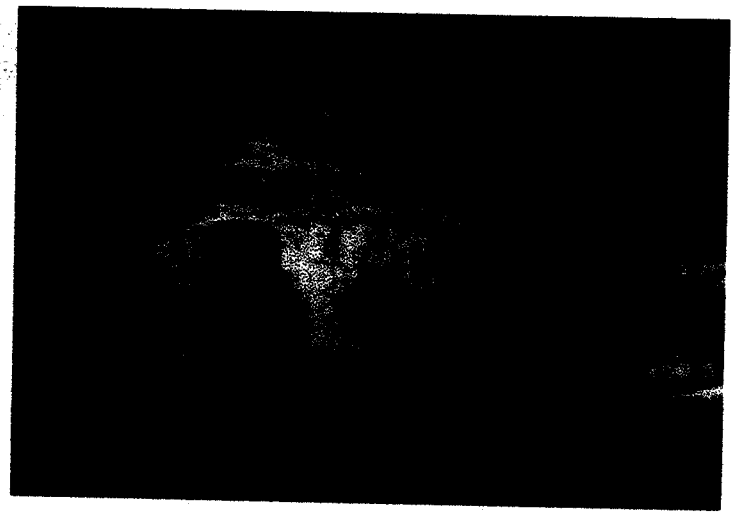
CAVES - A NATURAL PHENOMENON



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CERTIFICATE

This is to certify that the project

"CAVES - A NATURAL PHENOMENON"

is a bonafide record of studies carried out by this group under the guidance of Mr . K . Devadass and Mr . Jiju . V . Jacob , Kumaraguru college of Technology , and submitted to the Department of English in partial fulfillment of the requirements for the completion of I-year B . E . English paper during the year 1999 - 2000.

Acknowledgement

We place on record our profound thanks to our respected principal Dr. K.K.Padmanabhan for providing this nice opportunity to submit this model project as a part of the curriculum for the first year of the Engineering Degree Course.

We would also like to express our gratitude to Mr. K.Devadass and Mr.Jjiju V. Jacob for their continuous support and kind encouragement to bring out this model project successfully.

Last but not the least our thanks are due to our parents and friends for their valuable help and encouragement in our humble venture.

Sharad Murali

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INTRODUCTION

Cave, also called cavern, is a naturally hollow area in the earth that is large enough for a person to enter. Some caves consist of a single chamber only a few meters deep. Other caves are vast networks of passages and chambers. The longest cave ever explored, the Mammoth-Flint Ridge cave system in Kentucky, U.S.A., extends more than 306 kilometers.

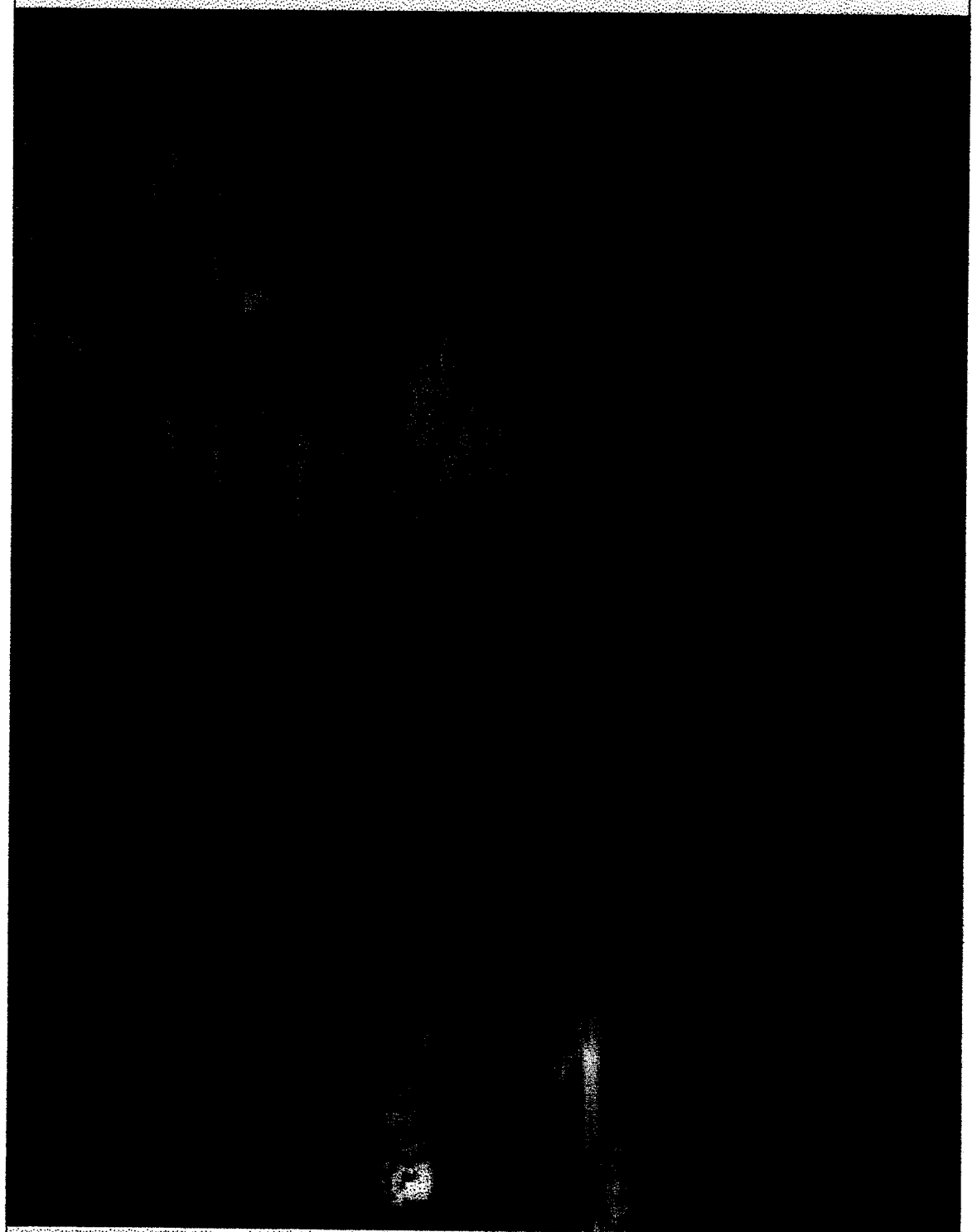
The interior of a cave is a dark, damp place where sunlight never enters. However, artificial light supplied by explorers may reveal a strange underground landscape filled with beautiful, oddly shaped rock formations called speleothems. Many caves also have underground lakes, rivers, and waterfalls.

The scientific study of caves is called speleology. Scientists who study caves and the organisms that live in them are known as speleologists. Many people enjoy the hobby of exploring and mapping caves. The hobby is called potholing, caving, or spelunking.

Most caves are formed in limestone or in a related rock, such as marble or dolomite. Such caves, called solution caves, form as underground water slowly dissolves the rock. This process takes thousands of years. It begins when surface water trickles down through tiny cracks in the rock to the water table, the level at which the underground area is saturated. There the water dissolves some of the rock, forming passages and chambers. The water may form deep pits in places where the rock tilts sharply.

Limestone and similar rock are only slightly soluble in water. But the water that trickles down from the surface contains carbon dioxide, which has been absorbed from the air and soil above the rock. The carbon dioxide forms a mild acid in the water, and this acid helps dissolve the rock.

Carlsbad Caverns, New Mexico



Eventually, the water table may drop below the level of the cave. The cave may also be raised above the water table by an earthquake or, more often, by a gradual uplifting of the ground. Most of the water then drains out, and air fills the cave. A surface stream may enter the cave and flow through it. The stream continues the process of dissolving the rock and thus enlarges the cave. Connections from the cave to the surface may develop in several ways. For example, the rock above part of the cave may collapse, forming a vertical entrance called a sinkhole. Sinkholes are also called swallowholes or potholes, from which the term potholing comes. Other entrances to caves may be horizontal. They may develop on a hillside or a valley slope, especially at a point where a spring or stream flows from a cave.

Other caves, called lava caves, form from molten lava. As lava flows down a slope, its outer surface cools and hardens, but the lava beneath remains molten. The molten lava continues to flow and eventually drains out, creating a cave. Lava caves are near the surface of the earth and have many openings in their thin roof. Sea caves form along rocky shores as the surf and wind wear away weak areas of the rock.

If the water table drops below the level of a cave, water may continue to seep in through cracks in the rock. The water contains dissolved minerals. As it enters the cave, some of the minerals crystallize and are deposited as speleothems. A speleothem may be white, brown, red, or multicoloured, depending on the minerals that form it.

The best-known kinds of speleothems are stalactites and stalagmites. Stalactites are iciclelike formations that hang from the ceiling of a cave. Stalagmites are pillars that rise from the floor. A stalactite and a stalagmite may join and form a column.

Many other kinds of speleothems may also form in a cave. Drapery consists of thin sheets of rock that hang from the ceiling. Flowstone develops where a thin film of water flows over the walls and floor of a cave, depositing sheets of minerals. Gypsum flowers are delicate spiral crystals that sprout from porous rock. Helictites are strangely twisted cylinders that grow from the walls, ceiling, or floor of a cave, or from other formations.

