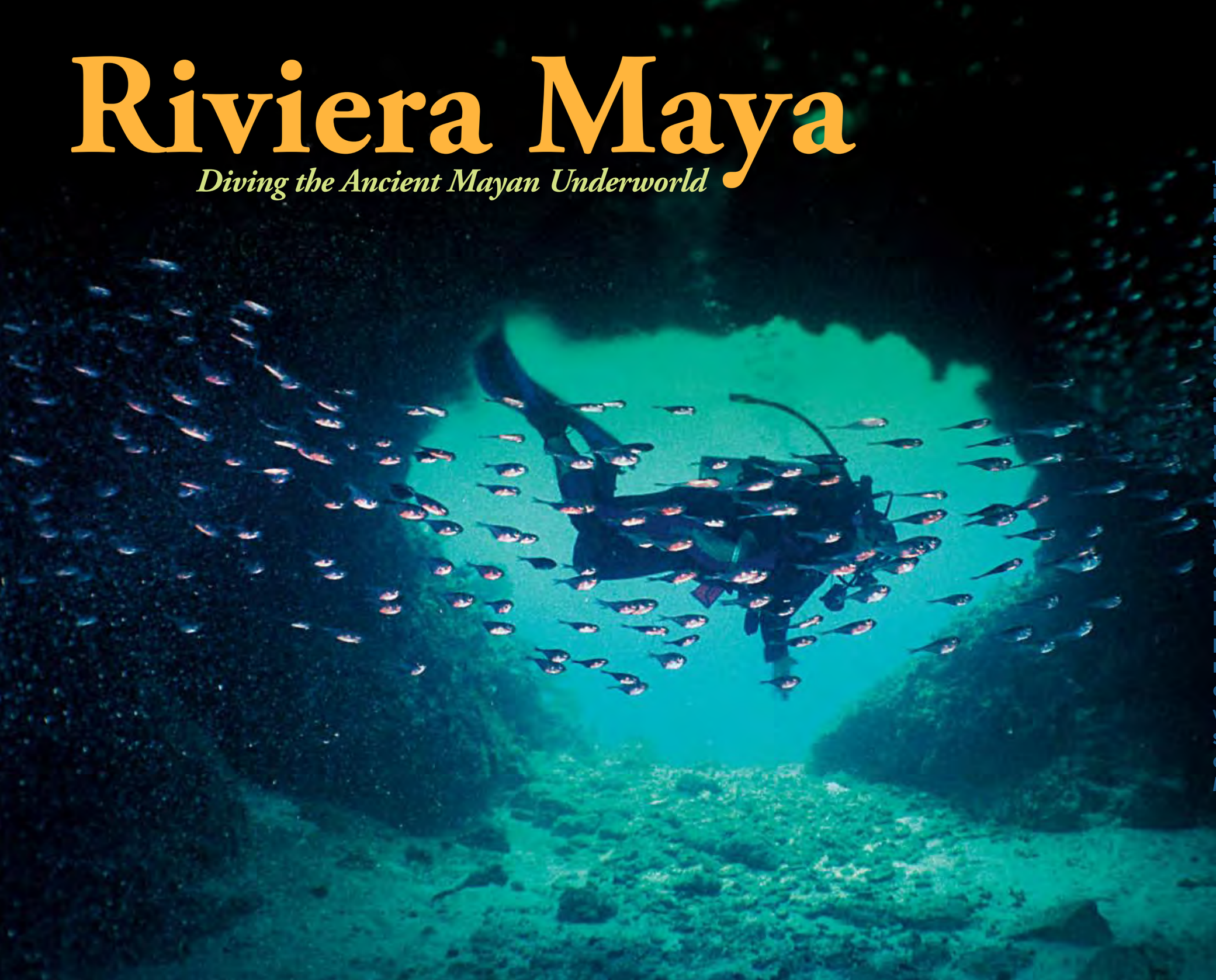
Riviera Maya

Diving the Ancient Mayan Underworld



The Yucatan Peninsula is located in the south of the contiguous Mexican states. The ground here is heated by the tropical sun—35°C makes for a hot and impassable jungle. The bogs—littered with iguanas, snakes and crocodiles—are drying up. A rare tropical storm suddenly and unexpectedly flies up from the Caribbean Sea. Black clouds, peals of thunder, bright lighting, squalls of wind and rain last no more than 15–20 minutes and again the damp stuffy mind-melting weight of the stifling heat returns. It is not the best place to dwell for the white man. But this land saw an era over 1000 years ago, when it was occupied by a surprisingly small-in-stature, dark-skinned people—the Maya.

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CLOCKWISE FROM TOP: Mayan ruins; The coast of Yukatan; The mysterious underworld of the ancient Mayan people
PREVIOUS PAGE: Diver explores cave

The Mayans completely adapted to the conditions of their environment, with superb observations of the nature around them, learning to cultivate maize and settling throughout their lands. In homage to their Gods, they constructed temples, pyramids and observatories. They developed an alphabet and wrote texts. They devised their own calendar, composed legends and wrote down history of unique peoples. Mayans have maintained their unique guttural language and the original tenets of their culture up to current times.

Over 30 years ago, the government of Mexico made a decision that changed the life of its native peoples. The government set out to construct a new resort on the southeast coast of the Yukatàn Peninsula on a place hitherto unknown in a small fishing village. The city is now known as Cancun, which translated from the Mayan language means "the nest of the Snake" (or the place where the Mayan god lives), and includes the area adjoining it which has been built up with luxurious hotel—the Riviera Maya.

Today Cancun and the Riviera Maya are popular vacation spots and make-up the diving capital of the Mexican Caribbean islands. Here, one will find smart hotels, splendid palm trees, snow-white beaches of coral sand, the azure sea, everywhere smiling cheerful people with fins, snorkels, masks and cylinders on their backs, a casino, noisy discos, night clubs and the popular Mexican bullfight every Wednesday. There are huge divers' supermarkets where it is possible to buy everything one needs for diving. There are fleets of dive boats heading out to sea every morning with enthusiastic skin divers onboard.

Certainly, there is interesting for everyone in plunging into the underwater world of the Caribbean Sea, to admire the multi-colored tropical fishes, to dive in thickets of soft corals, to take pleasure in the strongest sea currents around and to explore the underwater bronze guns of Spanish galleons even though the maximal diving depth in this area does not exceed 18 meters, and in the vicinity of the city, there is only one wreck. But one can see the same diving pleasures you can find here in any other place around Caribbean basin. So why do experts recommend coming to this location? To go here only for sea diving? Definitely not. So why then, during the high season, do 70,000 visitors come when all the local hotels have put up the "sold out" notice? Why do these people choose Cancun and the Riviera Maya? The answer to this question is that only here, on the Riviera Maya, is it possible to see one of the truly great diving miracles of the world—the surprising and exciting world of the underwater caves of the Yukatàn.

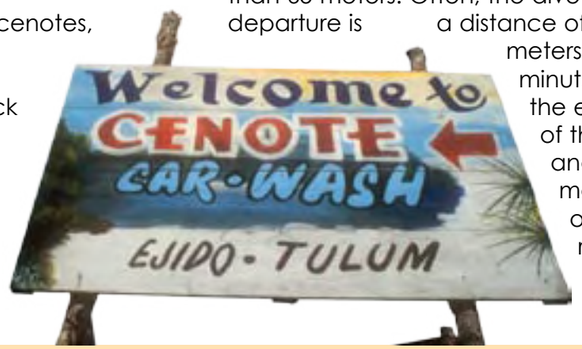
An old Mayan legend tells a story about how the gods, when they created the land, filled the peninsula with fresh water, which they say is the "blood"

feeding the ground of the Maya. When limestone collapses within a cave, freshwater lakes (in the Maya language is "cenotes") become the inputs to the magical underground world of the ancient Mayan gods. In the past, during seasons of heavy draught, cenotes were for Mayans the unique, sacred sources of fresh water. Here, at the cenotes edge, Mayan priests made human sacrifices and dumped the bodies of the victims into the caverns. From here, they took water for irrigating maize fields. But the terrible pagan customs are long past gone in history, and now the underwater caves have become the focus of mass pilgrimages of skin divers from all over the world.

