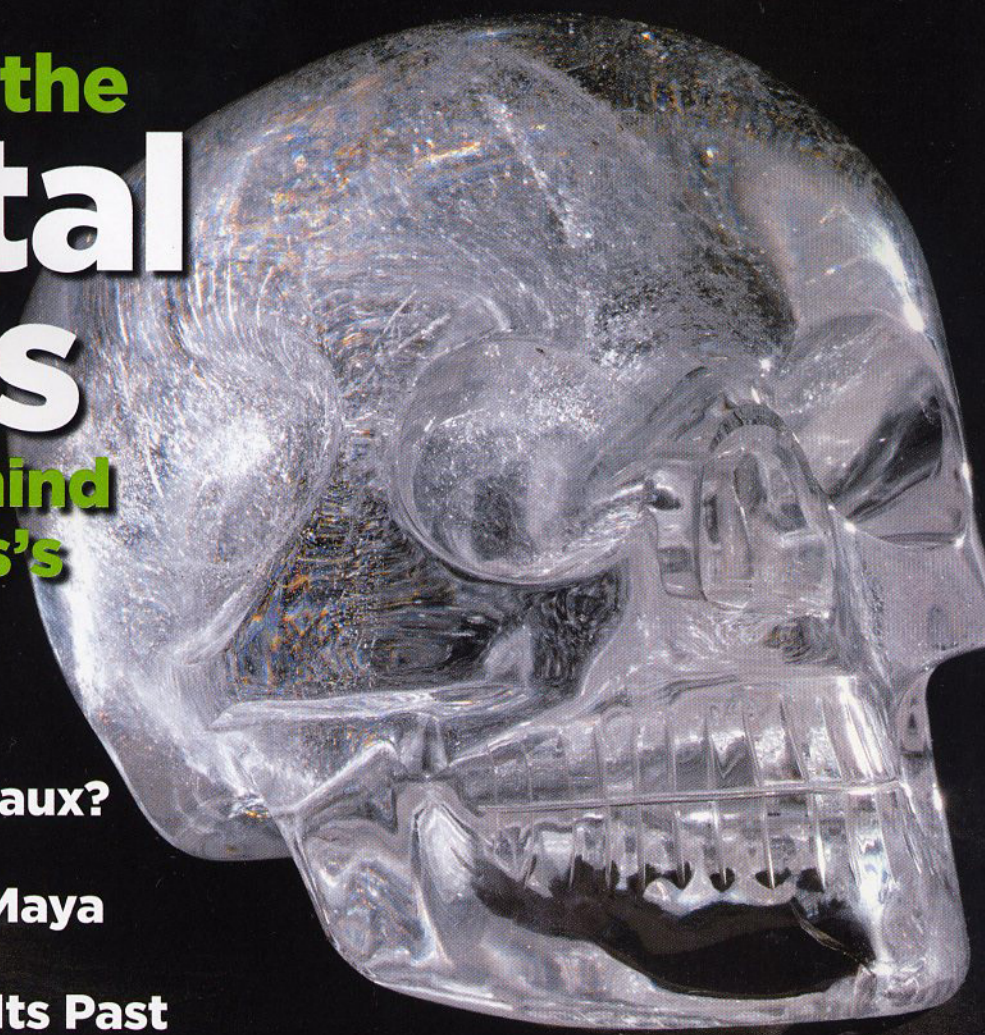
Who's Killing Lascaux?

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By Paul Bahn

# Killing Lascaux

Inept bureaucrats and creeping fungi are destroying the world's most famous cave paintings

I first visited the cave of Lascaux, in southwest France, in 1977, and it was an overwhelming experience. I was staggered by the sheer beauty of the prehistoric paintings, their size, their quality, their enormous numbers. The huge aurochs bulls, the cavalcades of small horses, the delicate deer, the enigmatic "signs" all swirled around my head in the semidarkness. The same emotions recur on every visit—there are about 600 paintings and 1,500 engravings in this cave, and I always see unfamiliar figures or new details. Some people I have taken into Lascaux have burst into tears at the sight. There are few experiences that can match a visit to this sublime place, easily the most beautiful and important decorated cave ever discovered. But since the cave was found in 1940, this treasure from the last Ice Age has suffered more damage than it had in the previous 15,000 years. Today, the cave and its paintings are deteriorating faster than ever and causing many in the artistic and archaeological communities to wonder how much longer these irreplaceable works of art can survive.