Wall paintings, stone tools, and skeletal remains found in caves show that people lived there thousands of years ago. Today, many kinds of animals, including a small number of human beings, use caves as permanent shelters.

Animals that live in caves include birds, crickets, lizards, raccoons, rats, salamanders, and spiders. Many bears hibernate in caves. Large numbers of bats roost in caves during the day and fly out at night to hunt for insects. The guano (manure) of bats provides food for the countless beetles, millipedes, flatworms, and other creatures that make their home in caves.

Various species of animals known as troglobites live in the innermost part of caves, where there is no light, wind, or change in temperature and humidity. Such animals include certain beetles, fish, salamanders, and spiders. Most troglobites are blind and have a thin, colourless skin or shell. They rely on highly developed senses of smell and touch to make up for their lack of sight.

Green plants, such as algae, ferns, and mosses, may grow in the outer parts of caves, which receive some sunlight. Only fungi and other organisms that do not require light can live in the dark inner areas.

Spelunking is an exciting but relatively dangerous hobby. Individuals who wish to explore caves should always do so in groups that are headed by experienced leaders. Spelunkers use sturdy ropes or cable ladders to

scale steep underground cliffs. They wear hardhats and rugged, heavy clothing for protection against dripping water and jagged rocks. A spelunker should always carry at least two sources of light--a headlamp attached to the hardhat plus a flashlight held in the hand.

Experienced spelunkers leave a cave in the same condition as they found it. Therefore, they neither damage nor remove anything they may find in the cave. Speleothems are fragile and, if broken, cannot be restored. In addition, some cave animals are extremely rare and can be easily harmed.

North America contains many huge caves with spectacular displays of speleothems. Three groups of caves--Carlsbad Caverns, Mammoth Cave, and Wind Cave--are protected in national parks. Mammoth Cave, Kentucky, is part of the world's longest known cave system. South America's many caves include the Ribeira Caves in a limestone district in southern Brazil.

The Balkan Peninsula has large limestone uplands, which are riddled with caves. The Postojna Cave, in Slovenia, contains one chamber called the Concert Hall, where symphony concerts have been held. Some caves in the French Alps and in the Pyrenees, between France and Spain, are among the world's deepest.

The largest known cave area in the United Kingdom is the limestone Craven district in the north Pennine Hills of England. This region contains at least 400 caves. They include the deepest known British cave, Pen-y-Ghent Pot, which is 160 metres deep. Gaping Gill, in the same region, is the largest known British cave. It is 137 meters deep, 150 meters long, 27 meters wide, and 34 meters high. The Peak District, in the south Pennine Hills, is another important cave region, containing more than a hundred caves. The caves of this region contain a beautiful stone called blue john, which is made into vases and

ornaments. The Mendip Hills in Somerset contain the Cheddar Caves, which have spectacular formations of stalactites and stalagmites.

Cave systems in Wales include Dan yr Ogof and Ogof Ffynon Ddu, in the upper Swansea Valley. Agen Allwed, in Powys, has about 25 kilometers of chambers and passages, and is the most extensive cave system in the United Kingdom. Fermanagh, in Northern Ireland, has many caves. The best known is the Marble Arch. In Ireland, the longest cave is at Slieve Elva, in County Clare. It is 346 meters long.

Sea caves occur in all sea cliffs and are most common on the western coasts. The best known sea caves are Fingal's Cave, on the island of Staffa, and Smoo Cave in Sutherland, both in Scotland.

China has many caves, especially in the southeastern uplands. The deepest known cave in Asia is the Ghar Parau in the Zagros Mountains of Iran. Explorers have reached a depth of 751 meters, but water prevented further descent. The largest known cave chamber is the Sarawak Chamber, in Malaysia's Gunung Mulu National Park. It is 700 metres long, its average width is 300 meters, and its minimum height is 70 meters. Also in Sarawak are the Niah Caves, where fragments of tools used by people more than 40,000 years ago have been found.

Many caves in southern Asia have religious associations and some are used as Buddhist or Hindu temples. Southern India and Sri Lanka contain thousands of rock temples. Many of them are highly decorated with beautiful wall paintings and sculptures. Many cave temples have been carved into the rock and some are natural caves that have been enlarged. For example, the Elephanta Caves on Elephanta Island, in Bombay harbour, date from the A.D. 700's and 800's. The Buddhist Ajanta Caves in Maharashtra state are carved in granite, and the wall paintings depict Indian gods and legends.

Morocco and Algeria contain many impressive caves, including Kef Toghobeit Cave, in northern Morocco, which is about 700 meters deep. But South Africa's Cango Caves are perhaps the best known in Africa. They consist of a series of illuminated chambers with many beautiful rock formations.

Most limestone caves in Australia are found in the southeastern part of the country. These include such beautiful caves as those at Jenolan, Yarrangobilly, and Abercrombie in New South Wales, and at Buchan and Lilydale in Victoria. Jenolan Caves were discovered by Europeans between 1838 and 1841. In 1866, the area was made a special reserve and is now a tourist attraction.

South Australia has some beautiful caves near Mount Gambier and Naracoorte. The Naracoorte Caves contains fossils of extinct marsupials (see MARSUPIAL). The large dry caverns in the desert area of the Nullarbor Plains have also yielded fossil finds. Ancient Aboriginal art has been found in one of the caverns, called Koonalda Cave. Aboriginal cave art is abundant in Arnhem Land and Kakadu National Park, in Northern Territory, central Queensland, and southwestern Tasmania.

The Kimberley Ranges of Western Australia contain limestone caves and others are located around Augusta in the extreme southwest of the state. Most of Queensland's caves are in the east of the state, such as around Chillagoe and Mungana, and between Rockhampton and Gladstone. Tasmania has caves near Hastings, south of Hobart, and Mole Creek, in the north.

In New Zealand, the King Country in central North Island contains the best-known caves, notably the Waitomo Caves with their famous glowworm grotto.

DWELLING IN CAVES

Caves have been the sites of human occupation for hundreds of thousands of years. Living in caves, even with the benefit of fire, may not have been very safe in prehistoric times. Most cave dwellers probably did not occupy the deeper recesses but lived near openings and in the area of overhangs.

The Middle Paleolithic use of caves, which has contributed to popular images of cave dwellers, is probably the product of preservational biases and archaeologists' preference for digging cave sites. Middle Paleolithic people probably lived in caves for short periods of time, occasionally using them as shelter from inclement weather. Remains of simple windbreaks and tents have been found dating from the late Lower Paleolithic and throughout the Middle Paleolithic, indicating that these forms of shelter were also used

Archaeologists who excavate cave sites often find remarkably complete records of human cultural and biological evolution during the period the caves were inhabited. The South African cave sites of Sterkfontein, Makapansgat, and Swartkrans have yielded many fossil remains of Australopithecus, the earliest-known human ancestor. It is unlikely, however, that these early hominids, living some 1 to 4.2 million years ago, were residents of the limestone caves, which were formed underground by water solution and were connected to the surface by vertical shafts. Apparently, australopithecine bones entered the caves through the shafts. Predatory carnivores and scavengers were probably also responsible for some of the bone accumulation in these sites.

Present evidence suggests that the first definite cave occupation coincided with the controlled use of fire. This may have occurred first in colder climates, as indicated by the earliest evidence of cave-dwelling Homo erectus. The best evidence for early cave occupation is from Zhoukoudian (Chou-k'ou-tien), near Beijing (Peking), China. Excavations in this 500,000-year-old cave have yielded fossilized remains of Homo erectus. The presence of charred animal bone suggests that these protohumans cooked their food. Apparently, fire was also used to harden antler tips and wooden-tipped spears.

The 400,000-year-old French site of Tautavel has yielded a fossilized prehuman face that represents a transitional form between Homo erectus and more advanced species of early humans. Only fragmentary human remains have been found in the Lazaret cave in southern France, dating to about 150,000 years ago, but much has been learned about the lifestyles of its ancient game-hunting occupants. The remains of tents, probably made of animal hides stretched over a wooden framework, were found in the cave, with the tent entrances facing away from the cave opening. A wolf skull was situated inside the doorway of each tent, perhaps placed there to guard the dwelling or to bring good luck in the hunt.

Neandertal Caves

The traditional idea of the prehistoric "caveman" comes from sites yielding bones of Neandertalers, who lived some 150,000 to 35,000 years ago. The classic Neandertal cave sites were found in the early 1900s in the Dordogne of France and include La Chapelle-aux-Saints, La Ferrassie, Le Moustier, and others. Much is known about these people and their ways of life. The Neandertalers probably occupied the caves on a seasonal basis, taking advantage of their protection from the cold and

wild animals in the winter. It is likely that the cave entrances were covered with skins, while inside, inhabitants made clothing and tools, butchered game, prepared food, and engaged in other activities.