People that come here in the hottest part of the day will take pleasure in the crystal clear cool waters (+24°C) and swim for a while at the mouth of a cavern with only a mask, a snorkel and a small torch in hand. Those who are more brave dive here with a skilled guide—an instructor with one cylinder behind his back and a noisy cheerful company of friends. The rules of cave diving are simple enough: one guide should have no more than four underwater tourists, and it is necessary for all participants on the cave diving excursion to have an Open Water certificate.

Cenote Etiquette

At the entrance of the cenotes, you will have to hear a short lecture on how to correctly do the frog kick with your fins, how to show signals by torch, how to use a guide line and how to use the "one third" tank rule. As a rule, beginning cave divers dive in water with a visibility of no less than 10 meters, a depth of no more than 33 meters and a distance from the cenote's entrance of no more than 65 meters. Often, the dive group's departure is a distance of 300-400 meters for 35-40 minutes from the entrance of the cave, and on many sites of such routes, there is



CLOCKWISE FROM LEFT: Mayan warrior dances to invoke the spirits; Divers explores cenote caverns; Cenote welcome sign

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THIS PAGE: Divers swim through passages and narrow crevasses. INSET: Ancient Mayan art

absolutely no daylight visible.

During these routes, it is always possible to find several air chambers under the arch of a cave or outputs in dry cave halls. The popularity of cave diving here has become so great that all dive centers offer similar rounds and will organize excursions almost daily. In the afternoon, at an input to a cenote, it is sometimes possible to see the lines of several divers who are waiting for an opportunity just to begin a dive. People go cave diving here only for the pleasure of it. This is the reason why it is has become so attractive for so many people.

Underwater caves expand the diver's erudition and open for them the mysterious world of the Mayan culture. What you will see here completely contradicts preconceived opinions… that cave diving is only for the elite—groups of single-minded people who always put on black equipment and cannot live without the feeling of constant danger… those who like to "sit on an adrenaline needle" for a long time.

Cave Diving Tourism

Perfectly organized mass cave diving tourism is the brightest distinctive feature and unconditional advantage of Cancun and Riviera Maya dive centers. It is a real cave diving paradise. To be on the Yukatàn and never dive the underwater caves is to miss an opportunity to achieve a diver's greatest success.

On the peninsula today, it is known that there are over 3,000 cenotes, entrances to underwater limestone labyrinths. Through the efforts of many brave cave divers, it was possible to prove that many of these cenotes were connected with each other and had a general hydrological system. This means that if you dive in one of these cenotes, you can find an exit on the surface far from the place where you started your dive and come out in another part of the jungle. So Nohoch Nah Chich, one of the longest cave diving labyrinths, having a total extent of underwater passages of more than 68 kilometers. And in the deepest cave system, Dos Ojos, a depth of 106 meters has already been reached. Modern explorations and scientific research confirms the old Mayan legend about the huge underground

RIGHT: Divers traverse the stony landscapes of the Mayan underworld; Dancers perform traditional Mexican dances: LOWER RIGHT INSET: A cenote sits silently in the jungle

river which connects together all the cenotes of the peninsula. It is my opinion whatever it is that exists here under the Yukatàn will be explored, and one of the greatest underwater cave systems of the world will be discovered. Even though our time was short here, our team decided to try to make a few research dives into some of the most known cenotes.

Cenote Dos Ojos

A one-and-a-half-hour race with a small minibus at high-speed on a concrete-surfaced road takes us to a huge sign with the inscription "Welcome to the magic cenotes world". We turn off onto a dirt road which winds into a dense jungle. Reed huts and native people are at patrol. We brake, exchange greetings and pay eight dollars to a person for the right to stay on their land and the permission to dive here. Another couple or three kilometers of ground, and we are at the site.

With anticipation, we jump out from the vehicle and run to examine the limestone collapse. We find vertical walls covered with moss, roots of trees hanging down and collecting water from the underground lake at the bottom of the pool where every stone is visible. It would be great to take a dip right now, but we are limited in time, and it is necessary to prepare our equipment.

As always, we run through the habitual procedure of checking equipment functionality and capacity, one's own and one's buddy's regulators, gauges, torches, reels, etc., as well as complete a bubble check. Once again we repeat the dive plan, and then we commence the dive.

Water tenderly embraces us, fins wave easily, and we plunge into the delightful world of Dos Ojos. We do a circle of the perimeter of Entrance Lake. Solar beams play and shimmer in the water and on the walls of the collapse. Underwater labyrinths open from different directions. Above the entrance, hanging like the huge teeth of a dragon, are conical black stalactites. Our Mexican colleague, Huan, finds the gold guide line and fixes a jump-reel onto it. He then invites us to continue the dive. We begin to journey into the gloom, switch on our HID torches from which bright blue light

Performers in traditional Mayan costume

emanates filling the caverns all around us. Visibility of the water is more than 20 meters, and we soar over sandy dunes into the underground tunnel.

Our way is blocked by a disturbing sign with an image of an old woman—she is Death with a scythe in a bony hand. The inscription on it says: "More than 300 divers, including open water scuba instructors, have died here in caves just like this one. You need training to dive. You need cave training and cave equipment to cave dive.

ABOVE: A group of snorkelers meet the team of cave divers as they emerge from the depths

Without cave training and cave equipment, divers can die here." It is obvious that it is an advertisement for selling cave diving education courses. Passing it, we take some photographs and continue on our path.

Tunnels branch and the yellow guide line looks endless. The stock of air in our twin sets steadily expires to "one-third". We understand that only more skilled teams of cave divers can pass this point. Dos Ojos is not easy to navigate. So, it is time for us to go back.

We are met by snorkeling divers at the cenote's entrance. They are entertained by the sight of us, as if we are some kind of heroes with doubles coming back from the underground depths. They have the same enthusiastic interest in our group that visitors at a circus might have, who, for the first time, see an elephant. They examine us and our equipment. Some of them even dive toward us to check us out or even to shake our hands.

Grand Cenote

Our friend, Rahelio, looks like a tough guy—short cropped hair, ears sticking out of his head, a chain with the tooth of a prehistoric shark hanging around his neck and an upper body covered with tattoos. He's a really big fan of sharks and cave diving. We joke, that all he

Cave diver and writer, Andrey Bizyukin after a good dive

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Underwater photographer hovers under stalagtites.

Performer in traditional Mayan costume invokes the spirits

needs now is a ring in his nose. Despite all of this exuberant body décor, Rahelio is still a fine cave diving instructor.

He suggests that we dive Grand Cenote, a grandiose cenote indeed, where we will dive as far as it is possible. We reach the next limestone collapse and locals collect an entrance fee from us. With a wide step, we enter the clearest, cleanest lake I have ever seen. It is teaming with darting little fish. Huge stone columns block the entrance to the cave. We swim between them and take a quick look back to say goodbye to the daylight.

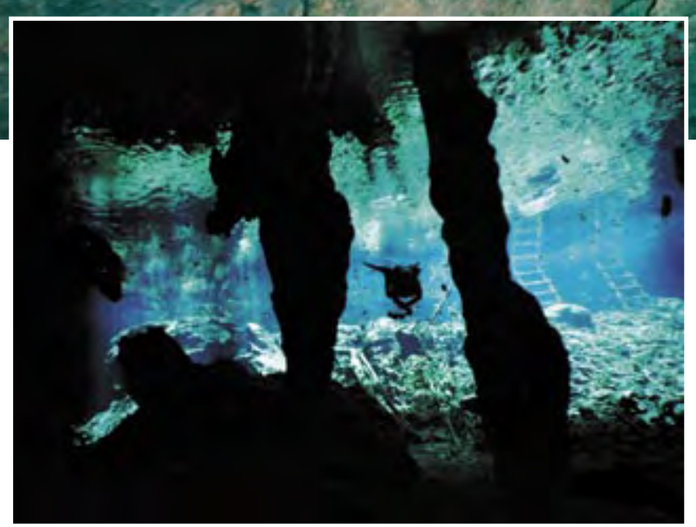
A great number of a most exotic array of cave formations confronts us—forms that seem inspired by a god's amazing imagination—including a plethora of stalactites, stalagmites, columns, limestone curtains and simple thin hollow tubes (spaghetti). There is simply no place free of limestone formations.

