TROGLODYTES
a hidden world

50 years ago...
Commemorating the end
of the Second World War

INTERVIEW WITH
JEAN DANIEL

ENVIRONMENT:
PROTECTING PLANT LIFE

HERITAGE:
LUXEMBOURG: THE BALCONY OF EUROPE
The big peace
1992
by Carlos Eduardo Abbud

Within an outline of the Arabic word for peace, Brazilian artist Carlos Eduardo Abbud has drawn Hebrew, Christian, Polynesian, Celt, Amerindian and Shinto-Buddhist religious symbols.
**TROGLODYTES**

**a hidden world**

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Consultant: Jacek Rewerski

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**50 YEARS AGO...**

Commemorating the end of the Second World War (1939-1945)

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EXTRACT FROM THE PREAMBLE TO THE CONSTITUTION OF UNESCO, LONDON, 16 NOVEMBER 1945

"The Governments of the States parties to this Constitution, on behalf of their peoples, declare...

that since wars begin in the minds of men, it is in the minds of men that the defences of peace must be constructed...

that a peace based exclusively upon the political and economic arrangements of governments would not be a peace which could secure the unanimous, lasting and sincere support of the peoples of the world, and that the peace must therefore be founded, if it is not to fail, upon the intellectual and moral solidarity of mankind.

For these reasons, the States parties... are agreed and determined to develop and to increase the means of communication between their peoples and to employ these means for the purposes of mutual understanding and a truer and more perfect knowledge of each other's lives."

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**THE UNESC0 COURIER**

Published monthly in 30 languages and in Braille.
Troglodyte communities down the centuries have created a little-known form of architecture that demonstrates exceptional versatility and resourcefulness.

Strictly speaking, troglodytes are people who live in caves hollowed out by human agency. The earliest of them lived in the New Stone Age, when societies abandoned hunting and turned to farming and animal husbandry. Unlike their ancestors, the hunters of the Old Stone Age who took temporary refuge in natural caves against bad weather or attack, troglodytes (the word is derived from the Greek *trogle*, hole, and *dunein*, enter) used a favourable geological environment (soft but not friable rock) to create areas that could be used as dwellings and for economic activity as well as for worship, burial and defence.

It is simpler to hew a shelter out of rock than to build one, but considerable understanding of the natural environment is called for, as well as a remarkable capacity to adapt to it. Contrary to what is often thought, the underground dwelling is not a backward form of architecture but rather a more economical way of living, above all in regions where building materials such as wood are rare. As a result, most troglodyte dwellings are found in arid regions, where the big differences between day-time and night-time temperatures and the frequency of sandstorms are an incentive to search for serviceable shelter.

**Hewn from the living rock**

To a greater extent than natural caves, “artificial” underground dwellings are designed on a human scale to meet human needs. The economic and ecological advantages of this ancient form of habitat, especially stability of temperature, have attracted the interest of modern architects, who believe that it holds rich possibilities for the present and the future.

The oldest known troglodytic site is at Beersheba in Israel, where thirty-odd underground dwellings dating from the fourth millennium B.C. were excavated in the 1950s. The dwellings, which could house between 200 and 300 people, are positioned at intervals along a two-kilometre-long site on the banks of a stream. At the neolithic site of Banpo, in
Bamian Valley (Afghanistan). At centre is the “Little Buddha”, a 38-metre-tall statue which was sculpted in the rock face in the 4th-5th centuries. The cliffs are perforated with monks’ cells.

Left, cross-section of the monastery and church of Gheghrard (Armenia).

China’s Shaanxi province, there are extensive remains of hollowed-out dwellings which prefigure settlements that appeared in China later on. The prehistoric site of La Madeleine in the Périgord region of France, which has given its name to an important culture of the Old Stone Age, is interesting on two grounds. Firstly, it shows how troglodytism began in rock shelters that were first used by hunters and then extended by digging. Secondly, it was inhabited over an extraordinarily long period which lasted, with interruptions, from the Magdalenian (10,000 B.C.) to the sixteenth century.