Recent investigation into Neandertal cave sites suggests a rudimentary appreciation for art, symbolism, and religion. While many Neandertal graves are known, inferring some sense of religion or spirituality, there are no convincing cases of burials that include grave goods. The frequency of artifacts and animal bones found in Neandertal graves are similar to that found in the surrounding soil. This suggests that the bones and artifacts found in the burial were accidentally included. Red or yellow ocher and other pigments have been found in excavations of Neandertal cave sites, suggesting that Neandertalers may have painted themselves for rituals or before a hunt. At the cave site of Shanidar in Iraq, pollen grains of a number of different types of flowers were found in the burial site of a 40-year-old man. It is questionable whether flowers were offered to the deceased, or pollen was accidentally brought in via rodent burrows at the site.

Cro-Magnon Caves

A dramatic change in cave occupation occurred about 28,000 to 40,000 years ago with the advent of Cro-Magnon peoples. The appearance of these anatomically modern humans coincides with elaborate cave decoration (see prehistoric art). Wall paintings and engravings of animals have often been found in long galleries deep inside caves. These deep recesses, which in some cases could only be entered with light from lamps or torches, may have been sites for places of religious activities. In such famous caves as Altamira, Lascaux, Niaux, and others, ivory, stone, and bone carvings of horses, mammoths, and even humans, such as the Venus of Willendorf, have also been found.

More Recent Cave Sites

In the New World, evidence of cave-dwelling people dating to around 10,000 years ago has been found at Ventana Cave in Arizona and elsewhere. The most remarkable North American cave sites are those of the prehistoric cliff dwellers of the southwestern United States, who occupied the famous Mesa Verde site in about ¥1000. In some remote places in the world, caves and rock shelters are believed to be in use much the same way they were used in prehistoric times. A group of cave dwellers, the Tasaday, were discovered in the Philippines in 1971, but some investigators have labeled the find a hoax.

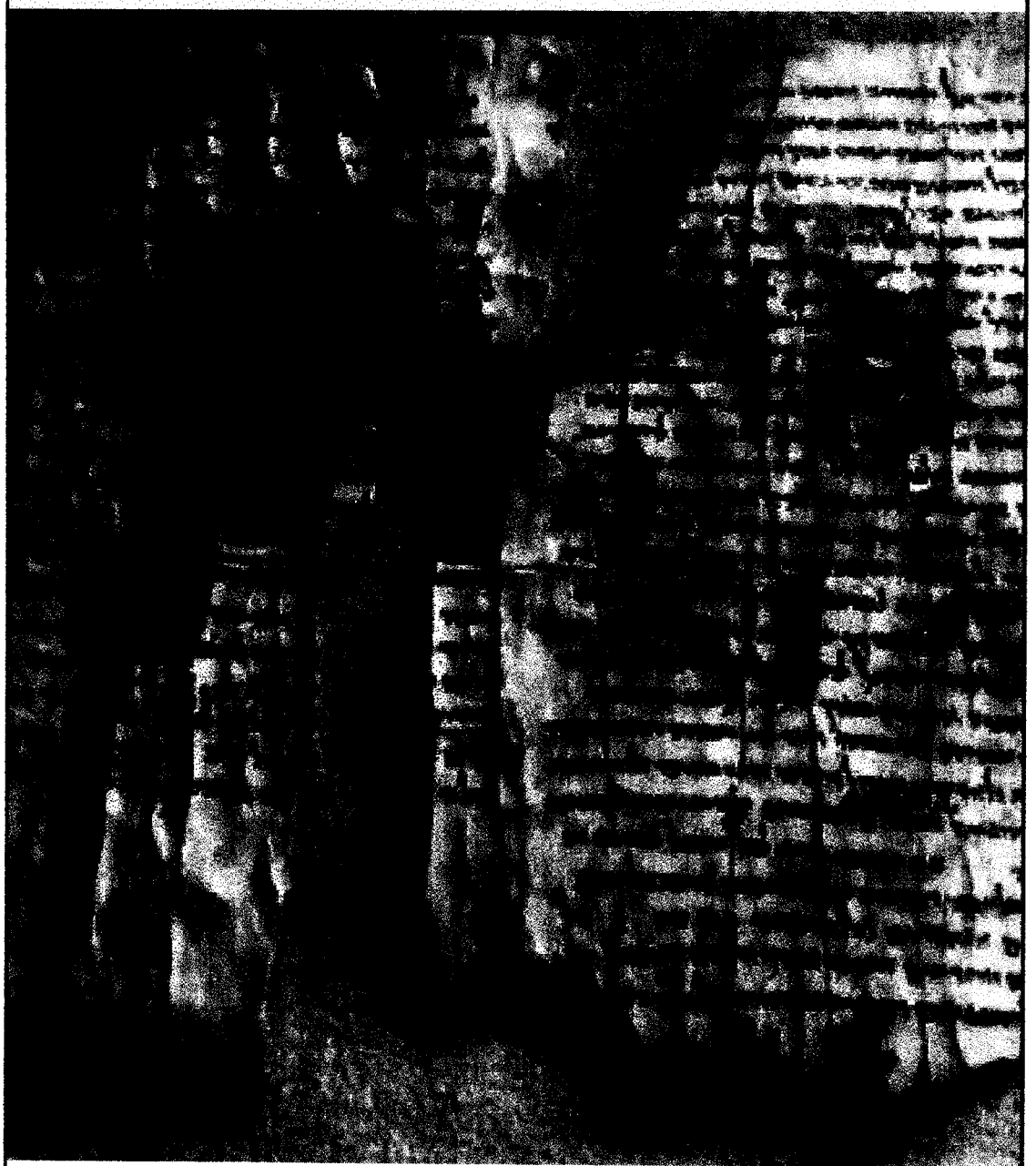
CAVES AS ARCHAEOLOGICAL SITES

DEAD SEA SCROLLS

The Dead Sea Scrolls are Hebrew, Aramaic, and Greek manuscripts discovered (1947-56) in caves near Wadi Qumran, in what is now the Israeli-occupied West Bank, on the northwestern shore of the Dead Sea. They were left there by a Jewish community that lived in the area around the time of Christ. The scrolls contain several types of Jewish religious literature, including many parts of the Old Testament in Hebrew, Greek translation, and Aramaic paraphrase (Targum). Biblical material was also rewritten, imitated, and expanded in stories, thematic collections of biblical texts, commentaries, hymns, psalms, blessings, prayers, exhortations to wisdom, and elaborations of biblical law. Also found were nonbiblical Jewish literature and scrolls that testify to the worldview and theology of the Qumran community. Among the latter are the Community Rule, which defines its goals and way of life; the War Scroll, which describes the final, apocalyptic battle of good against evil; and the Temple Scroll (which some date prior to the community), describing an ideal Jerusalem Temple and laws for a sanctified people. The collection consists chiefly of thousands of fragments, most of them very small. Complete documents are relatively few in number.

Although they had been preserved in dry caves for almost 2,000 years, all the scrolls show some damaged edges, deterioration, and discoloration. Infrared photography and a variety of other scientific techniques were used to decipher the writing. The largest and best-preserved scrolls were quickly photographed, translated, and made available to the scholarly world. However, many of the manuscripts had broken into hundreds of small parts that had to be

Dead Sea Scrolls



pieced together, identified, and interpreted. An international team of scholars divided up the work, but more than 40 years later many of the texts still had not been published. Widespread protests about their unavailability to other researchers led the Huntington Library of San Marino, Calif., to make photographs of the unpublished texts available to the public in September 1991. A month later Israeli authorities agreed to remove restrictions on access to the scrolls.

The original publication of the scrolls caused an immediate sensation. They give firsthand evidence for Jewish thought and religion in the New Testament period.

The scrolls have had three major effects on historical and religious knowledge. The copies of biblical books, older than any others in existence, have illuminated many previously unclear passages of the standard Hebrew Bible and have shown that the ancient Greek translations often reflect authentic Hebrew variations that had hitherto been lost. Second, the diversity of the literature has revealed the rich variety of Jewish tradition in antiquity, thus providing a context for understanding the development of early Judaism and Christianity. Third, knowledge about the Qumran community has been greatly increased. It has most often been identified as a type of Essene group, although some scholars are not convinced by this identification. The prevailing view is that the group moved to Qumran 150-100 bc after a conflict with the ruling Hasmonean high priests in Jerusalem. If the events alluded to in the biblical commentaries are historical, the community and an early leader, the Teacher of Righteousness, experienced external oppression and also internal divisions.

The community considered itself to be the true Israel, zealously obeying biblical law as interpreted by its leaders and awaiting the coming of God to destroy all evil and purify Jerusalem. They were governed at various times by priests, overseers, and councils and met in regular communal assemblies.

Property was held in common, celibacy was probably practiced, and ritual purity and tithing rules were strictly observed. The members, who lived in caves within several miles of the main administrative center, kept apart from outsiders. Initiation was carried out in several stages. Behavior was governed by detailed instructions supported by penalties for disobedience, including expulsion.