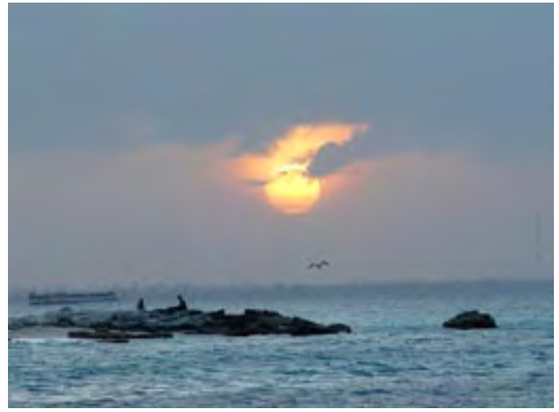
As always, in serious caves, we are met with a menacing poster: "Stop: Diving beyond this point is only possible for specially trained divers". We certainly accept the charges on our account and continue the dive.

Mayan sculpture

Large cave catfishes are disturbed by our bright lights and majestically withdraw back into the darkness. We are already quite far from the entrance, but from time to time we meet small silvery fishes. They follow us into the depths of the cave or swim back to meet us. What is the reason that has brought them here? Why are they bewitched by the gloom of the cave gloom just like us? How are they guided here without daylight? It is a riddle of nature.

Rahelio gives us a signal that we have come close to the goal of our journey, so we add some speed. The opportunity to find something new in the cave gets us carried away like bloodhounds. But suddenly, my buddy's primary torch starts to blink and then switches off. Mentally, I take into consideration that he might have insufficient light to be accurate in navigating the cave, but I believe that it should be enough for him to use just a few small back-up lights to continue the dive. But in the back of my mind, I think in this particular spot of the cave,





THIS PAGE: Scenes from the cenote caverns. RIGHT: Sunset over Yucatàn

something is bound to go wrong. Five minutes later, my primary light shuts down as well—the best HID torch on the market with the highest reliability rating, which I never doubted. Go figure.

Rahelio looks at us with wonder when we switch on our secondary lights of poorer quality and understands that it was an "ambush". Instead of exploring further, we have to drag our legs away from here. In this incident, we feel something abnormal, even mystical, happened. It may be just that the great Grand Cenote decided not to share its secrets with us casual visitors.

A small freshwater turtle met us on the entrance from the cave. As indemnification for an unsuccessful dive, we follow her, take some pictures and enjoy diving on the border of light and darkness.

Cenote Chac Mool

The huge influence that ancient beliefs of the Maya have on the modern culture of Mexico is evidenced in the symbol of the eagle holding a snake in its claws. It is the symbol of Chac Mool, one of the supreme Mayan gods, the god of a rain and lighting. He is represented even on the national flag Mexico. Our next journey is to the Cenote Chac Mool.

We are again in the jungle, and ancient worn stone steps take us into the depths of the next cave we will explore. An underground lake is hidden under a stone arch. A few shafts of daylight pass through a narrow crack somewhere above us. Careful not frighten away the underground spirits, we enter silently into the blue lake and begin one of the most exciting dives of our trip.

There is a narrow underwater passage. We squeeze into it to follow our guide and come into the next cenote. Sunlight is seen again. The smooth surface of a silent forest lake is above us, and green crowns of trees are visible though the incredible clear water.

We pass through narrow underwater tunnels from cenote into cenote, admiring the play of light and shadow. But soon our road leads far under the arch of the cave. We proceed deeper into the cave and hit a halocline. The feeling is like being pierced though a liquid mirror. All of a sudden, it gets toasty warm (+28°C). The water reminds me of warm milk. We stop to take the heat into our bodies, and then continue on our path to acquaint ourselves with the cave.

Underwater tunnels, narrow passages, huge stones of a fallen arch and the gloom of the cave—it all seems to us already to get a little monotonous after just a few cave diving days, but at the next turn we stop with sheer delight. A huge, absolutely black cavern gapes before us, and a laser beam of light—similar to the blue light of the swords of

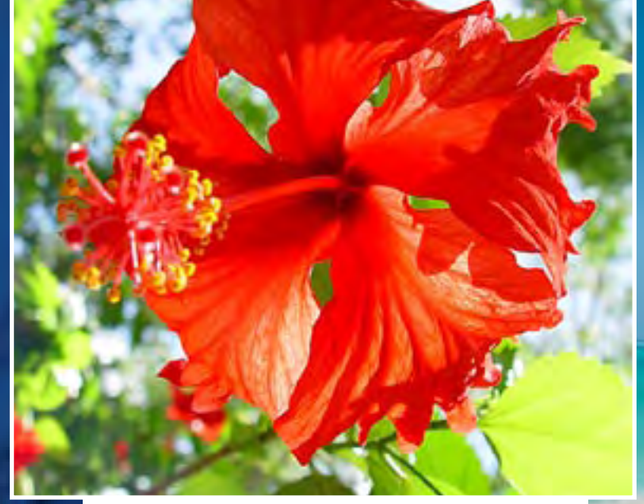
even to touch it with our hands.

We try to take photographs of the beam, and each stop closer to the beam to be better than previous. Hence, we spend all our film here. Now, we have absolutely forgotten boredom, and the pioneering passion wakes up in us immediately. We are again full of determination to dive and explore new miracles of the underground world.

the Star Wars action heroes— shines in the darkness. A small aperture is probably located somewhere up in the ceiling of the cavern. The sunlight is passing through the thickness of the earth and refracting in the underground pool creating this surprising optical effect. The blue beam amazes and fascinates all of us. It is impossible to tear our eyes off the sight of the beam. We want to swim up to it, get closer to have a better look or

Island of Swallows

Cozumel Island in the Maya's language means "Island of Swallows". The small island is only 16 by 48 kilometers long and only 19 kilometers, or a half hour by ferry, from Cancun. It seems that it is very close, but everything is so different on Cozumel.



LEFT TO RIGHT: Maps of the Yucatan; Hibiscus flower; Mayan ruins at Tulum overlooking the Caribbean Sea

The first Europeans visited the island in 1510 when one of the Spanish ships wrecked at its coast. Only two of the crew survived. One of them was Gonzales Ortega who accepted the Mayan culture, lived on the island, married an Indian princess, had children and eight years later, together with the native people, fought against the Spaniards. The second time the island was explored was in 1518 by a Spanish expedition under the command of a nephew of the governor of Cuba. Forty-thousand natives lived on the island at that time, but in a few years of war, not more 300 individuals remained. In the 17th century, the island became a favorite base for pirates from which to attack "Gold Spanish carracks". But modern diving days, or the Gloria of Cozumel, began in 1961 when the team of Jacque Ives Cousteau shot a movie about the fantastic underwater world of the island.

Cozumel, today, is the standard of the Mexican sea diving. One city is on the island. It stretches for many kilometers along coast. There are small, cozy streets and many tequila bars and restaurants

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to entice tourists. All the other parts of the island are covered by jungle, and there are also ruins of Maya pyramids.

There are 39 reefs surrounding the

island to satisfy any, even the most exacting of divers. Dive centers are located in each of the 21 hotels on the island. They carry compressed air, nitrox and rebreathers. Divers will find fascinating recreational diving down to five meters just off the beach as well as good diving on wrecks with penetration, underwater flights in currents with five knots speed or 100-meter walls for technical divers with trimix. The island survives only due to the dive-industry.

Yes, everything is more expensive here—about 30 percent more than on the continent—but on Cozumel, it is absolute rapture of the sea. Inspired sea landscapes and warm turquoise Caribbean waters entice thousands of divers daily. They arrive with huge cruise ships, ferries from the continent or via the local international airport. All dive sites are located on the western side of the island, which is protected from northeast ocean winds. It is always the quiet sea one finds here as well as currents, various depths and the most beautiful relief of the sea floor.

The encounters between the first Europeans and the Mayans were rarely happy ones

CLOCKWISE FROM BOTTOM LEFT: Iguana; Sea turtles: Matador and bull; Puma; Tree monkey; Land turtle; Dive writer, Andrey Bizyukin and zoo staff with crocodile

Diving Cozumel

We have arrived on the island only an hour ago, but already we are preparing for the next dive. How often do you think it's possible to see—on one dive—ancient anchors, Spanish canons, statues and Maya sculptures, bright tropical fishes, huge barracudas and an underwater cave with an underground river running into the sea? Well, it is possible, if you dive on Cozumel at a place called Chankanaab.