Troglodytism belongs to a very ancient and widespread tradition which still continues to be practised. There are more than 40 million troglodytes in China today. In Tunisia, ancient dwellings hewn vertically out of the rock have been transformed into attractive hotel complexes. Remarkable examples of cave-dwelling communities still exist in Spain, Italy and France. In the Saumur
region of France, near the river Loire, many
cave dwellers enjoy the same amenities as
householders who live above ground. At the
same time many troglodytic sites have been
abandoned, many are deteriorating and will
soon be beyond repair, and others have dis-
appeared entirely, even if some are being ren-
ovated thanks to tourism. Is troglodytism
merely a survival from a bygone age which
will one day be forgotten?

As an original way of life and form of
architecture, troglodytism is part of the
world’s cultural diversity. But the traditional
systems to which it belongs and which have
functioned for thousands of years now seem
doomed gradually to disappear under the
pressure of growing standardization. Both the
ancient and the modern forms of the heritage
are in danger. Troglodytism is little known
and tends to be a source of suspicion, largely
because of the ambiguous image of the
underground world, regarded in many cul-
tures both as the home of the dead and a place
of renewal, tomb and matrix. It is a source of
both attraction and repulsion.

Sanctuaries and refuges
One of the most spectacular forms of this
architectural tradition is sacred troglodytism.
Underground temples, monasteries, burial
vaults and catacombs hewn out of the rock
constitute a vast heritage designed for wor-
ship or burial, showing how the human imag-
ination regards rock as an impregnable form
of shelter. To bury one’s dead in a rock-tomb
is to stake an eternal claim to that place.
The tomb-temples of Petra in Jordan, the Buddhist temple-monasteries of Ajanta and Ellora in India, the burial vaults of Lycia and the rock churches and hermitages of Cappadocia in Turkey are outstanding examples of troglodytic sanctuaries. Some of them, such as the rock churches of Lalibela in Ethiopia, are still used for worship. These forms of sacred architecture hewn from the living rock are highly sophisticated. Carving a sanctuary from the block, like sculpture, allows no room for error.

People who live in caves become invisible and inaccessible to the outside world, and cave-dwelling has been practised as a defensive ploy on every continent by individuals and communities. Many of the villages constructed by the Dogon people along the steep sandstone Bandiagara cliffs in Mali contain refuges in crannies in the rock to which the villagers could retreat when attacked. In the West of the United States are sites where fortified villages were built amidst a multitude of granaries and food-stores hewn out of the rock. People living in these villages clinging to canyon walls could cut themselves off from outsiders by removing the ladders that gave access to them. In Cappadocia, thousands of people could take refuge with stores of food and livestock in the extraordinary troglodyte settlements of Kaymakli and Derinkuyu.

There are large numbers of underground civilian and military fortifications in Europe, ranging from Roman and medieval refuges to the buried parts of twentieth-century defensive systems such as the Maginot Line. Poland, a land of plains which has been invaded many times, is particularly rich in fortifications which in many cases have an underground section as their main feature. Highly interesting specimens of underground architecture have also survived on old battlefields. During the First World War, the German army built a network of dugouts in old quarries on the Chemin des Dames in Champagne (France) and joined them by means of tunnels and railways. These underground installations
Below left, Las Cuevas (the Caves) of Guadix in Andalusia (Spain).

Below right, Ostrog Monastery in Montenegro (former Republic of Yugoslavia).

Architecture by subtraction

In spite of its wealth, diversity and beauty, the underground heritage does not enjoy the same prestige as that built on the surface. Improving its status is not easy. The conservation of so-called “natural” habitats is a new departure. We must try to understand how they blend into the environment and how to preserve them from erosion, the risk of which is increased by their fragility, which is caused by digging and is inherent in the very principle of this “subtractive” form of architecture. Conserving a cave dwelling is a totally different activity from conserving a building made of “dead” stone removed from its environment. A cave building lives, changes and ages with the earth of which it is a part.