MOUNT CARMEL CAVES

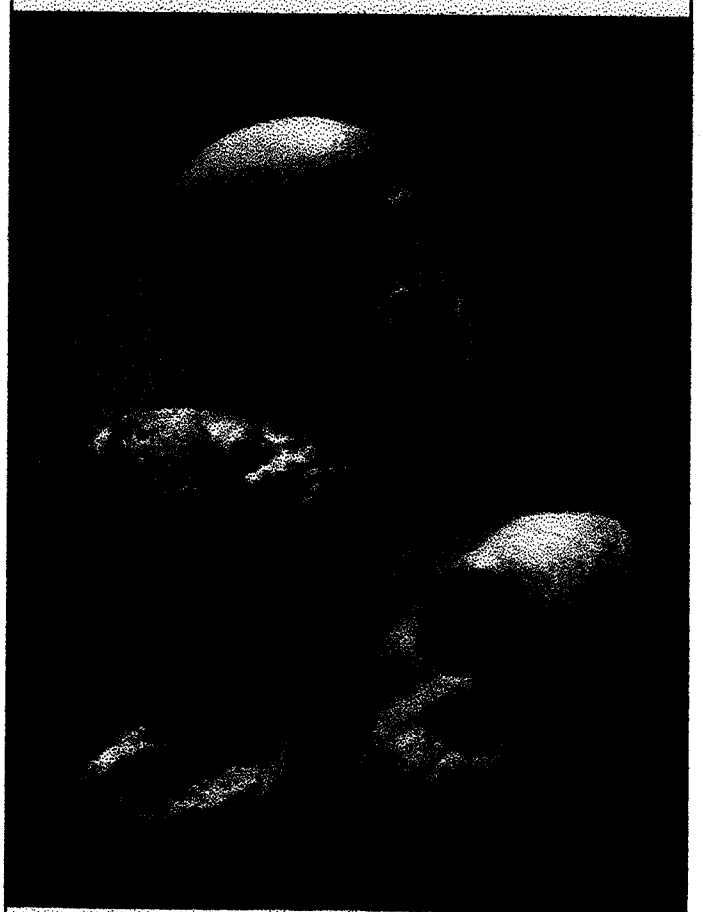
Among the most important Paleolithic Period sites ever excavated are three Mount Carmel caves situated near one another in the dry river channel known as the Wadi el-Mughara, on the Mount Carmel Range, south of Haifa, in Israel. The caves, known as el-Wad, et-Tabun, and es-Skhul, have yielded an abundance of hearths, artifacts, animal bones, and human fossils.

Archaeological levels in the caves span much of the prehistoric past, from the early Paleolithic (Acheulian), the middle Paleolithic (Mousterian), and the upper Paleolithic, through earliest farming groups, and into the Iron Age. Although a large number of human skeletons were unearthed in the caves, most anthropological attention has focused on the fossil bones of more than a dozen individuals found in the middle Paleolithic Mousterian levels of the Skhul and Taban caves.

The fossil bones from Tabun are usually considered to be from Neandertalers, while the human skeletal materials from the Skhul cave possess many features, including a high rounded braincase and a chin, among others, that define these peoples as more modern humans. Dates for the deposits from Skhul, which range from 100,000 to 115,000 years ago, suggest that these are

Qumran caves, West Bank

Australopithecus, Taung skull



the earliest modern humans yet discovered. The Tabun sequence, in contrast, ranges from earlier to later-in-time than the fossils from Skhul cave.

Complicating the issue even further, the artifacts found in both caves in association with the fossil bones are of the Mousterian tradition. Anthropologists continue to debate this evidence, but it is clear that there is no simple evolutionary relationship between Neandertalers and early modern humans in the Middle East.

BAMIAN

Bamian (Bamiyan), a town in the Bamian River valley (elevation 2,590 m/8,480 ft) northwest of Kabul, in Afghanistan, was for centuries an important commercial and religious center on the caravan route between central Asia and India. During the 2d to 9th century, numerous Buddhist monuments were constructed along the conglomerate cliffs that wall the valley. They include caves fashioned into temples and monasteries, many containing well-preserved frescolike wall paintings, and a famous colossal statue of the Buddha, standing 53 m (175 ft) high, the tallest stone sculpture of its kind in the world. This standing Buddha and another measuring about 37 m (120 ft) are set within niches carved into the cliff. The statues, which probably date from the 3d to 5th century, are mentioned by the Chinese monk Xuanzang, who visited Bamian c.630 on his way to India. Mongol invaders under Genghis Khan destroyed the town in 1221.

During the Afghan civil war of the 1980s and '90s the caves at Bamian became a shelter for refugees. The presence of so many people created a

grave risk to the archaeological site, which also came under bomb attack by the Taliban government in 1997. Taliban militiamen captured Bamian in September 1998, raising fears that these militant Muslims might destroy the statues, which they consider idolatrous.

MAMOTH CAVE ARCHAEOLOGY

Paleoindians

Over 12,000 years ago, when huge sheets of thick glacial ice covered large portions of the North American continent, small nomadic groups of people wandered over the Kentucky landscape. Today, archeologists refer to these early American people as PaleoIndians, which means "ancient Indians." However, we know very little about them. We don't know what they called themselves and we don't know what language they spoke. We know that they were experts at working stone to make spear points for thrusting into their prey. We know that they lived by hunting animals and gathering plants, and we know that part of their time was spent hunting megafauna (large animals) such as bison, giant ground sloths, and mastodons. The PaleoIndians were a transient people, moving frequently and moving long distances in order to follow animal herds and collect nuts, berries, and other foods that ripened with the seasons. Because these people moved so often and traveled in small groups, there have been few opportunities to locate the places where they camped. So far, only a few spear points of the PaleoIndian people have been found in Mammoth Cave National Park.

Archaic Indians

Over time, temperatures warmed, glaciers retreated to the north, megafauna became extinct, and the local environment changed from a forest dominated by pine, spruce, and fir to a forest of mixed hardwoods containing oak and hickory. The population of the Indians also increased. With these

environmental changes came changes in the ways native Americans lived. Instead of hunting megafauna, they hunted smaller animals such as deer, turkey, and raccoon. They continued to make fine stone tools, but they made them in different shapes and sizes, reflecting the new hunting methods developed to more efficiently capture smaller animals. Because these descendants of paleoIndians practiced a different way of life from their ancestors, archeologists have given them a different name: the Archaic Indians. The Archaic period dates from 8000 B.C. to 1000 B.C. in Kentucky. The earliest Archaic peoples continued a foraging way of life similar to that of their PaleoIndian ancestors. Small groups of related peoples, called "bands," frequently moved within their hunting territories, collecting various plants and animals as they became seasonally available. Several Early Archaic (8000-6000 B.C.) sites exist in Mammoth Cave National Park.

Middle Archaic Period

As the numbers of Archaic people grew, the number of bands grew, and the hunting territory of each band shrank in size. The smaller territories and the differences in local environments between territories led to the development of more and more differences between groups. Members of each band adapted to the conditions, developing new tools and modifying seasonal movements and hunting and gathering strategies to take advantage of the resources within their own territory. In Mammoth Cave National Park, this slow adaptation to local environments is reflected in an increase in the number and types of artifacts, especially spear points, found from the Middle Archaic period (6000-3000 B.C.).Bands did not live in isolation. They came in contact with other bands, and they exchanged shells, copper, and marriage partners.

Late Archaic Period

During the Late Archaic period (3000-1000 B.C.) the numbers of people in this region continued to grow. During the later portion of the Archaic period, the Indians began making pottery, cultivating gardens, and growing

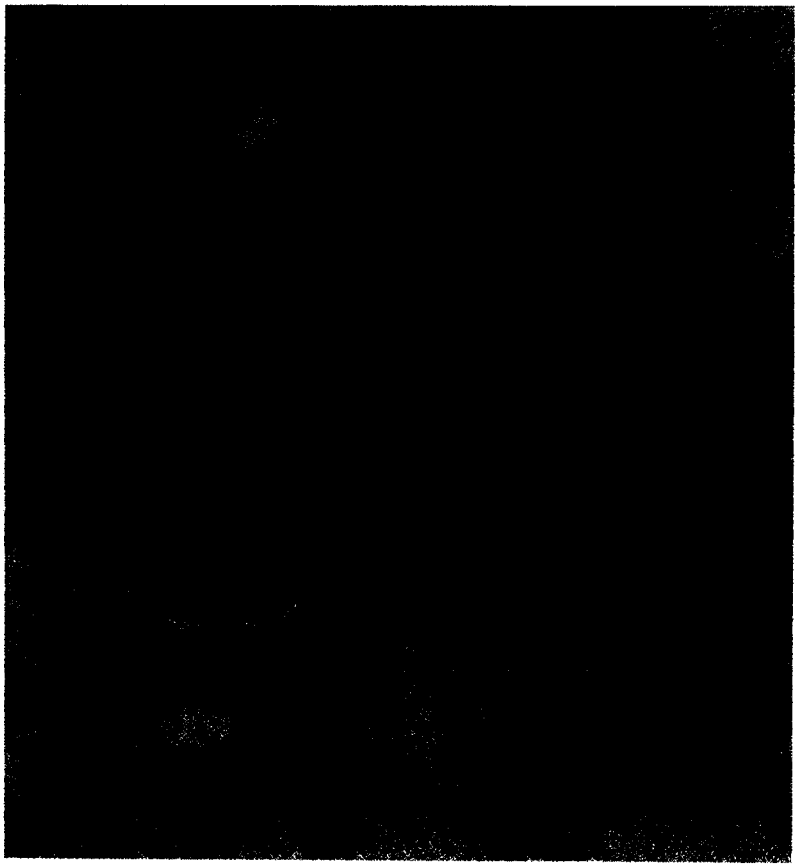
domesticated plants. It was near the end of the Late Archaic period that Indians began exploring Mammoth Cave and other caves in the area, collecting minerals they found. Why Late Archaic people traveled miles within Mammoth Cave to collect selenite, mirabilite, epsomite, and gypsum is a matter of speculation. The most likely reason is that these minerals were valued for their medicinal properties and/or ceremonial uses, and that they were traded to other groups for food, shells and other goods.