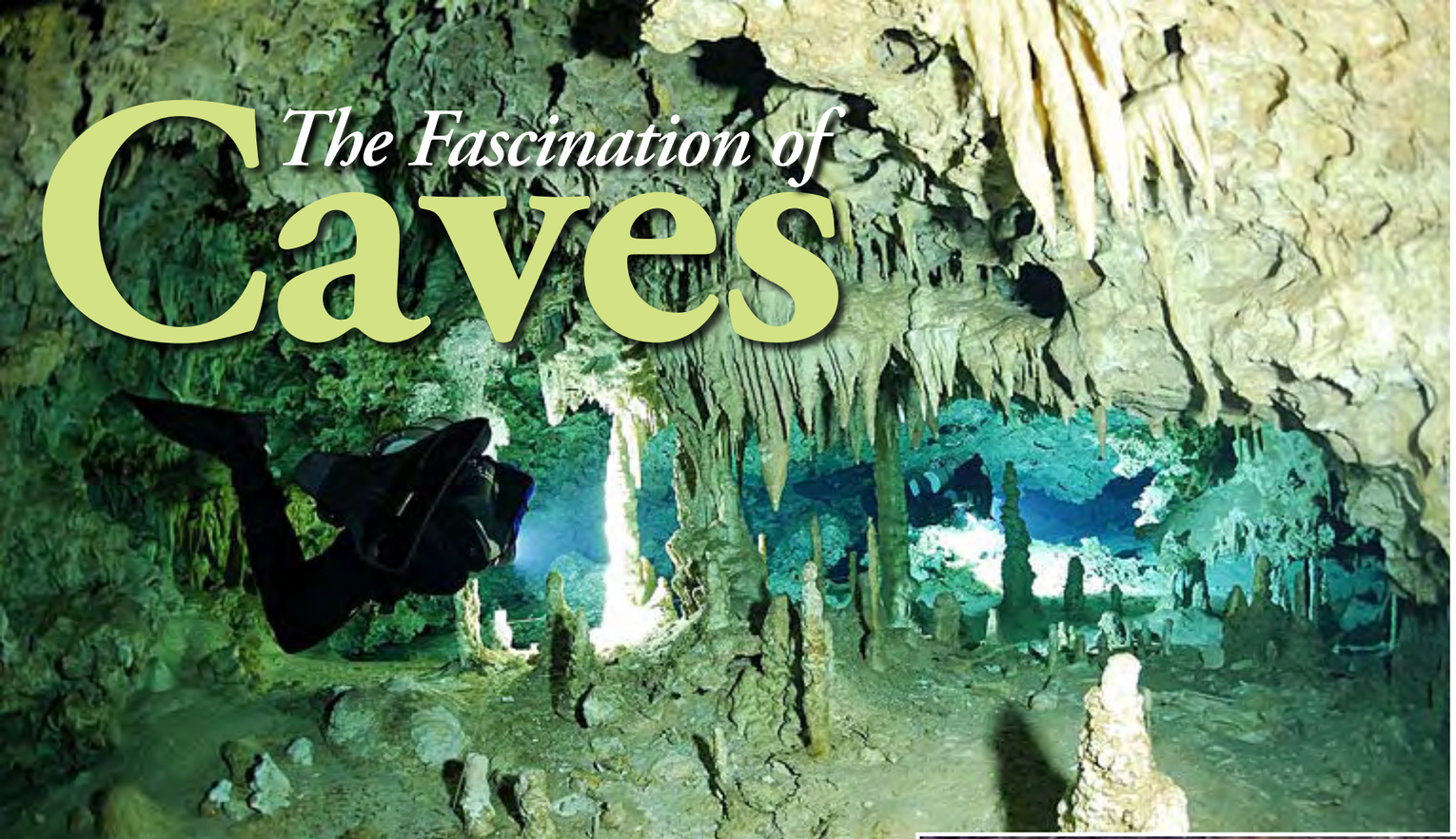
Colombia reef is really an exotic dive site off the island. Here, there are huge columns of freakish forms of heights up to 20 meters with coral labyrinths. It's very easy to lose one's way. There are mustached lobsters, huge sea turtles, porcupine fish and hundreds of other kinds of fish that have found a haven here. The current is so strong that in 40 minutes we drifted three kilometers. Picturesque reef swept by before us with the speed of an underwater express train. It is a pity that to photograph on such speed it is simply impossible! It was necessary to embody only all visual textures in memory.

Twelve days is too short a time to get acquainted with Mexico and even more so with Yucatàn. But to us, it has been an incredibly lucky opportunity open to experience the unknown—the underground world of the Maya—the world of stones and water, the world full of miracles and riddles, the world accessible to everyone who comes here with an open heart and a pure soul. This is indeed the eighth miracle of the world, worthy of respect and admiration.

We shall return back to you, Yucatàn. ■

The Monument of Gonzales Ortega

The Fascination of Caves



From the earliest days of mankind humans have been interested in caves as a shelter from both the elements and from predators. It was in caves like those of Lascaux, in the valley of the Vésère in France, that humans also first expressed their artistic urges with their wonderful depictions of animals.

Today, caves, especially underwater ones, still seem to fascinate people, though not for their domicile properties. Speleologists go down into caves for the sake of pure adventure while the same may be said for divers entering underwater caves. However, it is also the beauty of many of the caves and caverns themselves, with their magnificent formations of stalagmites and stalactites. that attract the visitors, be it the ordinary tourist visiting the large Adelberg caves near Trieste, say, or the Carlsbad Caverns in New Mexico, USA. For the diver, though, there are also the attractions of visiting underwater caves such as those in Mexico.

Text by Michael Symes
Photos by J P Bresser

A lava tube on the island of Hawaii, taken just above a lava fall. The floor is cauliflower pahoehoe, a rougher form of pahoehoe. Note the tree roots coming in from the ceiling. Lava tubes tend to be fairly close to the surface

Solution cave Ice cave

Types of caves

Generally speaking there are four main types of cave:

Solution caves: These are formed in carbonate and sulphate rocks such as limestone and marble by the action of moving water that dissolves the rock to form tunnels and caverns.

Lava caves: These are formed when the outer surface of a lava flow hardens while the molten lava within continues to flow and eventually drains out to leave a tube.

Sea caves: These are formed by the action of waves attacking the weaker parts of rocks along the shores of oceans and lakes.

Glacier caves: These are formed by the drainage of melt water through the ice.

The formation of solution caves

This type of cave is of the most interest to tourists and to divers, as they are the ones containing dripstone formations of stalagmites and stalactites. Such caves can be formed in a number of ways but all of them must originally have been formed above water level, be it sea level or water table level, since stalactites and stalagmites, and curtains of dripstone, form only in the air .Their existence in a cave indicates that the cave was, at some time, above the water table while the dripstone was forming. This occurred, for example, during the last glaciation, about 20,000 years ago, when so much water was locked up as snow and ice that global sea level was then about 130 meters lower than today.

The process of forming these caves is a very slow one, and is primarily due to rain. Falling through the atmosphere, rain absorbs a small amount of carbon dioxide, CO_2. Further amounts of CO_2 are taken up by the rainwater as it percolates down through the soil to meet the underlying limestone substrate. Now, limestone is basically metamorphosed chalk i.e. calcium carbonate, and is therefore practically almost insoluble in water with only about 0.014 g of calcium carbonate per litre of cold water. However, the presence of CO_2 in the water changes the situation drastically because calcium carbonate will react with water that is saturated with CO_2 to form the soluble calcium bicarbonate.

$$CaCO_3 + CO_2 + H_2O \rightarrow Ca(HCO_3)_2$$

Cave Formation

Stalagmites create a hand of stony fingers surrounding a diver

The HCO_3^- ion is known as the bicarbonate ion, and calcium bicarbonate, which exists only in solution, is up to 100 times more soluble than calcium carbonate.

As this weak solution of carbonic acid seeps through the rock it forms cavities and channels as it moves downward and laterally. Thus, after thousands of years underground caverns and caves can be formed. Initially, these caverns will be water-filled but when the sea level goes down they empty, partially or wholly. However, the acidic rainfall still occurs with its consequent dissolving of the limestone. When it reaches the caves below it can drip from the ceiling forming dripstone formations such as stalagmites and stalactites.