This multi-faceted heritage—monumental, archaeological, ethnographic, urban, rural, industrial—illustrates to an exceptional degree the ways in which human settlement can blend with the environment. It is perfectly suited for inclusion in UNESCO’s World Heritage policy, which takes into account both the cultural and natural dimensions of sites. Some major troglodytic sites registered on the World Heritage List (described elsewhere in this issue) are now strictly protected, but many others are still awaiting the necessary national and international recognition. They must be saved from ruin and from oblivion.

With the growing popularity of environmentalism more and more people are interested in getting “back to the earth”. At the same time, infrastructures in towns and cities are increasingly being buried underground as a result of demographic pressure. Troglodytism is being rediscovered.

Will our children be the troglodytes of tomorrow?

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An original solution to the challenge of living in a semi-desert climate, the dug-out villages of the Yellow River offer many advantages to their inhabitants.

More than forty million Chinese still live underground, most of them in the Huang Ho (Yellow River) basin in the country's central provinces of Gansu, Henan, Shaanxi and Shanxi.

Climate, geography and geology have encouraged the development of this kind of architecture. With low rainfall and an aridity that increases the further one travels north-westward, the climate of these continental regions is subject to wide swings in temperature between night and day, summer and winter. The land has been extensively sculpted by the 4,800-kilometre-long river...
The village of Shang Hong Chi in Shanxi Province.

Jean Paul Loubes, of France, is a teacher at the Architecture School of Bordeaux. His published works include a study on troglodytic dwellings in China entitled Maisons creusées du Fleuve Jaune, L’Architecture troglodytique en Chine du Nord (Paris, Créaphis, 1989).

and its tributaries. Throughout its long history the giant Yellow River has left in its lower basin deposits of materials detached from the land in its upper reaches, deposits that have been shaped by its wandering course.

Geologically speaking, the middle basin of the Huang Ho forms the world’s largest area of loess, a silt deposit made from an accumulation of dust carried by the wind during the ice ages. Highly consistent, the soil is easy to dig and, with sufficient irrigation (since it does not retain water), it can become fertile cropland.

Such conditions have traditionally attracted human settlement, and these loess regions were the cradle of Chinese civilization in very ancient times. A variety of forms of cave dwelling developed here, confirming that troglodytism is an advanced form of architecture that has developed over time, just like surface building. All the different possibilities of cave design, vertical and horizontal, are found in the Yellow River region.

Wells of heaven

Here, on flat ground, entire villages consist of dwellings built around vertical shafts. The layout of the dwellings follows rigorous principles. A shaft approximately fifteen metres square is dug vertically into the ground to form a courtyard. This area, around which the different rooms are built, is the equivalent of the central courtyard known as the “well of heaven” which is a feature of the traditional dwellings of northern China. It is usually six metres deep, which explains why the tem-
The bed-stove (kang) of rammed earth inside a shaft dwelling in China’s Shaanxi Province.

Looking down onto the courtyard of a loess shaft dwelling in Shanxi Province (China).

Plan of a Chinese loess village. This form of settlement permits a high density of population while maintaining a clear distinction between public and private areas.

Temperature is stable and why each shaft is sound-proofed from the next. Rooms are dug sideways into walls facing south, east and west. Each wall contains two or three rounded or pointed arches. The north-facing side of the shaft is taken up by entrances and sometimes a storage chamber.

The main rooms—bedrooms, the room for the ancestors’ altar and the living room—are dug into the south-facing side. As in the traditional Chinese house, each one is equipped with a kang, a stove under a rammed earth bed. The screen-wall, or yingbi, of the dwelling is another feature that is also found in houses built above ground. It stands in the courtyard facing the entrance, and its main purpose is to prevent evil spirits, which move in straight lines, from entering.
Abandoned dwellings in Gao Gun village (Shaanxi Province). A cave serves on average three generations.

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Abandoned dwellings in Gao Gun village (Shaanxi Province). A cave serves on average three generations.
Italy: rocks in a hard place

by Pietro Laureano

During its chequered history the ancient rock-hewn town of Matera withstood many waves of invaders. The pressures of 20th-century life proved harder to cope with...