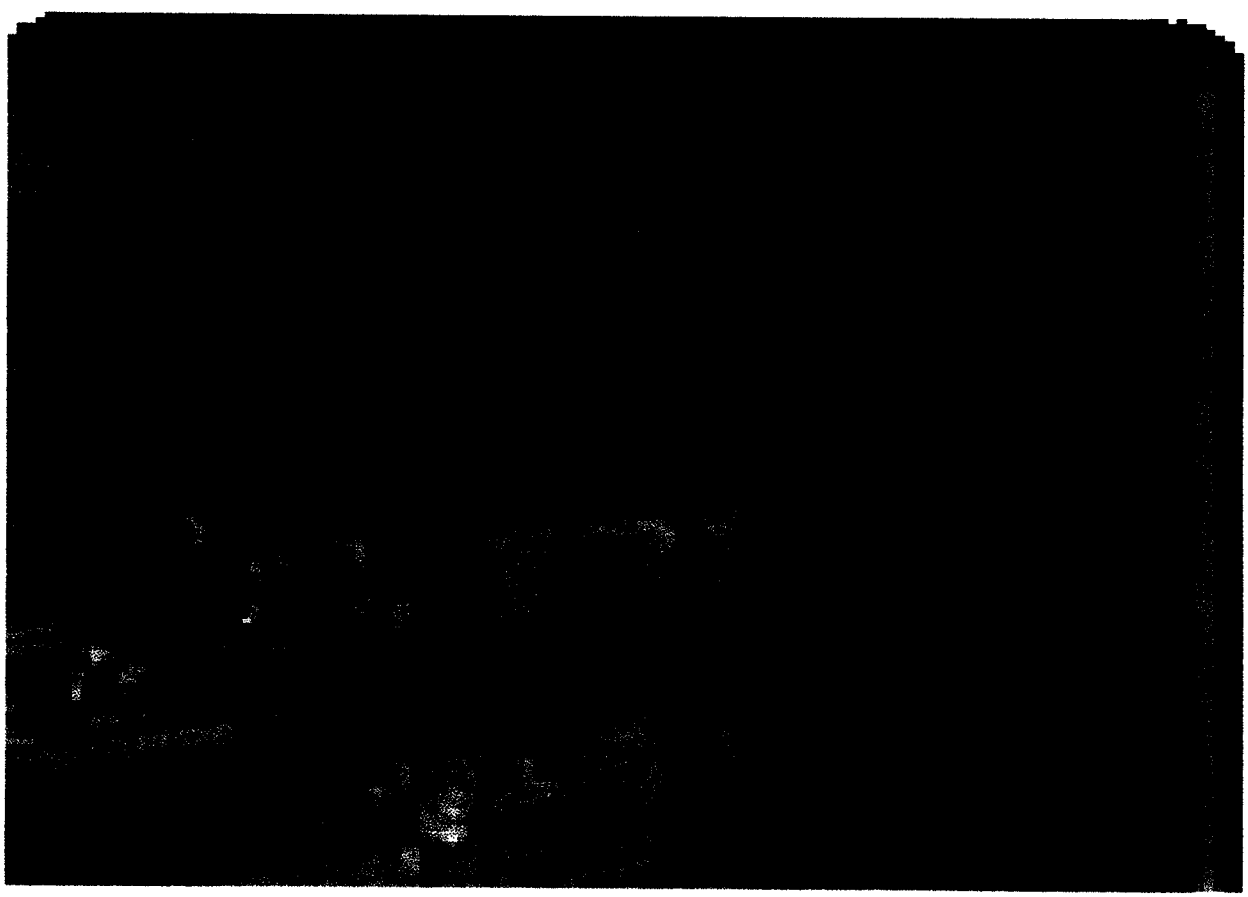
CAVE PAINTINGS

AJANTA CAVES

Ajanta is a village in Aurangabad district of Maharashtra state in western India. It is the site of famous rock-cut Buddhist sanctuaries dating from the 2nd century to the 7th century. The Ajanta caves contain extraordinary interior wall paintings. The 29 hollowed-out chambers pierce a crescent-shaped granite cliff north of the village. The caves, which served as a Buddhist monastery and a stopping place for pilgrims using the trade route through western India, are of two types: monasteries (viharas) and vaulted temple halls (caityas) for worship. Intricately carved pillars and niches decorate the facades and interiors of the caves. On the walls and ceilings are frescolike paintings, primarily depicting scenes from the life of the Buddha before his enlightenment.

The exuberant paintings, although essentially religious in theme, convey much information about contemporary secular life. The finest date from the 4th to the 7th century, and the style of their sensuously modeled human forms influenced later Buddhist art throughout Asia. With Buddhism's decline in India, the Ajanta caves were abandoned and forgotten until British soldiers rediscovered them in 1819. The Ajanta caves are a UNESCO World Heritage Site.





ELLORA

Ellora, a village in east central Maharashtra State, India, about 435 km (270 mi) northeast of Bombay, is noted for its 34 rock-cut shrines and cave-temples. The sanctuaries,mostly Hindu or Buddhist, with some Jain (see Hinduism, Buddhism, Jainism) were excavated in the scarp of a lava plateau between the mid-4th and late 9th centuries ¥. In most of the caves an entrance space leads to a shrine cut in the form of a pillared hall or cluster of halls. The interior effects of structural buildings are imitated in the layout and in the profuse carving of the rock surfaces.

The most spectacular of the rock-cut shrines, the great Kailasa temple, is not a cave at all but a freestanding monolith with an exterior courtyard and subsidiary shrines. Probably constructed under the Rashtrakutan king Krishna I (r. c.756Ð73), it is dedicated to Shiva, lord of Kailasa, whose icon, the lingam, is in the innermost sanctum. The Kailasa temple was intended as an architectural translation of the sacred mountain range, Shiva's eternal home, and was painted white to stress its symbolic relationship to the snowcapped peaks of the Himalayas. The Ellora caves are a UNESCO World Heritage Site.

ELEPHANTA CAVES

The island of Gharapuri, called Elephant by the English because of a colossal stone elephant that was found there, is situated 10 km (6 mi) offshore in Bombay harbor, Maharashtra state, western India. The island is the site of six rock-cut cave temples built during the 8th century and dedicated to the Hindu god Shiva. The largest temple, called the Great Cave, is a hall almost 40 m (130 ft) long by 17 m (55 ft) wide; its vast interior space is articulated, as in a structural building, by rows of massive pillars. In a deep recess at the back of the cave and aligned with the main entrance is a gigantic carved bust of Mahesamurti, Shiva's three-faced manifestation. The temple also contains an enclosed cell enshrining the phallic image of Shiva, the lingam. Large, richly carved panels throughout the interior vividly depict central incidents from the myth of Shiva. The Elephanta caves are a UNESCO World Heritage Site.

THE ALTAMIRA CAVE

Near Santillana del Mar, the beautiful Cantabrian town with one of the most outstanding urban complexes in Spain, where the evolution of civil Spanish architecture can be followed from the 13th to the 18th C, there are the Altamira Caves, part of the Heritage of Mankind since 1985. In Santillana del Mar, there is the Parador "Gil Blas" which occupies one of the many palatial buildings. The Altamira Cave was discovered by chance in 1869 by Marcelino de Santuola. Exploration began in 1875, but it was not until 1879 that the first paintings were discovered. Their surprising quality and exceptionally well-preserved state caused their specialists to doubt whether they were genuine. Their discoverer died before his lucky find had been officially accepted as authentic. Finally, the truth won and at the beginning of the century the

Altamira cave painting

Lascaux cave painting

scientific community submitted to the evidence. The discovery was exceptional evidence of the Magdalenian culture in southern Europe. The cave, limestone erosion's in a plateau, consists of a series of rooms and passages shaped like an "s" with an approximate length of 270m. It habitation dates from the Aurignacian period, to which the first figure-like symbols etched in the walls belong, but it was used more intensely in the Solutrean and Magdalenian periods, proof of which it the abundant stone material collected as well as the carbon-14 method used to date the organic remains found inside.

The main hall, which measures about 18 X 9 metres and lies about 30m from the entrance, was decorated at the beginning of the Magdalenian period. On its ceiling, splendid, many-coloured paintings were done. They are unique of their kind and depict bisons, horses, red deer and boar. The animal figures are large-scale, e.g., the red deer is 2.2 m long and is surprising not only because it is so lifelike, but also because the artists very painstakingly depicted its specific and sexual features.