Stalactites & stalagmites

As each drop of water hangs from the ceiling, it loses carbon dioxide. The acidity of the water is thereby reduced so that the calcium bicarbonate cannot remain in solution This causes precipitation of calcium carbonate to be deposited as a dripstone – in this case a stalactite which is slowly built up drop by drop, as it hangs down from the ceiling, over hundreds or thousands of years.

Stalagmites grow upwards from the floor of the cave, generally as a result of water dripping from the overhanging stalactite.

Alternative cave formation

A new theory suggests an agent other than carbonic acid may be responsible for creating some of the largest cave systems in the world. It has been discovered that sulphur was responsible for carving out enormous cavities from the limestone of Capitan Reef, the fossil reef that contains New Mexico's Carlsbad Caverns.

Several million years ago hydrogen sulphide gas escaped from the oil deposits underlying Capitan Reef. This gas mixed with oxygen in the groundwater, and sulphuric acid was eventually produced. Sulphuric acid is capable of dissolving vast amounts of limestone, much more so than carbonic acid. This can explain the size of Big Room. After the water table had dropped the cave floor was exposed to reveal large gypsum (calcium sulphate) deposits, a by-product of a reaction between sulphuric acid and limestone.

Kane Cave in northern Wyoming, USA, is also thought to have been formed by the same process.

Cave of Lascaux, France—Hall of Bulls

Cenotes

In the Yucatan peninsula are to be found the world famous underwater caves known as cenotes. These are freshwater pools with underwater caves and caverns that are favourite places for snorkeling or scuba diving. The word cenote is derived, via Mexican Spanish, from Maya conot. They were often used as a sacrificial site by the Mayas.

They were formed some 1.5 million years ago, during an ice age, when the sea level sank about 100 meters. At this time, the rain water had carved holes in the limestone ground, and when the ice began to melt again the sea level rose and the caves were again flooded. However, in places the soil had been washed away causing the overlying limestone crust to collapse, and thus exposing the water filled caves beneath. They are therefore often referred to as sinkholes or waterholes.

The water which fills the caves is partly intruding seawater but mainly fresh rain water. As the fresh water has a slightly less density than that of sea water it 'floats' on the sea water to give it an oily appearance, and is called a halocline. ■

Riviera Maya

A Journey to the Underworld

Text by Peter Symes
Photos by Andrey Bizyukin and J P Bresser

J P BRESSER

It was a strange feeling, frolicking around in the shallows. I found myself sitting there in the tropics, in clear fresh water, not at the beach as one might expect but in a hole in the ground deep inside the jungle looking around at cliff walls and staring up under trees hanging over me.

There were lily pads around me and lush underwater vegetation of a species I forgot to ascertain but perhaps it was just strands of the omni-present Canadian water weed (*Elodea canadiensis*) which is known to every aquarist.

It was a tranquil scene, the water was clear and still and not may sounds were to be heard. Yet my state of tranquillity was blended with a simmering uneasiness. Was it due to the fact that I was just about to go diving into a cave, my first venture of the sort, where I would be swallowed up by a dark hole that led to who knows where? Perhaps that had something to do with it, but there was something else to do with it as well.

It wasn't the somewhat mind-boggling fact that these sink holes, the cenotes in which I was now sitting, were once sacred places for a grand civilization that had built palaces and temples around these parts long ago.

Divers swim through the clear fresh waters of the Yucatàn

What started the dream: Readling Uncle $crooge & Crown of the Mayas

I realized that my mental state had something to do with a childhood memory coming back to me—reading a Donald Duck comic strip for a good night story while sleeping over at my grandparents' house. In a now classic adventure, the famous ducks go to the Yucatán to search for archeological treasure— Indiana Jones style—the riches being gold and silver sacrificed by the Maya into these ancient sink holes in the jungle.

As a little preschool kid, I was not only entertained, but also intrigued and a little bit spooked reading the passages of the ducks jumping into these dark watery holes in pursuit of the treasure.

The story was penned down by the legendary Carl Barks in an era that predated the 'scuba industry' as we know it and certainly dive travel as we know it. Come to think of it, this story was probably my first introduction to anthropology and archeology. So, don't say that nothing good comes out of reading comics. It kindled my interest in these disciplines.

So, here I find myself—a good third of a century later—sitting waist deep in water, trying to connect all the dots.

Diving in under the ledge and into darkness, leaving the

Yellow-headed parrot
ANDREY BIZYUKIN

J P BRESSER

Divers head down a passage adorned with sculptural forms of limestone
BELOW: Swallowtail Butterfly

Riviera Maya

sun behind us, I was still a mixed bag of emotions and somewhat filled with doubts about the sanity of my present undertaking as I headed straight into an overhead environment. But it lasted only for the few transient moments it took my eyes to adapt to the dim light inside the spacious cavern that opened up beyond the entrance. I was in… a cathedral.

Well, that was my first thought anyway. The architecture inside had pretty much the dimensions, and some resemblance, of some of the huge medieval cathedrals in Europe. However, in this case, the master sculptor was not some human Michelangelo but Mother Nature herself.

Everywhere there were organ pipe-like sculptures of stalagmites and stalactites. And at the far end where the altar would be, there was a faint light from another hole to the outside, allowing the greenish hue of sunlight passing through foliage to stream down from above.

The room was vast, the water crystal clear. One of the classic Cousteau quotes spring to mind. It went something like "diving is like flying, only without wings". The exact wording escapes me, but you get the drift.

Here, the 'flying sensation' is dramatically boosted by the clarity of the water and the distance between the floor and the ceiling. I definitively got a kick out of zooming around in all three dimensions in a manner you really can't do in the ocean or a lake.

One is still in shallow water here, so decompression issues are not really a consideration. But mastering buoyancy control is. This is definitively not the place to go bumping into walls or ceilings with their delicate structures like a bull in a china shop. Not only would you most likely hurt yourself, but you may also risk breaking the delicate structures which in some places have the appearance of being pencil thin delicate structures. They have been millennia in the making—much longer than the coral we are also told not to touch as they re-grow slowly. Most importantly, these stalactites and stalagmites only form in air, not underwater. They were formed when the sea level was much lower and the caves were flooded much later, after their creation.

The place is a magic one, and it plays all one's senses. You are truly in another world, or at least, at the very entrance to it. That was what the ancient Mayans believed.

Weird

Furthest into the cavern, there was a corner that was located much deeper. Here, we were about to experience a weird phenomenon. We spotted a silvery layer of water with a different consistency, clarity and colour. It was cloudy. We descended slowly into this soupy substance, and we were struck by a contrasting overlying layer of clear cool water. It was also – and this is the strange part – warmer.

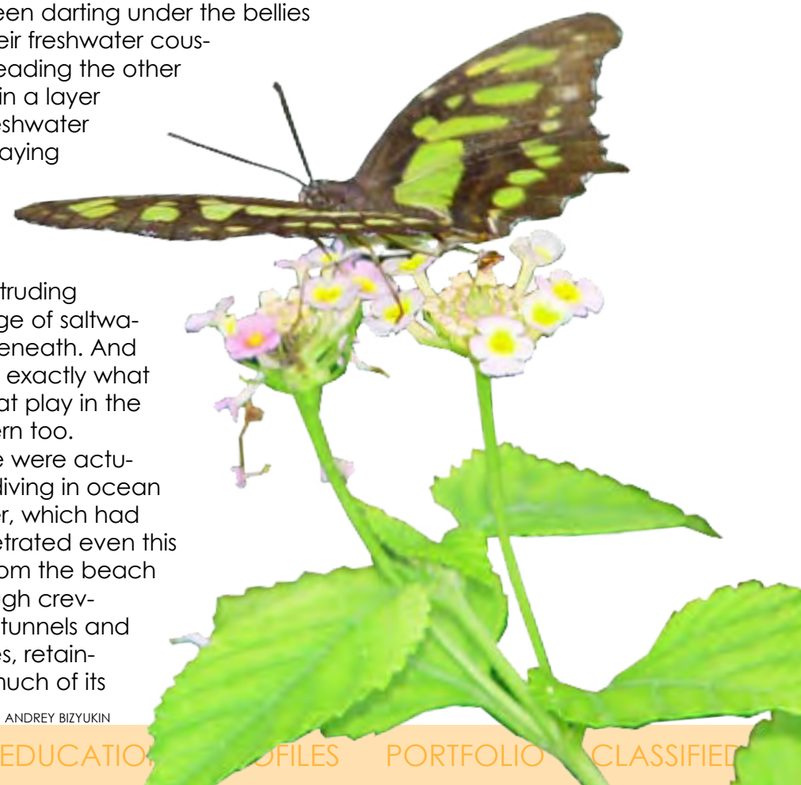
This was no thermocline, although it had some resemblance to it. It was a halocline, a separation of water layers that is caused not by a temperature gradient but by a difference in salt concentration, which creates a difference in density stronger than the one caused by temperature. This phenomenon can sometimes be observed at estuaries where saltwater flatfish can sometimes be seen darting under the bellies of their freshwater cousins heading the other way in a layer of freshwater overlaying an intruding wedge of saltwater beneath. And this is exactly what was at play in the cavern too.