The cave was discovered by four children from the nearby town of Montignac, who quickly revealed the secret to



Dynamic paintings like this one depicting a bull's head and charging horses from the Hall of Bulls (shown here before the crisis) are in danger of being destroyed.

their schoolteacher. By the 1940s, Ice Age decorated caves in France and Spain had already been open to the public for decades, but very few people had grasped the fact that what had preserved the art for millennia was the extreme stability of the temperature and humidity in the caves. The damage to Lascaux began when its entrance was widened, forever altering the interior temperature and air circulation, and permitting rainwater to enter. After World War II ended, the cave's sediments were dug out by laborers—with no archaeological investigation at all—to prepare it for tourists as rapidly as possible. After that, the number of visitors was so great that the cave's air often became unbreathable, so in the late

1950s an air-conditioning system was installed (devastating the cave's remaining sediments, again with no archaeological supervision). But even so, by the end of the 1950s guides were noticing the insidious growth of "green and white sicknesses."

The "green sickness" consisted of algae, bacteria, and fungi, often growing around electric lights while the "white sickness" was crystal growth on the walls and paintings caused by the evaporation of water saturated with carbonic gas, which dissolves calcium carbonate and leads to the formation of calcite crystals.

The cave was closed in 1963. After extensive scientific analyses, it proved possible to eradicate the green sickness, and with fewer visitors the expansion of the white sickness stopped. The crystals, however, could not be removed. The scientific commission appointed by France's minister of culture, André Malraux, determined that the problems had arisen primarily from the size of tourist groups and the amount of time they spent in the cave (thus raising its temperature and altering its humidity), as well as the pollen and spores they brought in on their shoes. The commission decided that the cave would only be open to one group of 5 people per day, 5 times per week, for only 30 to 40 minutes at a time, and that everyone had to walk through disinfectant on the way in. Instruments inside Lascaux

constantly measured the temperature and humidity, as is done now in most decorated caves open to visitors.

Since the mid-1960s the general public has believed that Lascaux was totally closed; the fact that it remained essentially open (everyone had the right to apply to see it for free, although preference was given to specialists) was never advertised.

The problem of making the cave accessible to the thousands of people who want to see it was essentially solved in 1983 with the creation of an extremely detailed facsimile of the cave, Lascaux II, and its opening to the public. But the system of small groups visiting the real cave for a limited time had worked perfectly for 40 years. I saw Lascaux many times after 1977, and each visit was as breathtaking as the others. The cave was "cured" and stable.



**B**y 1999, however, the air-conditioning equipment in the cave was old, and someone made the decision to replace it. In view of the strict precautions in place for four decades, one would imagine that the greatest care would have been taken with this work. Quite the opposite occurred. Shortly after the system was replaced, disturbing rumors began to

**Before-and-after photos show colonies of fungi and bacteria invading a painting of a bull.**

circulate among cave-art specialists about damage to the cave, especially after it was closed to all visits, as in 1963. But none of us had a clear idea of what was happening until an article appeared in *La Recherche*, a popular French science magazine, in April 2003, which provided us with the first details of the new growths appearing in the cave and what had caused them.

Unlike most decorated caves, where one person is in charge of the site, at Lascaux no fewer than six people or institutions share responsibility for different aspects. And there is little coordination or agreement between these six. Even now, it is unclear which individual is most to blame for what has happened! It appears that this person assigned the work to a local firm that had no previous experience working in caves, and whose workmen were left largely unsupervised. As Jean-Michel Geneste, Lascaux's curator told *Time* magazine, "The workers often ignored us...and didn't disinfect their feet. They didn't keep the door closed all the time; they wanted to get the job done quickly." Art restorer Rosalie Godin added, "The construction site was like a swamp, and there was construction waste all over the place. It was an apocalyptic vision."

**S**o it is hardly surprising that by 2000, as soon as the work was completed, new biological pollution appeared. Within a month a fungus, *Fusarium solani*, characterized by white filaments, was growing on the cave walls. Fungicides were applied, which sometimes had a brief effect, but the fungi bounced back as soon as the application ceased. Powdered quicklime was scattered on the floor to sterilize the cave, but this raised the temperature, further destabilizing the interior

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climate. Microbiologists soon learned that the fungus was associated with a bacterium, *Pseudomonas fluorescens*, which was feeding off the fungicide. So, for nine months, compresses soaked in fungicides and antibiotics were applied to the clay banks and taluses where the growths were occurring. But then a third invader was discovered—dark spots appeared on the walls and ceiling, possibly linked to the humidity. Once again these were fungi and bacteria, so chemicals were applied. But all of these measures were temporary, and merely slowed the organisms' growth.