Basically, the pictures are dynamic and the movement of the animals comes to life through the thoughtful use of the reliefs and uneven surface of the walls, thus creating a breathtaking effect. Another outstanding aspect is the variety in the texture of the furs and manes of the different species painted on the rock surface. It is created with a minimum of facilities and with the restrictions imposed by the use of only three shades of colour: ochre, red and black. In the complex of painting in the cave, bisons in different positions are most common and carried out most expertly, but there are also drawings described as "anthropomorphous" depicting humans with animal heads as well as different signs, such as hands or comb- and step-like symbols difficult to explain. Access to the cave is restricted today since the carbon anhydride breathed out by visitors damages these old paintings. This has made it necessary to limit the number of visitors to see these unique

Masterpieces of human prehistory.Its importance is so great that it is called the Sistine Chapel of palaeolithic art.

LASCAUX

Lascaux, a cave site near Montignac in the Valley of the Dordogne region of France, ranks with Altamira and Chauvet as one of the most spectacular and famous examples of prehistoric art yet discovered. Superb paintings and drawings in black, brown, red, and yellow pigments, as well as rock engravings, appear on the walls and ceilings of the central cavern and in several side chambers and galleries within the cave. The main cavern, known as the Great Hall of Bulls, is in itself a complete work of art, containing what appears to be a deliberately planned frieze over the entire extent of its walls. The frieze consists of huge polychrome bulls and horses, the largest 5.5 m (18 ft) in length and smaller bison, stags, a bear, and a curious, possibly mythical, spotted and two-horned animal. In the left gallery are the most famous paintings of polychrome animals, including the so-called Frieze of Little Horses and, on the vaulted roof, a beautiful composition with horses and cows. Inside a small side chamber are several engraved cave lions. In the so-called Shaft of the Dead Man is a scene unique in cave art, depicting a two-horned rhinoceros, a schematically drawn dead man, a wounded bison, and a bird on a hooked instrument, possibly a spear-thrower. The significance of the scene and of the many engraved and painted latticelike signs that alternate with the painted animals is obscure.

The art of Lascaux is dated to the early Magdalenian phases of the Upper Paleolithic Period (about 17,000 years ago). The cave was first discovered (1940) by four youths searching for their lost dog. Although initially the paintings were in perfect condition, subsequent

atmospheric changes in the cave caused some of the paintings to deteriorate. Lascaux was closed to the public in 1963; an exact replica of the famous cave, Lascaux II, opened nearby in 1983. Lascaux is one of more than 140 Paleolithic sites and some 25 decorated caves in the Valley, which has been designated an UNESCO World Heritage Site.

SPELEOLOGY

Speleology is the study of caves. It encompasses their geology, geography, biology, and history. Thus, studies of karst (limestone) topography and groundwater hydrology (flow of water through caves) are included as parts of speleology. One of the newest of sciences, speleology has had an extraordinary expansion since 1950 and has produced unifying principles leading to wide-ranging conclusions about the origin of caves, their environment, their actual measurements, their age, and the life cycles of cave animals. Speleological research has led to the economic utilization of caves as sources of water and as storage areas, the mining of cave-related minerals, and the gathering of data about early human cultures.

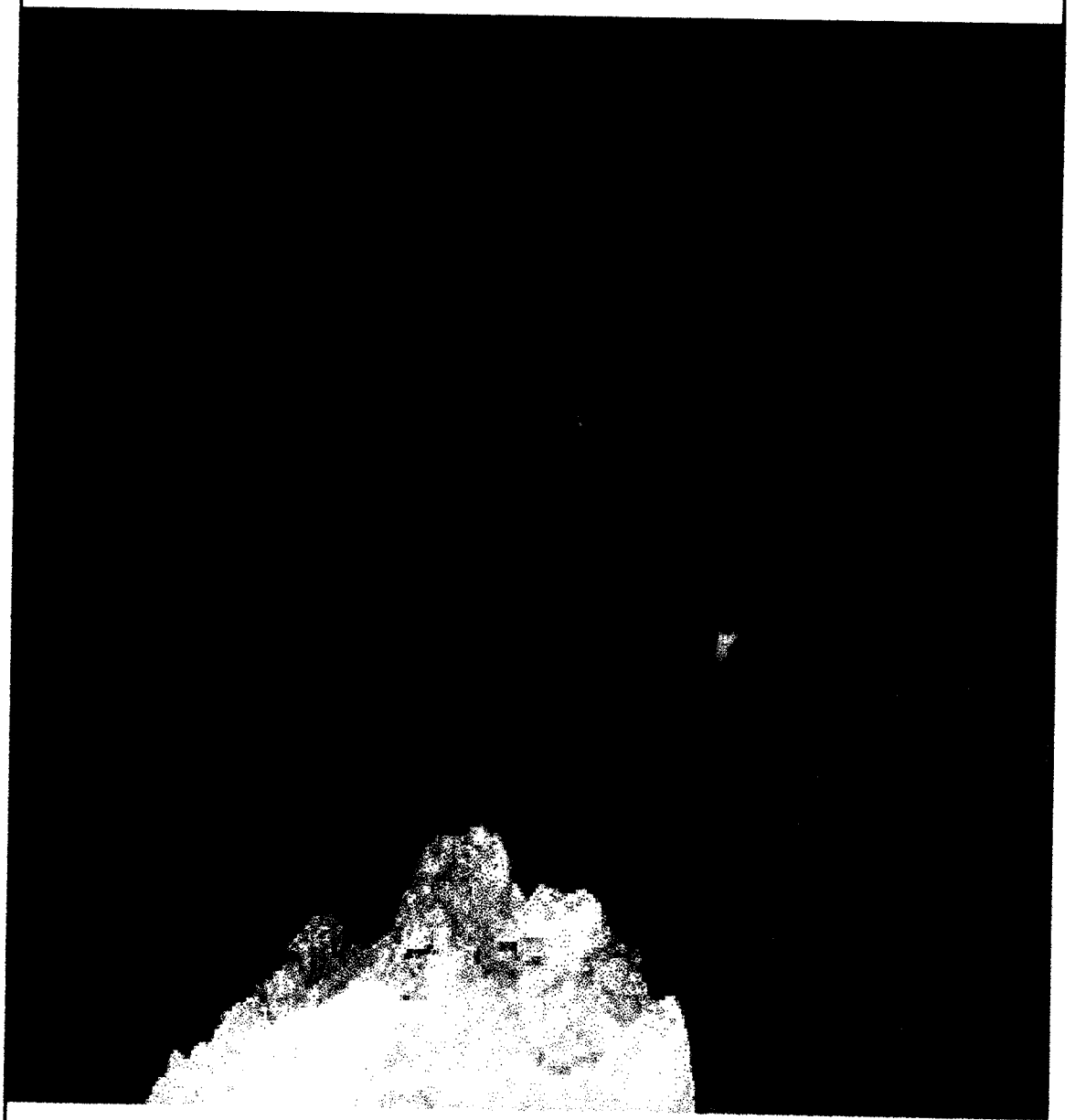
The cave of the fallen star

"Deep in a canyon with walls overhung by a caramel crust, only a few kilometers from the tepid waters of the Persian Gulf, I met a geologist who told me of a curious hole he had seen out in the desert north of Riyadh. Some of the local people claimed the hole was bottomless, while others held there was a river far below and that a tree trunk thrown into it had surfaced in Hofuf, 500 kilometers away... "

THE SIXTEEN-SECOND-STONE-FILLED-PEPSI-CAN PIT

"I might have scoffed at the tree-trunk tale, knowing that desert dwellers wouldn't throw such a valuable find down a deep hole, but what of my informant's claim that a stone-filled Pepsi can had continued clattering and bouncing for a full sixteen seconds after he had dropped it into the void?

spelunking



At this time (1985) I was an English teacher at the University of Petroleum and Minerals in Dhahran, now called KFUPM, but on weekends, my wife Susana and I would roam the desert, usually in search of caves. So my students were not surprised when I queried them about the bottomless pit near Riyadh and one of them immediately replied that a friend of a friend knew the location of this very place and he would be happy to make arrangements for the trip, how about next weekend?

In no time we put together a small, but truly international crew for our expedition: Abdulaziz Al-Agili, my student and a descendant of one of the men who helped King Sa'ud capture Riyadh and thus unify Saudi Arabia; Ron Kummerfeld, a hardy, mountain-climbing Survival Trainer from Kenya; my wife Susana Ibarra, a Mexican who had only recently been bit by the caving bug; Ron's dog Cricket, a Vizsla pointer from Hungary and me, representing the USA and its biggest caving organization, the National Speleological Society.

All of us were packed into a new Land Rover that was soon speeding past the sand dunes, escarpments and barren wastes found along the road from Dhahran to Riyadh. Our precise destination was Majma'ah, a town 186 kilometers northwest of the capital. There, on the following morning, we were to meet Aziz's contact who, because of Aziz's family connections,turned out to be the town's municipal president.

At 1:00 AM we rolled into brightly lit, but soundly sleeping Majma'ah and located our meeting place, the second gas station on the left. The only problem was that Abu Nassar, our guide, wouldn't be coming until 6 AM. We camped in a dusty spot on the outskirts of town, caught a few winks of sleep and somehow managed to creep out of our

tents at sunrise. Little did we know it was going to be one of the longest days of our lives!