Pierced into the soft limestone cliffside of a deep ravine in the high hills of southern Italy is a complex of troglodyte dwellings that has existed for thousands of years. Known as the Sassi (rocks) of Matera, it bears traces of human activity dating from as far back as the Old Stone Age, although it was not until neolithic times that the site began to be occupied. At that time the high plateaux of the Basilicata region in which Matera is situated were inhabited by semi-nomadic tribes who found the gravinas or deep canyons etched into the limestone hills ideal places in which to halt during their seasonal wanderings in search of grazing land.

Stones and time

When man began to use metal tools, it became easier to dig into the soft stone. Tombs and underground ritual chambers with central pillars left after the excavation of rocky rubble, date from this period. The first scattered rock dwellings were hewn around water reservoirs. Water became an object of worship, for it is rare in this region of scorching summers and icy winters, where annual rainfall amounts to no more than 500 millimetres.

In time these early human settlements began to coalesce into urban centres.

The rugged topography of the region, with its inaccessible rocks and hidden valleys, enabled its inhabitants to withstand many waves of invaders down through the centuries. The Greeks in the eighth century B.C. were followed by the Romans (fourth and third centuries B.C.), the Byzantines (fifth century A.D.), the Lombards (sixth and seventh centuries), the Saracens (ninth century), the Normans (eleventh century), the Slavs and the Hungarians (eleventh century) and finally the Aragonese (fifteenth century).
aridity of the land helped to strengthen its people's spirit of independence, and ancient traditions continued to be observed even as they were renewed and invigorated by newcomers.

The region's ancient agricultural and pastoral culture provided favourable conditions for medieval monasticism. Hundreds of churches, chapels, crypts and rock-hewn cathedrals adorned with frescoes were hollowed out in Matera. More than monasteries, caves and caverns became retreats and refuges for religious bodies which engaged in experimental attempts to create ideal communities and supported and promoted local agriculture and the local economy.

Medicinal plants were harvested on the high plateaux, which were rich in aromatic shrubs. The caves, where saltpetre, lichens and moulds could be found, were converted into storage rooms and laboratories where miraculous elixirs were produced. According to one sixteenth-century chronicler, a substance found in Matera called bolo (an ochreous clay formed by dissolution of the limestone) was even dubbed “holy earth” at the court of the Medicis where it was observed to have healing properties and to be an antidote to poison.

**An object-lesson in ecological management**

The organization of life in the Sassi was determined by five factors: the scarcity of resources, the need to use them collectively, the interplay between soil and water, and knowledge of the laws of mechanics and fluids.

Blending perfectly into its natural setting, the town of Matera climbs vertically up the steep sides of its gravina, the location and distribution of its dwellings determined by the rocky layers laid bare by the canyon. Two natural amphitheatres formed by two gullies known as *grabiglioni* (“small crevasses”) were subjected to intensive excavation and terracing. The dispersal and collection of...
water runoff via a network of channels, cisterns and caves protected the slopes against the destructive effects of erosion and preserved the stability of the terrain.

When it rains, water runs helter-skelter over the clay surface of the high plateau, creating ponds and marshes. During dry periods, the clay cracks and springs dry up. On the plateau and slopes, which are rich in red, fertile soil (bolo), were woods and fields. The dwellings with their deep subterranean chambers were built lower down along the grabiglioni, blending in with the rocky cliff face. Grouped into units, they open out onto terraces and hanging gardens. Each unit forms a vicinato (neighbourhood), a remarkable example of community organization.

The dominant architectural forms are cave-like. The basic element (the lamione) is a single barrel-vaulted room which may be the nucleus of a large structural complex. The terrace outside can be used as a communal courtyard, and beneath it is a communal cistern used for storing water that runs off roofs carefully designed for this purpose. Stairways serving as vertical axes of communication follow the course of diagonal water run-off channels. The horizontal drainage system, used to channel water into the terraced gardens and to fill cisterns deep inside the caves, provides a framework for paths leading to the vicinati.