In 2002 France's ministry of culture set up a scientific committee to tackle these problems, but very little news about their deliberations or decisions ever reached the archaeological community, let alone the general public. However, in 2003, the limitations of the chemical treatments were reached and the ministry of culture decided to have more soil removed from the cave to prevent the microorganisms from feeding off it. The few official pronouncements from the ministry of culture were consistently optimistic about the cave's condition, despite *La Recherche's* alarming

article and the terrible rumors in archaeological circles about the true state of affairs. But for the most part, there was a deafening silence from the French authorities.

The same year, Lascaux acquired a formidable champion. Laurence Léauté-Beasley, the French wife of well-known Californian sculptor Bruce Beasley, had been leading seminars on art and anthropology—which included visits to Lascaux—for many years, and she grew extremely alarmed by the rumors of damage to the site. Beasley mobilized a group of international artists who had visited the cave and understood its universal value. They formed the International Committee for the Preservation of Lascaux (ICPL), a nonprofit foundation that aims to raise public awareness and initiate public action to safeguard Lascaux for future generations. Above all, for the past four years they have fought to break the silence of the authorities. The result has been an ongoing campaign ([www.savelascaux.org](http://www.savelascaux.org)) that compelled the French media to take notice of the problem. In May 2006, Beasley induced *Time* magazine to cover the story, but this was ignored

by the French press, although it was widely reported in the rest of Europe. Recently, as a result of her efforts, articles and interviews have begun to appear in France's regional and national press, and French archaeologists have begun to speak more openly about the scandal. Above all, Beasley has been instrumental in bringing UNESCO into the picture—Lascaux was one of the first "World Heritage Sites" on UNESCO's list.

The basis of cave conservation is maintaining stable conditions; this fundamental principle was ignored at Lascaux. The old air system had successfully held the cave's humidity, temperature, and CO<sub>2</sub> in balance for 40 years; but the new system seems to have been installed without any testing of its suitability for this very special environment. According to *Time*, "Nobody claims authorship of the decision to install the new machine—neither the curator nor the project's main architect," while the president of the company that sold the machine claimed the discussion "was somewhat political." Be that as it may, it is very clear that this was in no way a scientific decision. When the authorities eventually realized their mistake, the machine was turned off. Now, eight years later, they are willing to consider replacing it. But once again, the major work needed to install something more suitable will mean subjecting the cave to further massive interference and risks.

The new installation involved removing the roof from the chamber at the cave entrance, where the old machinery was housed. It was replaced by a thin sheet of metal that allowed rainwater to fall into the chamber and the cave entrance. Astonishingly, this temporary roof is still in place, exposing the cave to the impact of outside temperature variations. Consequently, water runs down the cave's walls (and paintings) at times, followed by periods of extreme dryness.

Once the infestation of organisms became visible, the radical emergency measures—antibiotics, fungicides, quicklime, etc.—were applied with no consideration for possible side



With increased heat and humidity, slimy growths have taken hold on Lascaux's ceiling.

effects and no scientific master plan. The decision ignores the lessons of the past, when spraying was equally ineffective and antibiotics created the conditions for resistant strains of microorganisms to flourish. Between 600 and 800 liters of chemical solutions were sprayed inside the cave, raising its humidity. And indeed the emergency work itself seems to have caused further damage. From 2003 to 2008, teams of art restorers and surveyors have spent hours in the cave, for days at a time, to extract the fungus by the roots and make a photographic assessment of the cave's condition. These teams have used strong lights close to the walls to carry out their work, and these are suspected of being the cause of the new, rampant invasion of black spots. The spots, which are now on several of the paintings, have a component of melanin that is triggered by light. Laboratory results suggest that the black mold quickly contaminates other surfaces.

In spite of the authorities' reluctance to admit their responsibility for today's crisis, and the way they have downplayed the seriousness of Lascaux's condition, the ICPL has succeeded in exposing the cave's dire condition and alerting the public. In addition, it receives letters from all over the world expressing concern about the future of Lascaux. As Beasley told me, "Last month, we received 300 signatures from a petition coming from the artistic and cultural community of Mexico City. Today, the international scientific community is mobilizing for the defense of Lascaux."

Beasley was able to visit the cave recently to see the situation for herself. "Lascaux is such an extraordinary site that the paintings, even damaged, still take your breath away," she says, "but there are visible alterations. Grayish spots have left 'aureolas' on the paintings where the fungus has been removed by hand; the white calcite, which gave Lascaux's paintings their brilliant canvas, has turned gray; excess moisture has trickled down the walls, carrying prehistoric pigments with it; and black spots mar the walls

and obscure some of the most delicate engravings and paintings. Most of these changes are irreversible."