While Susy and I prepared coffee, Ron and Aziz went to meet Abu Nassar, a friendly and very efficient man, who took one look at our puny cookstove and cold-cereal breakfast, turned around and drove back into town. He came back in no time with an enormous barbecue grill, charcoal, two legs of lamb and several large sacks of tomatoes and onions. He had no intention of letting his guests starve in the lonely desert.We drove out of town for about thirty kms and then headed off into the desert until we reached a picturesque, grassy spot, just beside a low escarpment. "This we call a rawdah," said Abu Nassar. "For us, this is a woods." It was a rich green meadow with hundreds of low trees, just tall enough to provide shade. We were now more disposed to believe the tale about the tree thrown into the pit, which we assumed was somewhere nearby. But Abu Nassar informed us this piece of paradise was merely our camping spot (who could argue!) and that we should unload our gear and set up our tents.We'd then be off to the hole in no time. This said, he drove away and we unloaded.

Just a few minutes later a Datsun pickup appeared. It was Abu Nassar's friend Sa'ud. "Are you going to leave all these things here?" he asked."They'll be stolen! Better put them into my truck." Only later did we discover that Sa'ud was the top police official for the area and knew what he was talking about. So we picked up our scattered gear and dumped it into the back of his truck, jumped into the Land Rover and followed Sa'ud along a track that parallels the escarpment. .

HOLE-TO-HOLE TOUR

Sa'ud knew we were interested in holes in the ground and made sure we didn't miss a one. The first was a pit about four meters deep. Some years ago it had been a flat spot. Then a shepherd and his

flock passed by.Suddenly, the whole thing caved in, killing several sheep and shaking up the shepherd. We climbed down to admire the strange, edible flowers growing at the bottom and to try photographing some shiny black beetles sporting white polka dots on their backs. While thus engaged, I glanced up at one of the crumbly dirt walls of the pit. A gruesome, grinning thing was staring at me from within a hole in the wall. I must confess I felt a moment of anic, figuring I was about to be devoured by Son of Alien, but a second later it turned into the harmless skull of a sheep, no doubt one of the unfortunate victims of the cave-in.We continued to follow the escarpment and suddenly came upon the last thing we expect to see in a desert: a lake! It was only 20 yards or so in diameter and its water was slightly salty. Once again, this hole was associated with a sudden collapse. This time it was a camel herder and his animals, crowded around a well that used to be where the center of the lake is now. The herder didn't survive and the twenty-foot hole slowly filled with the water that had fed the well.

THE GREAT CRATER

When we finally came to The Pit, we immediately knew it. First of all, someone had gone to the trouble of bulldozing a dirt rampart all around the place, an enormous circle about 50 meters in diameter. Then, there was the stillness. It felt menacing. We climbed atop the wall of dirt and gazed at an open maw a good 25 meters across. You couldn't really see into it from there or from any safe vantage point, so we cautiously crept to the fragile looking rim, lay down flat and peeked over the edge. We were peering down into what looked like a great crater with steep, nearly vertical sides. In the middle of the crater's floor, we could see a big, square hole and beyond the hole, nothing but inky darkness. "You're not going down there?!" exclaimed Susy. Ron and I put on our best macho fronts, gulped down any second thoughts about how much bigger this was than what we had expected, and began studiously to check each side of the hole for the most advantageous rigging point.

Since cavers in Arabia normally tie their ropes to their vehicles, our first plan was to drive over the rampart in order to get closer to the edge. But for some reason, we changed our minds. It turned out to be a wise decision.

HANGING IN SPACE

We had no idea what lay beyond the ledge overlooking the square hole, so we tied our longest rope (100 m) to the Land Rover's towing hitch and threw just enough out toward the center to get it into the fifty-foot square hole. Then we eased the rest of the rope over the side, hoping the other end would reach the floor of the "bottomless" pit. We now had an audience of young boys who seemed to have appeared out of nowhere and who gaped in wonder as we put on our harnesses and snapped on carabiners and various pieces of clanking climbing gear. Next, we padded the spot where the rope passed over the crater rim and put a short line or "tail" alongside, to make it easier to get over the lip on the way back up. Everything had to be perfect, as our lives would depend on this one rope... at least that's the way cavers usually do it, but when Ron suggested we use a belay or safety rope, I couldn't think of any good reason not to, although I've heard cavers say they just get in the way. So, when I leaned over the edge, ready to jump off, a brightly colored mountaineer's rope was attached to the sturdy triangle on my harness. I took the final step into nothingness and began to fall slowly into the abyss. The rope was sliding through the aluminum bars of my rack, a favorite rapelling device of American cavers, and I glided down to the floor of the crater. I made my way to the edge of the great, square hole and peeked over. I could barely see anything. This lip also got padding and a tail, after which I slipped down into the shadows of the deep void. I expected to be going down a shaft about twelve meters wide, but I had barely got over the edge when I discovered where I really was. As I descended, the walls began to move away from me and as my eyes

got used to the weaker light, I saw that I was hanging in free space at the top of an enormous, nearly spherical room, as wide as it was high. I was the size of a tiny spider coming down through a knothole in the ceiling of a vast basement. Suddenly, I heard a great WHOOSH and the flapping of wings all around me as a flock of grey rock doves shot up out of the hole, indignant at being disturbed in the intimacy of their private chambers.

DISCONNECTED

I continued down, reflecting upon the relative thinness of this big room's ceiling and how lucky we were not to have parked the Land Rover any closer to the crater's edge. Then Ron shouted: "How much further to go? I have about forty feet of safety line left." I peered down at the chasm below me. It seemed we had greatly miscalculated the distance. I was at the top and the bottom was nowhere in sight! I slid down another ten meters, stopped and disconnected the safety line. I began to understand why cavers don't bother with them. I ventured another look at the bottom and my heart skipped a beat. At last I could see the floor, but it looked like the rope did not reach it. I glided down a little more, looked again and seemed to make out a foot or two of rope lying on the bottom. I stopped holding my breath, relaxed and looked about me. I was halfway down a vast cavern that looked a good hundred meters in diameter, with walls made of crumbly dirt. No limestone or rock of any sort visible. As I lowered myself down, I was very slowly rotating and along the distant walls, I could see doves nesting in long, horizontal fissures which looked ready to fall at the flap of a wing. Most of the floor was covered with rocky rubble, forming a sizeable hill. I assumed this had originally constituted the missing portion of the ceiling. When I finally touched bottom, it felt as if a great weight had been lifted from my shoulders. I was delighted that, by sheer luck, the rope was exactly the length we needed, plus an extra meter to spare.

Then I looked up. This was the most overwhelming moment of the whole trip. The wide gap I had come down through, now appeared like a tiny white square, miles above me. A shaft of sunlight was streaming from it, all the way down to a spot on the floor of this huge room and dozens of doves were soaring in and out of the long, slanting beam. I stood transfixed, unable to believe I had come from 'way up there. Then a few stones came trickling down from the surface. Whether they had been dislodged by the doves or tossed in by the kids up above, I didn't know, but I decided to get away from the center of the room. I detached my rack from the rope and clattered towards the wall, making my way over and around large boulders which obviously had fallen from above. Only now did I notice how cool the place was. I also noticed that my knees were shaking, so I sat down for a few moments, once again gazing up at the incredible height and size of this cathedral-like chamber.

BALD TIRES AND HEDGEHOG BITS

I made my way to the wall and found myself standing on a smooth, dirt floor. I started walking and, every few steps, would jump back in surprise as a startled dove rose up out of nowhere in a wild fluttering of wings and shot past me. Apparently they felt so secure in this inaccessible spot, that they had taken to nesting on the ground. Soon, I came to a muddy area, obviously the lowest part of the pit. The water that had stood here had never risen above an inch or two in depth and nowhere could I see signs of drainage. So how was this hole formed? This was the question I pondered as I made my way along the almost perfectly round perimeter. If this room had once contained dirt or some mineral, where had it all gone? Maybe the place was just a large version of the collapses we had seen earlier, but how had it come about and how could such a gigantic empty space sustain itself with only dirt walls and ceiling? I heard a tiny peep of a voice far above me. Ron had just come

over the edge and seeing him up there brought the whole room into proper scale. He looked the size of an ant! It was a spectacular sight and I stared in awe.