The vertical development of the city in medieval times integrated earlier constructions, used the law of gravity to facilitate water distribution and afforded protection against the wind. Two districts, known as Sasso Caveoso and Sasso Barisano, grew up around the two grabiglioni, which provided humus-rich land for cultivation. In the centre was a fortified area, the civita. Craftsmen's workshops and shops were built on the edge of the high plateau, where the large cisterns and rock-hewn grain storage silos were located.
Upsetting the balance

This complex and harmonious urban system, based on the drainage, control and distribution of water, survived intact until the eighteenth century. Then, in the nineteenth and especially the twentieth centuries, the ability to manage environmental resources in a spirit of community died out. The modern city of Matera extends above the run-off slopes to places where the builders of the old city never dared to venture. The filling in of drainage areas for use as roads and the destruction of the capillary network of water collection brought to an end time-honoured constraints that had to be observed in order to strike a balance between urban development and scarce natural resources. The urban network became denser and reached saturation point. As the dwellings became increasingly tightly packed, the system whereby life in them was organized began to break down.

Deteriorating hygienic and environmental conditions in the 1950s led to a decision to transfer the population of the old town to new quarters. When the evacuation project from the Sassi began, 15,000 people—two-thirds of Matera’s population at the time—were living in 2,997 dwellings, 1,641 of which were considered to be troglodytic. Since then the caves have remained virtually empty, but for visitors they document a unique architectonic experience, the creation over centuries of a remarkable urban area where people managed natural resources with great economy and skill.

Above, the interior of the church of San Nicola dei Greci (12th century).

Right: Madonna and Child, a 12th-century fresco in the chapel of Santa Lucia alle Maive.

Carved out of the living rock eight centuries ago, the churches of Lalibela are still a magnet for worshippers and pilgrims.

The rock churches of Lalibela, which are hewn out of the mass of red volcanic tufa that makes up the high plateau of Lasta, are a remarkable offshoot of the flowering of Christian civilization in Ethiopia in the twelfth and thirteenth centuries.

Christianity was introduced into the Aksumite kingdom of Ethiopia around 330 A.D. At the end of the fifth century it spread as a result of the efforts of monks who had come from Antioch, but the allegiance of Ethiopian Christians went to the Coptic church.

In the ninth century, the Aksumite kingdom disintegrated under the pressure of Islam and the Beja invasions. Following the gradual contraction of the Byzantine empire, Christian Ethiopia became increasingly isolated. The upheavals that followed the collapse of the kingdom of Aksum and the shift of its political and religious centre southwards led to the emergence in the twelfth century of the Zaghawa dynasty, which reinforced ties with the Coptic church and encouraged missionary activity.

The new capital of the kingdom was set up on a mountainside in the region of Lasta. Now a small town perched at an altitude of 2,600 metres, the monastic centre of Lalibela, named after the Zaghawa king who excavated the churches there, was intended to be a new "Holy City".

A unique architectural complex

The eleven medieval churches and chapels of Lalibela, which form two distinct groups on either side of a mostly dried-up stream, the Yordanos (Jordan), scarcely rise above ground level. Four of them are monolithic. The others are smaller and are either semi-monolithic or underground their sites indicated to the faithful by a façade sculpted in the rock. Each of the two groups constitutes an organic ensemble enclosed in a kind of surrounding wall within which visitors are able to move around via a network of alleys and tunnels hollowed out of the tufa.

The monolithic churches, which stand in the centre of shafts seven to twelve metres deep, were carved straight out of blocks of rock separated from the rest of the plateau by
The sunken Church of St. George (Bete Gyorgis, 11th-13th centuries) is patterned on the shape of a Greek cross. Opposite page, the north-west façade of the Church of Gabriel and Raphael.

trenches. Carving started at the top (the vaults, ceilings, arches and upper windows) and continued down to the bottom (the floor, doors and base). To allow the torrential summer rains that affect this region to run off, the floor of the spaces created in this way are on a slight incline. Protruding features of the architecture, such as roofs, gutters, cornices, lintels and window sills, project to a varying degree depending on the prevailing direction of the rain.