We were actually diving in ocean water, which had penetrated even this far from the beach through crevices, tunnels and caves, retaining much of its warmth in the process.

Under the halocline, the visibility was pretty mediocre, so we didn't hang out for long.

Ascending through the non-transparent halocline once more to pop up into a cool but clear realm above was once again a somewhat weird experience—one you have to try to really comprehend.

Once back at the surface and de-kitted, I soon enough saw myself heading for one the best ice teas I have ever had and a light snack before a very well-deserved siesta in a hammock under the palms. When in Rome, do as the Romans… so since we are in Mexico, we'd better test all the customs—all in a day's work for this dutiful travel reporter in pursuit of doing the proper research for this story, of course. ■



ANDREY BIZYUKIN

Cave & Cavern Diving Training & Equipment

SPELUNKING

—Not to be confused with Speleology

> *"Because it's there."*
> —British climber, George Leigh Mallory, when asked why he wanted to climb Mount Everest

Cave diving is a type of technical diving in which specialized SCUBA equipment is used to enable the exploration of natural or artificial caves, which are at least partially filled with water.
—Wikipedia

> *No amount of previous open water diving experience or training can adequately prepare you for cave diving*
> —National Speleological Society

Spelunking, or caving, is what you do when you explore a cave just for the hell of it. Or as my husband likes to say, inspired by George Leigh Mallory, because they are there and because we can.

Text by Millis Keegan Photos by JP Bresser and Deep Sea Production, www.deepsea.se

We have come a long way since the first diver ventured into caves. Today's training and equipment goes well beyond just having an explorers' mind, some wit and lots of luck.

Basic cave diving training teaches you skills well beyond recreational dive training. To perform safe diving in a closed environment, you need to become self-confident, and you need to be self-reliant at all times. There are no short cuts if you want to survive in an environment where you have no direct access to open air. The only way to get there is by practicing techniques, over and over again. In the process, becoming a cavern/cave diver not only teaches you proper cave diving techniques, the training helps you know your limits and your potential on a personal level too.

Through exercises, you learn equipment familiarity. That includes basic equipment training such as handling a reel and dive lights, using proper finning techniques and mastering emergency procedures such as handling an out of air situation, valve shut downs and regulator switches.

Basic Safety Rules for Cave Diving

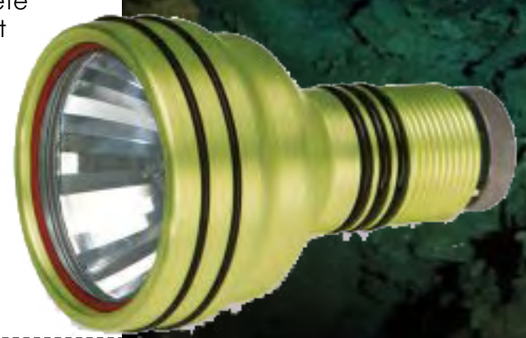
► No cavern/cave diving without proper training

► Dive within your limits

► Use a continuous guideline to the cave exit

► Rule of thirds
Always follow the 1/3 rule, that means turn around when 1/3 of your gas supply is used up. The reason is that loss circumstances like loss of visibility, sharing gas, even a temporary loss of guide line contact, are all situations when the gas consumption can increase.

► Three sources of light
Always use three sources of light. It is not a question of whether a dive light will or will not fail, it is a question of when, and you should be prepared for that. Loosing a light could lead to difficulties in finding the guide line. Finding the continuous guide line in complete darkness is part of the training, but it is a risky task, and unhooking your second light beats the fibbling in the dark. In cave diving, three battery powered lights is mandatory, one primary and two back up lights. In cavern diving, two battery powered lights, one primary and one back up, since the light from the cavern opening is considered to be the second back up light. ■



You need three sources of light

Note the line cutter used for cutting line if entangled—a potentially dangerous situation

Getting Certified

Where do I begin?

A very popular way to start is by taking a three-day combination package, usually provided by probably every cave diving organization—the Cavern Diver/Intro to Cave Diver combination. These are cave diving classes that allow you to do single tank dives only into caverns/caves. It is a good way to find out if this is something for you, and an opportunity for personal growth. It is a great experience and will give you experience you can use in your future diving whether you decide to continue your cave diving training or not.

To become a fully certified cave diver, you have to pass three levels of training before you can sign up for the Full Cave Diver Course.

The certification levels:

- Cavern Diver
- Intro Cave Diver
- Apprentice Cave Diver
- Full Cave Diver
- Advanced Cave Diver

Cavern

The first level is the cavern course. This class takes you through the basic planning and organization of cavern diving, the hazards of diving in an overhead environment and the special equipment needed. The dives take place in a cavern, meaning a total distance of 40 metres/130 feet from the surface at any time. Minimum four dives over two days.

Cave

The second level is the intro to cave diving class. In this class, you leave the cavern zone and the daylight and make it into the cave system using the main lines of a cave system. You get some serious use of your basic overhead environment skills; you will train emergency procedures in the cave, get good use out of the propulsion techniques you picked up during your cavern class and learn some new ones. Even though this class will get you penetrating a cave system, it will be a limited penetration, and you are no where near the skill level needed for cave diving on all levels.

Apprentice cave

The third level is the apprentice cave diving course. In this class, more focus is placed upon expanded dive planning skills through conducted dives. The class also gives an introduction to jump and gap procedures. The class is held over two days and includes at least four dives.

Full cave

Finally, you are ready for the Full cave diving course. This course focuses on proper procedures for completing traverses and circuits. During this course, you will be responsible for all dive planning, gas management and the execution of the dive, which you—thanks to the first levels of training—should be fully ready for. ■

"Deep Silt"

Don't get your self into "deep silt". A diver can stir up a lot of sediment with the wrong fin kick. While cave diving, propulsion techniques truly become an art form, there are fin kicks that leave virtually no traces, even when the bottom sediment is easily stirred up. Training propulsion techniques used in a cave is something anyone can benefit from. We are sure everyone has a story to tell about careless divers leaving a trail of silt behind, destroying the visibility for others.

Get a kick out of it

Fin kicks used to avoid stirring up silt are variations of Frog kicks, Flutter kicks, Roof Walking and Shuffle kicks.

What you are training for is a rehearsed response to an emergency, which could save your life.

Cave Diver Training

The following is an (incomplete) list of agencies who offer cavern/cave diving training.

Worldwide organizations

►IANTD
IANTD World Headquarters
1545 NE 104 Street
Miami Shores, FL 33138-2665 USA
www.iantd.com

►Technical Diving International (TDI)
International Training
18 Elm St
Topsham, ME 04086 USA
www.tdisdi.com

►NAUI
NAUI Worldwide Headquarters
PO Box 89789
Tampa, FL 33689-0413 USA
www.nauiww.org

►PADI
30151 Tomas Street
Rancho Santa Margarita
CA 92688-2125 USA
www.padi.com

Training agencies found in USA

►NACD
National Association For Cave Diving
P.O. Box 14492
Gainesville, FL 32604 USA
www.safecavediving.com

►GUE
Global Underwater Explorers
15 South Main Street
High Springs, FL 32643 USA
www.gue.com

►NSS/CDS
National Speleological Society, Cave Diving Section
NSS-CDS Administrative Office
2109 W US Hwy 90, Suite 170-317
Lake City, FL 32055 USA
www.nsscds.org

Equipment

"A tonne of stuff"

Cavern and cave diving in any form is a very equipment intensive hobby. Below is a list of the minimum requirements. Note that when you make this decision, you take your diving to a new level, and you should commit to this configuration of your dive equipment. If you don't understand that, you are not ready. You need at least:

3 line arrows per diver

Slate & pencil

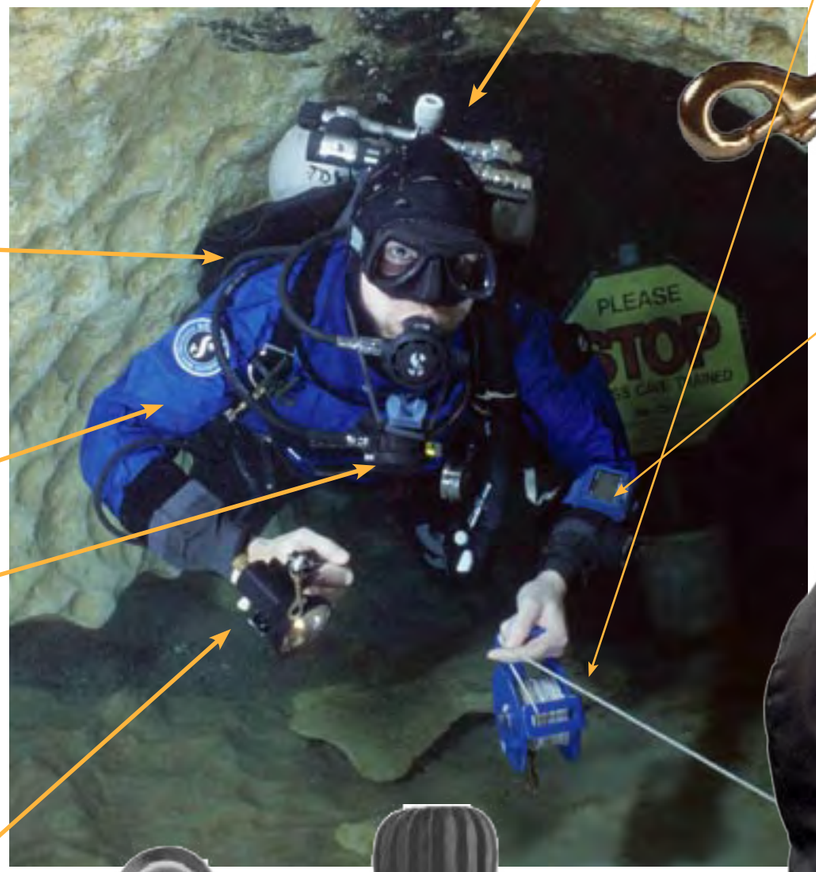
A safety reel with a min. of 75'/23 meters of line. A primary cave diving reel with approximately 350'/106 meter line

Watch/bottom timer, depth gauge or dive computer

Duct tape (to tape mask and fin straps)

The question is not whether a dive light will or will not fail but, rather when.

2 individual tankvalves/2 first stages



A 7'/2 meter long octopus hose for alternative air source

A dive suit fitting the environment you will be diving in

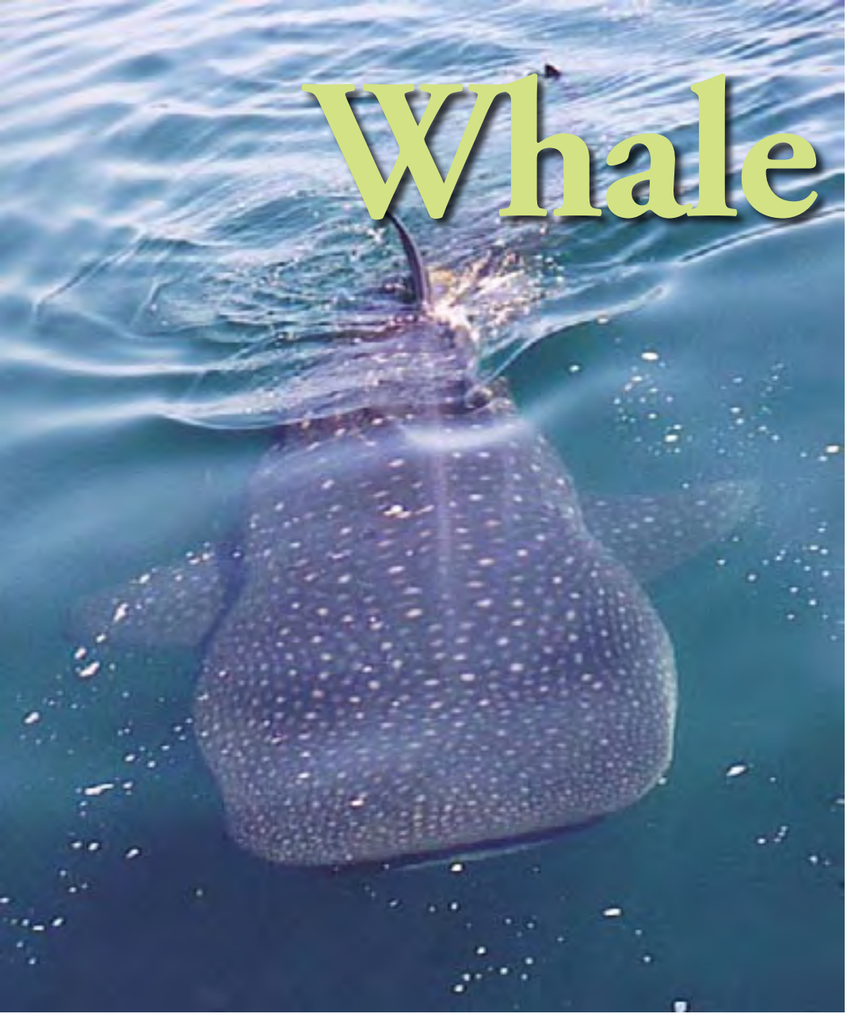
Alternative Air source attachment

Submersible dive tables

Three battery powered diving lights, one with at least 30-50 watt power

A tank that holds a minimum of 71.2 cubic feet or 2 cubic meters with a dual orifice (Y) valve or (H) valve

Whale Sharks off Yucatàn



THIS PAGE: Views of a whale shark. Snorkelers enjoy the company of a whale shark (above)

Text edited by Gunild Symes
Photos courtesy of Yucatek Divers

The world's largest fish, whale sharks, or *Rhincodon typuscan*, can grow up to 15 meters in length according to experts. It was thought that some could reach up to 20 meters in length, but these individuals are no longer common due to the threats that the species currently faces including over-fishing for whale shark fins or meat, injury through collision with marine traffic and habitat loss. Whale sharks are now listed as an endangered species and protected under CITES.

The huge fish is found worldwide in tropical and warm temperate seas between latitudes 30° North and 35° South. Their migratory path brings them to the tropical waters near Isla Holbox (hol-bosh) in Mexico. It is one of the few areas on Earth they like to visit often.

About 1,500 people live on this 26 mile long isand located near the northeastern tip of the Yucatan Peninsula in the state of Quintana Roo of Mexico. It is part of the Yum Balam ecological reserve and is separated from the mainland by the Yalahua Lagoon.

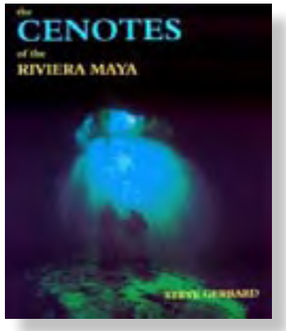
The whale sharks congregate here each year between June and September. This a time when the ocean is rich with plankton. Regardless of their massive size, these great fish are docile creatures and feed on huge quantities of plankton. They do not attack humans.

In 2002, Underwater Editions (UWE) launched a long-term video and photo identification behavior research project of the whale sharks in cooperation with the local community of Isla Holbox.