I couldn't wait to see Ron's reaction when, after making a safe landing, he first looked up at the far-away ceiling and the tiny looking hole he had come through. When he hit bottom, before he removed his harness, Ron slowly turned, taking in the whole panorama. "John this isn't just big, it's BIG!" We continued my tour of the perimeter and came upon one of the few snakes . I've ever seen in a cave over nearly thirty years of exploring. Of course, according to Saudis, not to mention Hollywood, there ought to be at least a dozen snakes per square foot in any cave worthy of the name. This lonesome creature was about two feet long and beautifully mummified. The only other creatures -- aside from the omnipresent birds, which we now estimated to be in the thousands-- were prickly little hedgehogs or what was left of them. Their porcupine-like quills were in fine condition, but not the rest, which had been completely devoured by whatever predator had dropped them there. We suspected there were more than just doves living in the crevices far above us. We made a complete circuit of the well-lit room, peering into every crack or signs of a side passage, but all we found were more flustered rock doves. Had we found a passage, each of us was generously prepared to give the other the honor of crawling into it through the thick layer of bird droppings plastering every nook and cranny. But no passages appeared and, having done our duty as cavers, we headed back towards the rope with only an occasional nervous glance at the millions of tons of soft dirt being held up above us by forces beyond our comprehension. We picked our way among the boulders, bald tires and rusty basins, carefully stepping on every Pepsi can to see whether it might be full of stones and sixteen seconds' worth of dents. No luck. Though neither of us is an archeologist, we both had a strong suspicion artifacts like these were not going to require carbon dating.

IN A TOMATO

I prepared myself for the trip back up. I put on my harness and snapped three ascending devices onto the rope. Alternately lifting my legs and pushing down with my feet, I began to climb the rope, "frog style." Twenty meters up, I heard Ron utter a word not fit to print. He had just discovered he was out of film. "Susy can throw you one of ours," I suggested. Then, as I slowly made my way up, I heard this conversation:

Ron: Hello, Susy!

Susy: What?

Ron: I'm out of film. Would you mind throwing me---

Susy: What?

Ron: I -- am -- out -- of --

Susy: What?

Ron: FILM ... THROW .. DOWN ...

Susy: What?

You'll have to believe my version of this conversation, because I was the only one able to hear what both parties were saying! Yes, this was a mighty deep hole and the dialogue sounded like two people trying to shout through a brick wall. I made my way up a bit higher and called down to Ron that I would solve the whole problem by speaking to Susy in her native tongue.

John: ¡Hola, Susy!

Susy: What?

John: Tira una película... (Throw down a film...)

Susy: What?

John: Una película... ¡ ¡ UNA PELICULA ! !

Susy: What?

John: (a few feet higher) PE - LI - CU - LA

Susy: Película?

John: Sí sí sí sí sí sí -- ¡Película~ ¡Envuélvela en algo suave! (Wrap it in something soft.)

Susy: ¿En qué?

John: Algo suave ... ¡ SU - A - VE !

Susy: In a tomato?

John: What? a tomato?

Somehow, part of the message must have got through, for, a few minutes later, a plastic bag came whizzing through the air and disappeared into the shadows below. Ron's voice was barely distinguishable: "...only slightly exposed, I think..." were the few words I caught. Apparently, the film magazine had exploded on impact and Ron was trying to put it back together in a desperate attempt to get at least one shot of the spectacular view from the bottom. Unfortunately, we had decided to take only one camera down. Ron was to get pictures from the bottom and Susy from the top.

CLIMB LIGHTLY

I kept inch-worming my way up until suddenly the safety line was beside me. Although emergency ropes "just get in the way," I found myself snapping this one to my harness with a sigh of relief. Now I could relax for a few moments to take in the magnitude of this impressive pit and enjoy looking down at Ron, who once again appeared the size of an ant. With Aziz belaying, I reached the first lip and discovered that the rope my life depended on had been rubbing against a rock throughout my ascent! Apparently, it had slipped off its padding when Ron went over the edge. Part of the outer sheath was gone, but the inner fibers seemed okay. I got up and over the spot in a flash, padded it and told Ron to climb "as lightly as possible."

Then I looked up and saw a sight I had never seen before, a scene I would immediately have described as sheer fantasy had anyone ever suggested such a ridiculous idea. I saw my wife Susy standing in a

crack at the very lip of the crater, high above me, leaning over the edge, snapping pictures like mad. "Hey," I shouted, "I didn't know you had a twin! If that's you, what happened to your vertigo?"

"It's gone," she replied, she who used to clutch the nearest tree with both arms and legs at the slightest hint of a drop four yards away. And though she didn't descend that particular pit, from that day on, Susy has been the most ardent rapeller in our organization and usually needs to be restrained whenever we drive over high bridges, so strong is her urge to jump over the edge.

DHARB AL NAJEM

Susy, Aziz, Sa'ud and his little daughter all welcomed us enthusiastically as we came over the crater rim. They had been languishing in the heat while we had been strolling around the cool bottom of the pit. So we immediately got to work pulling up our ropes and gathering our gear.

Meanwhile, I asked Aziz, "Just what is the name of this hole and has anyone ever been down it?" "The local people call it Dharb Al Najem," he replied. "Dharb means a hit and Najem is star, so you could call it The Hit of the Star or The Place of the Fallen Star and you are definitely the first to reach the bottom and come back up alive."

EAT! EAT!

Sa'ud brought us back to Al Nadhim, "The Grassy Place," where we immediately set about the task of roasting the half-ton of meat given to us that morning, as well as cooking eggs, hot dogs (beef, of course), potatoes and other foods we had originally planned to eat. Aziz guaranteed he'd be able to eat anything left over. There is something universal about the size of teen-age appetites!All around the oasis, there were other groups of picnickers gathered around smoky fires. It was, after all, a beautiful Thursday night, the end of a long working week.

Somehow, word of our exploits must have spread among the barbecuers. A tall, heavy set man came toward us carrying a big metal pot and shouting, "Eat! eat!" He had noticed we lacked the traditional mountain of rice to accompany our half ton of roast lamb and so, here was a pot of kapsa to help us scrape through. A pot of salad soon followed and, eventually, a visit by our mysterious benefactor's entire party, all of them dressed in flowing white thobes. One of our four visitors spoke excellent English and well he should have, for he introduced himself as the local Minister of Education. He and the entire group were most interested in the depth and size of the Dharb Al Najem and, of course, the amount of water that might be in it. As we talked, we discovered that the man who had brought us all that food was no one less than the regional governor! Another member of the party was the local Minister of information and the jolly old timer who had cooked the kapsa turned out to be the local Minister of Water. In the course of that evening, we had to decline numerous invitations to tea and further dinners. Someone brought us a pailful of laban, the watery yogurt that is popular as a refreshing drink in this part of the world. The donor was urging us to drink more (We still had three-fourths of a bucket to go), when the first drops began to fall.

DESERT STORM

In Saudi Arabia, a sprinkle of rain is a real treat, but we had been so busy entertaining guests and stuffing ourselves that all of us had neglected to put up our tents. The rain pattered on as we hurriedly set them up, threw our belongings inside and jumped in to escape what was now a genuine drizzle. No sooner were we inside the tents than we began to feel that drowsiness that follows a long and strenuous day. Time for bed, no matter whether our watches -- so out of place in this natural paradise-- insisted that it was only 8:00 PM! After a little while, the drizzle subsided and the stars came out, but Susy was already

asleep, Ron was snoring in his bag, stretched out beside his car and Aziz had just crawled into his gently flapping tent. All was quiet, except for an occasional clap of distant thunder...

Thunder? In Saudi Arabia? Yes, it's true that it only rains but rarely in the desert -- all the more reason for nature to put on a real first-class show. In seconds, the far-off flickers turned into lightning bolts right over our heads. Then the gale hit us full force. First, the northeastern side of our dome tent bulged inward until it touched the southwestern! Then a ton of water hit us like a tidal wave. Both of us leapt up and pushed back the sail-like wall, which was already soaked through and dripping. I reached through the fabric and grabbed two of the fiberglass poles that had been bent almost to the snapping point. We leaned against the bulge and our combined strength was barely enough to keep the wind from turning over the tent, which, of course, we hadn't pegged to the ground. Dome tents don't need it, right? For ten minutes we held on, rainwater streaming down our arms. Both flashlights had perversely decided to quit on us, but I could feel what was happening to the floor of the tent: sleeping bags, clothes, books, shortwave radio and cosmetics were all floating in a cold, wet, muddy soup. KRRRACKK! A bolt of lightning exploded an inch from our bedraggled shelter, scaring the daylights out of us, whatever daylights are!

ABANDON SHIP

"Abandon ship!" I yelled to Susy. "Grab anything that's worth saving and get it into Ron's car! I'll try to keep us right side up a few minutes more!" Trembling, Susy unzipped the tent door. Outside, the storm was raging. Lightning flashes showed camping gear flying every which way. Ron and Aziz, safely inside the truck, understood our need at once. Ron started the engine and drove closer to the tent, unknowingly squashing the boxes we had stored beneath the Land Rover.One hour later, four wet cavers and a ton of gooey equipment, all

mixed into one great heap, were rolling in the open desert. It was 9:00 PM. Somehow we found our way that dark and wild night across thirty kilometers of rough wasteland and actually came upon the Majma'ah road. After that, we drove in shifts until, bleary-eyed, we pulled into Dhahran at sunrise, Friday morning. The entire Dharb Al Najem adventure had taken place on one very long Thursday, but some of us didn't recover for a full week. And, of course, we realized that the pit we had bottomed couldn't have been the deep hole the geologist had spoken of. What adventures will befall the lucky people who first descend the real

Sixteen-Second-Stone-Filled-Pepsi-Can Pit?

REMARK :<u>This extract reveals the thrill and danger involved in spelunking.</u>

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