The excavation work apparently took place in several stages, so that architects, workers and craftsmen could work at eye level without having to erect scaffolding. Some hewed the monolith out of its surrounding rock, others fashioned it. Rubble was removed via openings such as windows and doors. Simple tools were used—picks and levers for excavation, and hatchets and chisels for finer details.

Rare paintings and sculpture

Probably the most impressive of Lalibela’s churches is Bete Medhane Alem (the House of the World’s Redeemer), which is 33 metres long, 23 metres wide and 11 metres high, with a sculpted cornice supported by 34 square pillars. It is the only church in Ethiopia which has five naves, as did the former cathedral of Aksum, according to Father Francisco Alvarez, the chaplain of a Portuguese embassy to the Solomonic court in the sixteenth century.

The interior is reached by three doors giving onto the west, north and south respectively, in accordance with Christian custom. It is built according to the basilica pattern, with an east-west orientation, and divided into eight bays lined with 28 pillars rising to the semicircular arches of the ceiling.

The neighbouring church, the House of St. Mary (Bete Maryam), which occupies a smaller area than Medhane Alem, is nine metres high. Its walls, which have windows in the Aksumite style, house three naves whose special feature is that they are covered from top to bottom with decorative paintings representing geometrical motifs (Greek crosses, swastikas, stars and rosettes) and animals (doves, phoenixes, peacocks, zebus, elephants and camels) and with frescoes—mostly now destroyed—illustrating scenes from the life of Jesus and Mary as described in the gospels. Some specialists
believe that these paintings date from the reign of King Zar’a Ya’kub (1434-1465). Above the main door is a bas-relief representing two horsemen slaying a dragon, an exceptional piece of sculpture given the scarcity of animated carvings in Ethiopian sanctuaries, as indeed throughout the Christian Middle East.

Quddus Mikael (St. Michael), Bete Golgotha (the House of Golgotha) and Bete Selassie (the House of the Trinity) form an ensemble of churches. The largest of the three, Quddus Mikael, is harmoniously divided up into three naves by cruciform pillars. The most notable feature of Bete Golgotha, a church dedicated to Christ’s Passion, is its series of seven lifesize ecclesiastics carved out of the walls of the two naves. It also houses, in a niche, a Christ in his tomb.

The small chapel dedicated to the Holy Trinity (Bete Selassie) is reached through Bete Golgotha. It is trapezoid in layout and houses three monolithic altars. Arranged in a semi-circle and adorned with crosses, these altars contain cavities in their centre in which the priest placed the Tobot (Ark of the Covenant in Geez, the Ethiopian liturgical language) during mass. At the back of the crypt, two mysterious figures with their hands clasped in prayer stand on either side of an empty niche topped by a cross within a circle—perhaps a representation of the Trinity.

Bete Merkoreouos and Bete Gabriel Roufaël (the House of Mercury and the House of the Archangels Gabriel and Raphael) are underground chambers originally used for
An Easter service.

non-religious purposes and later consecrated. Once they were probably royal residences. A little further on, Bete Abba Libanos contains features which are characteristic of both the monolithic churches and underground churches: its four sides are separated from the mountain by a high hollowed-out gallery that runs round the construction, while its roof is integral with the upper rock mass. Bete Amanouel (the House of Emanuel) is a three-naved basilica which displays all the features of the classical Aksumite style.

Set apart from the other churches at the bottom of an almost square shaft (22 x 23 metres), Bete Gyorgis (the House of St. George) has the shape of a Greek cross. Set on a very high base, the church contains neither paintings nor sculptures which might distract attention from the harmony and simplicity of its lines. On the ceiling, each arm of the cross is intersected by a semicircular arch carved out of the continuation of the pilasters that rise from the four corners of the central space. While the construction’s lower windows are in the Aksumite style, the higher ones consist of pointed arches with fleurons similar to those found in Bete Golgotha.