One particularly astonishing fact she has uncovered is that the scientists who helped to cure Lascaux in the 1960s have barely been consulted this time, even though they are ready and anxious to be called to its rescue. One of them, Pierre Vidal, was contacted at the beginning of this new crisis. He stressed that top priority should be given to Lascaux's equilibrium, and he sent a note to the administrators underlining the importance of the scientific protocol limiting human presence in the cave, and warning that to ignore it could have dire consequences. In the 1960s, André Malraux had warned his scientists about the danger of transforming Lascaux into a laboratory for experiments. It looks like the warning has not been heeded. For example, the studies made during the earlier crisis clearly showed that the cave can tolerate 5 people per day for 35 or 40 minutes, as mentioned above. But they also showed that any increase in numbers or time would have an immediate negative impact on the site—yet this is precisely what has been permitted during the various "decontamination" episodes.

Both the *La Recherche* article and the *Time* investigation exposed the cover-up by the French authorities about the contamination of the cave and its paintings. A spokesperson for the ministry of culture has repeatedly denied that there is damage to, or fungi on, the paintings, despite clear photographic and eyewitness evidence. At one point the ministry of culture claimed that the fungi have "disappeared naturally," yet restorers were still working in the cave three days per week, manually removing the fungi by their roots—extractions that have left dark marks and circles on the paintings. Clearly, the public has not been told the truth.

Beasley believes that the authorities have failed to do the right thing because a critical analysis of their actions would shed a very uncomfortable light on Lascaux's administrative caretakers. Neverthe-



**Top, a photograph taken in 2000 shows a painting of a deer intact. Below, the same painting photographed in 2007 shows black growths in the deer's body.**



less, since international attention was drawn to the cave's plight, the French authorities have—as the ICPL website put it in March 2007—“closed ranks and are issuing false and misleading statements about the condition of the cave. According to their statements in public interviews, the cave is now recovering and the crisis is over.” Certainly, for anyone concerned about Lascaux's preservation, it is a shock to discover the extent to which the authorities have orchestrated a policy of misinformation, denial, and blame-shifting since the beginning of the crisis in 2000. Isabelle Pallot-Frossart, director of France's Laboratoires de Recherche des Monuments Historiques (LRMH), claimed in *Le Figaro* (December 13, 2006) that “today's administrators of Lascaux are simply picking up the pieces and cleaning up the mess caused by the crisis in the cave forty years ago.” Thus she suggests that the current crisis is only a continuation of the old crisis.

officials again claimed that they have the situation entirely under control. But it seems that they are continuing to try procedures on a trial-and-error basis inside the cave. Most recently, the scientific committee was split between those who wanted to unleash another barrage of antibiotics on the problem and those who simply wanted to shut down the cave for a long time in the hope that everything would magically become fine again. So to appease both sides, the administrators (rather than the scientists) decided on a compromise: the black spots would be sprayed and the cave would be closed for only three months. But the cave's administrators tried this in 1963, and after a closure of some months found that the algae had increased tenfold!

As Beasley explained to me, “It is clear that the authorities in charge of managing the Lascaux conservation crisis have, for the most part, some direct responsibility for its occurrence. This is why they have produced no

objective view or critical analysis of what has been done since the inception of the crisis. The scientific committee which they direct cannot have the necessary critical approach needed to understand what happened, why, and how to remedy the problems. The scientific commission appointed in 2002 by the minister of culture meets two or three times a year to review the actions decided on by the administrators. The scientists on the committee are acting as consultants, not as decision makers. And being hired hands, or part of the Lascaux administration, they are prevented from talking about Lascaux's problems with other scientists outside the commission. This situation with its lack of transparency is lethal for the cave.”

Today, Lascaux continues to deteriorate. The visual integrity of its beauty has been severely damaged. Fearing a downward spiral, the ICPL has called upon UNESCO's World Heritage Center to intervene. A monitoring mission will take place soon to assess the situation in the cave. It will report its conclusions to the annual World Heritage committee meeting in July, and it is to be hoped that strong action will be taken.

The clock is ticking. The ICPL has asked that Lascaux be placed on the U.N.'s World Heritage Center's list of endangered sites. “By involving UNESCO,” says Beasley, “our goal is to pry open the closed circuit in which the present management is operating. We are calling for a truly independent and international scientific task force to monitor the process of Lascaux's conservation, and to report to the world the situation in total transparency.” The necessary scientific competence exists, and just needs to be brought to Lascaux's “bedside” so it can do its job with no strings attached. And the future management of the cave should also be open to public scrutiny. If Lascaux is doomed to disappear, it must not be allowed to do so amid indifference and silence. The world's greatest cave art deserves far better than this. ■

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**ARCHAEOLOGY.**