As tourist interest grew in the whale sharks, UWE developed Eco-Tourism guidelines in 2003 to help protect the species and provide guided opportunities for tourists to swim and snorkel with the whale sharks. Later in 2004, the organization and CONANP helped educate and train local guides, establish rules and guidelines for interaction with the whale sharks. The program continues to run today. *SOURCES: CITES, Shark Trust, Yucatek Divers.* ■

travel

The Cenotes of the Riviera Maya



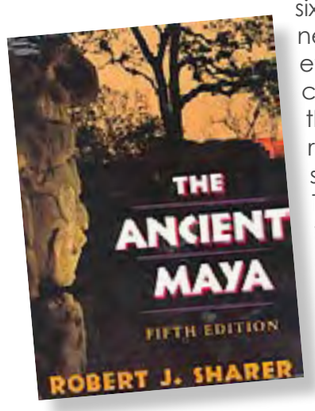
A Complete Guide for Snorkeling, Cavern and Cave Diving the Cenotes of the Riviera Maya by Steve Gerrard
Publisher: Steve Gerrard
Puerto Aventuras, Quintana Roo, Mexico
Paperback: 244 pp. ISBN: 0-967 7412-0-3
Price: US$49.00

Appointed with page after page of incredible photographs of the mysterious underwater world, this book is more than just a complete guide for snorkeling, cavern and cave diving the Cenotes of the Riviera Maya. This book includes over 200 colour photographs that show the breath-taking wonder of the crystal clear water and incredible sights of subterranean Mexico. Not just a coffee table book, Cenotes provides practical details of where and how to swim, dive and enjoy these beautiful caves located on the Caribbean coast of Mexico's Yucatan peninsula.

AquaQuest.com

The Ancient Maya

by Robert J. Sharer, Loa P. Traxler
Publisher: Stanford University Press; 6th edition
Paperback: 931 pp. ISBN-10: 0804748179
Price: US$25.50 **Amazon.com**



This book traces the evolution of Maya civilization through the Pre-Columbian era, a span of some 2,500 years from the origins of complex society within Mesoamerica to the end of the Pre-Columbian world with the Spanish Conquest in the 16th century. The sixth edition presents new archaeological evidence and historical studies and offers the most extensive revisions of this classic work to date. The result is the most thorough and incisive study of the origins and development of ancient Maya civilization ever published.

An Album of Maya Architecture

by Tatiana Proskouriakoff
Publisher: Dover Publications
Paperback: 144 pages
ISBN-10: 0486424847
Price: US$13.22

This magnificent guide presents 36 sites from Central America and southern Mexico as they appeared more than a thousand years ago: Temple of the Cross, Palenque; Acropolis and Maya sweat bath, Piedras Negras; Red House and north terrace at Chichén Itzá; more. Each illustration features text of archeological finds and line drawing of remains. 95 illustrations.

Amazon.com

Artifacts from the Cenote of Sacrifice, Chichen Itza, Yucatan

Edited by Clemency Chase Coggins
Harvard edition World
Paperback: 408 pp., 30 line illustrations, 300 halftones, 2 maps, 32 tables
ISBN 0-87365-694-6
Price: US$75.00 **Amazon.com**

In this abundantly illustrated third and final volume on the artifacts found by Edward H. Thompson in the Well of Sacrifice, specialists analyze the great variety of objects and debate whether they represent evidence of dateable prehistorical ritual. The collection includes the rare remains of hundreds of textiles, wooden objects, and copal incense offerings that were preserved in the waters of this limestone sinkhole, as well as the lithics, ceramics and bone and shell artifacts commonly found in Maya burials and caches and about 250 mammalian remains. These objects are remarkable for having been cut, torn, broken, and burned before they were thrown into the green waters of the sacred well at Chichen Itza. See companion book below:

Cenote of Sacrifice

Maya Treasures from the Sacred Well at Chichen Itza by Orrin C. Shane (Editor), Clemency Chase Coggins (Editor)
Publisher: University of Texas
Paperback: 176 pp.
ISBN-10: 0292710984
Price: US$11.50
Amazon.com

Sunken Cities, Sacred Cenotes and Golden Sharks

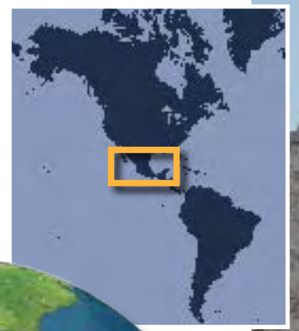
Travels of a Water-Bound Adventurer
by Bill Belleville
Publisher: University of Georgia
Hardcover: 248 pp.
ISBN-10: 0820325929
Sale Price: US$22.76

This collection of essays is about places that are noted for archaeological treasures, rare plants and animals, or great scenery. For example, in the Amazon, it is the quest is for a freshwater dolphin, and in the Florida Keys, it is the quiet past-preserving backwaters.

Amazon.com

fact file

Yucatán Peninsula, Mexico



LEFT TO RIGHT: Globe map showing Yucatán; Western Hemisphere map showing Mexico; View of the ruins of Yucatán

History An ancient land of advanced Amerindian civilizations, Mexico succombed to Spanish rule for 3000 years before gaining independence in the early part of the 19th century. Mexico was thrown into economic turmoil after a devaluation of the peso hit the country in late 1994. It triggered the worst recession in over 50 years. But the country continues to make leaps in its recovery while economic and social concerns continue to challenge the nation, including underemployment for large numbers of citizens, low real wages, unequal income distribution, and few opportunites for advancement for Amerindian indivituals in the poor southern states. In 2000, election results marked the first time since the Mexican Revolution in 1910 that the opposing party defeated the incumbant party in government, the Institutional Revolutionary Party (PRI). In December of that year, Vicente FOX of the National Action Party (PAN) became the first chief executive elected in free and fair elections. Government: federal republic. Capital: Mexico (Distrito Federal)

Geography Mexico is located in central or middle America, bordering the Caribbean Sea and the Gulf of Mexico, between the US and Belize and bordering the North Pacific Ocean, between Guatemala and the US. The country's terrain is filled with high, rugged mountains and plateaus, low coastal plains and desert. Lowest point: Laguna Salada -10 m; Highest point: Volcan Pico de Orizaba 5,700 m. Coastline: 9,330 km.

Climate varies from desert to tropical. Natural hazards: hurricanes on the Pacific, Gulf of Mexico, and Caribbean coasts, tsunamis along the Pacific coast, volcanoes and destructive earthquakes in the center and south.

Environmental issues include a lack of proper hazardous waste disposal facilities and natural fresh water resources with pollution marring the northern reservoirs, poor quality or inaccessible sources in the rest of the nation; industrial pollution and raw sewage affect rivers in urban areas; rural populations are moving to urban areas, widespread erosion; desertification; deforestation; deteriorating agricultural lands; serious water and air pollution in the nation's capital and urban centers along US-Mexico border; groundwater depletion causing subsidence in Valley of Mexico. Note: Lack of clean water and deforestation are now considered national security issues by the government. Mexico has entered some international agreements including Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Law of the Sea, Marine Dumping, Marine Life Conservation, Ozone Layer Protection, Ship Pollution, Wetlands, Whaling.

Economic Mexico's free market economy has recently entered the trillion dollar class. A blend of modern and outmoded industry and agriculture is increasingly dominated by the private sector. The government has expanded competition in seaports, railroads, telecommunications, electricity generation, natural gas distribution and airports. Per capita income is one-fourth that of the US. NAFTA has tripled trade with the US and Canada since 1994. Ninety percent of Mexican trade is under free trade agreements with over 40 countries including, Guatemala, Honduras, El Salvador, the European Free Trade Area, and Japan. Current administration is mired by congressional opposition against measures to improve infrastructure, modernization of the tax system and labor laws, and allowing private investment in the energy sector. Challenges also inclue boosting economic growth, improving Mexico's international competitiveness, and reducing poverty. Natural resources: petroleum, silver, copper, gold, lead, zinc, natural gas, timber. Agriculture: corn, wheat, soybeans, rice, beans, cotton, coffee, fruit, tomatoes; beef, poultry, dairy products; wood products. Industry: food and beverages, tobacco, chemicals, iron and steel, petroleum, mining, textiles, clothing, motor vehicles, consumer durables, tourism. Note: Corn (maize) is thought to have originated in Mexico. It is one of the world's major grain crops.

Currency Mexican peso (MXN). Exchange rates: 1EUR=14.14 MXN, 1USD=10.95 MXN, 1GBP=21.47 MXN

Population 107,449,525 (July 2006 est.) Ethnic groups: mestizo (Amerindian-Spanish) 60%, Amerindian or predominantly Amerindian 30%, white 9%, other 1%. Religions: nominally Roman Catholic 89%, Protestant 6%, other groups 5%.

Languages Spanish, various Mayan, Nahuatl, and other regional indigenous languages.

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Scuba Doc Mexico Directory
scuba-doc.com/divmex.htm

Web sites

Mexico Tourism Board
www.visitmexico.com ■