The new Holy City

In addition to its eleven churches, which are on the World Heritage List, Lalibela contains other, less architecturally distinguished monuments whose presence helps us to understand the more general significance of the ensemble and its unity. That unity is the result of King Lalibela’s sense of organization—even if it is unlikely that all the excavation work was carried out solely during his reign (1190-1225). The significance of this exceptional site is abundantly clear from its topography and toponymy: the stream that bisects the former capital is called the Jordan, and a stone cross marks the spot where John the Baptist baptised Jesus.

Christ’s tomb in Bete Golgotha, the House of the Cross (Bete Masqual), the House of the Consecrated Bread (Bete Lehem), Adam’s Tomb, and the platform in front of the House of the Archangels Gabriel and Raphael which local people call “Pilate’s Pretorium”—all these monuments concentrated in a single spot suggest that Lalibela was intended to be a replica of the Holy City of Jerusalem, which was taken by Saladin in 1187, and which could not at the time be visited by pilgrims because of the Third Crusade.
Troglodytic sites on the World Heritage List

The earliest work on these Buddhist rock temples dates from the fourth century A.D. The caves are located on the edge of the Taklamakan (Gobi) Desert in Gansu province, on the Silk Route, and were the site of intensive activity until the fourteenth century. The most important structures, including a 33-metre-high Buddhist temple, date from the Tang dynasty (seventh century). Adorned with frescoes and sculptures by artists of a variety of origins, the caves are a record of ten centuries of central Asian history. Placed on the World Heritage List in 1987.
The remains of this ancient Arabian city, which was the capital of the Edomites and then, in the fifth century B.C., of the kingdom of the Nabataeans, stand in a natural circus reached via a narrow, two-kilometre-long defile. Temples, tombs and palaces, half free-standing, half hewn from the pink sandstone cliffs, form a unique blend of Oriental and Greco-Roman architectural traditions.

The Nubian monuments from Abu Simbel to Philae (Egypt)

1. Detail of the façade of the small temple of Abu Simbel, dedicated to the goddess Hathor and to Nefertari, wife of Ramses II.
2. façade of the main temple. Statues of Ramses II.
3. Cross-section of the main temple of Abu Simbel.
4. Inner sanctum of the main temple. From left to right: Ptah, Amon-Re, Ramses II and Re-Horakhte.
5. Inside the main temple.

The rock churches of Ivanovo (Bulgaria)

Conquered around 1550 B.C., Nubia (especially the area around Aswan) became a strategic strongpoint of Pharaonic Egypt. The open-air museum of Nubia and Aswan comprises the temples of Abu Simbel, hewn from the rock by order of Ramses II in the fourteenth century B.C., the great temple of Isis and a complex of several temples built between the fifteenth century B.C. and the second century A.D. Placed on the World Heritage List in 1979.

Situated on the banks of the Russenski Lom River, the monastery complex of Ivanovo consists of churches, chapels and cells which were hewn from the rock between the restoration of the independence of the Bulgarian church in 1235 and the annexation of Bulgaria by the Ottoman empire in 1396. Frescoes, which originally covered the walls of almost all the churches and chapels, illustrate the development of the school of Tarnovo (capital of the second Bulgarian kingdom) and, more generally, of Bulgarian and Byzantine art. Placed on the World Heritage List in 1979.

1. Natural site and spiritual centre.
2. A natural cave modified by human hand.
3. Figures are portrayed in the Ivanovo frescoes with a sense of drama that relates them more closely to Hellenistic than to Byzantine art.
4. After centuries of damage, the frescoes of Ivanovo now offer only a few tantalizing glimpses of medieval Bulgarian art.
Ajanta

1. General view of the cliff.
2. Cave No. 1. The Vakataka period (3rd-5th centuries A.D.).
3. Façade of cave No. 19.

Elephanta

4. The temple (6th-8th centuries A.D.).
5. Three-headed Shiva.

Ellora

6. Entrance to cave No. 10.
7. The sanctuary of Vishvakarman (cave No. 10). The caves receive the light of the setting sun.

- **Ajanta** - Hewn from a cliff overlooking a bend in the Waghora River (Maharashtra State), the thirty Ajanta caves include five Buddhist sanctuaries and monastic annexes. The first group of caves were made in the second century B.C. on a basilical pattern in which the main nave is separated from the aisles. A second group was hewn out between the fifth and seventh centuries A.D., during the Vakataka and Gupta dynasties. Abundant statues and wall paintings mark one of the highest points of Indian art. Placed on the World Heritage List in 1983.

- **Elephanta** - The Elephanta Caves, on the little island of Gharapuri, offshore from Bombay, are divided into two groups. The main site contains five Hindu rock-hewn sanctuaries which embody many features of traditional architecture. The sculptures in the main cave which surround the chapel containing the lingam (phallic symbol representing the fertilizing aspect of Shiva) are among the most important of their kind dedicated to the cult of Shiva. They have been approximately dated to some time between the sixth and eighth centuries A.D. Placed on the World Heritage List in 1987.

- **Ellora** - Unlike Ajanta, Ellora is the product of three great religions of ancient India. Thirty-four caves hewn from a high basalt cliff on a two-kilometre-long site in Maharashtra State contain Buddhist, Brahmanic and Jainist temples and monasteries. The oldest date from the seventh century and the most recent were probably made between 800 and 1000 A.D. Placed on the World Heritage List in 1983.
The Bandiagara Escarpment ('Dogon Country') (Mali)

1. A Dogon village built on rock. Alongside the rectangular houses are grain stores with conical thatched roofs.
3. The entrance to a religious leader's dwelling, protected by a carved snake.
4. The houses are built of dry stone or unbaked clay bricks. The walls are coated with clay.
5. Traditional houses clinging to the cliff face.

Covering an area of some 400,000 hectares, this site includes almost 250 traditional villages of the Dogon people, most of which huddle against the cliff. The Dogon, a people formed about 800 years ago from the intermingling of tribes which had been chased from Mandé with the local Tellem people who lived in caves and rock shelters, preserved a number of their predecessors' rock sanctuaries. They later developed a form of social organization which was reflected in their architecture. Placed on the World Heritage List in 1989.
The rock cones of Cappadocia (Turkey)

As early as the fourth century A.D., Christian anchorite communities took shelter in the unusual conical peaks sculpted by erosion in the heart of Turkey’s Anatolia region. They began creating troglodyte villages to protect themselves from Arab invasions, and by the middle of the ninth century stone churches were being gouged from the soft rock and richly decorated with figurative painting.


1. Landscape of Cappadocia, in the heart of Anatolia. The site was created from a massive flow of lava from Mount Argeus.
2. Volcanic cones topped with dovecotes.
3. A troglodyte dwelling still in use.
4. The king’s palace in the underground city of Cappadocia.
5. A rock-hewn Byzantine church, Göreme Valley.
7. Rocky pyramids in Göreme Valley.

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The traditional habitat of the Anasazi Indians appeared in the sixth century A.D. in the form of partially buried villages on the high table-land of Mesa Verde (Colorado). From the eighth century on it developed in the form of villages that were partly troglodytic and partly built above ground. Buried structures known as kivas were made and were used for various cultural activities. The civilization of the Anasazis, to which the Pueblo Indians belong, reached its zenith between the twelfth and thirteenth centuries. At the end of this period the surface villages were abandoned and the Indians settled in more rudimentary defensive buildings huddled against the sides of the canyons.


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Underground mining of rock salt deposits began in the thirteenth century, and in the course of time galleries were opened up on nine levels, to a maximum depth of 327 metres. Their total length, including wells, corridors, labyrinths, excavations and rooms is nearly 300 km. The old galleries strikingly illustrate the evolution of mining processes over the centuries. Underground chapels are adorned with altars, pulpits and statues carved out of salt.

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