By CURTBOWEN

TEN THOUSAND YEARS AGO GIANT ICE SHEETS COVERED MOST OF NORTH AMERICA. AT THAT TIME, FLORIDA HAD A CLIMATE MORE LIKE NORTH CAROLINA, NOT LIKE THE SUBTROPICAL CLIMATE TODAY. THE VEGETATION CONSISTED OF LARGE GRASSY PLAINS AND THICK FORESTS OF OAK AND HICKORY TREES. VARIETIES OF ANIMALS INCLUDING WOOLY ELEPHANTS, GIANT GROUND SLOTHS, NORTH AMERICAN CAMELS, SABER TOOTHED CATS ALONG WITH MANY OTHER ANIMALS, ROAMED THROUGHOUT FLORIDA.

IT IS BELIEVED THAT WATER SOURCES IN THE WARM MINERAL SPRINGS AREA WERE FEW AND FAR BETWEEN DUE TO THE POROUS LIMESTONE ROCK LAYERS BELOW THE SURFACE KEEPING MOST OF THE WATER MOVEMENT BELOW GROUND. AT THIS TIME, OCEANS WERE 70 TO 90 FEET SHALLOWER DUE TO THE LARGE AMOUNTS OF WATER TRAPPED IN THE GIANT SHEETS OF ICE. THE WESTERN COAST OF FLORIDA EXTENDED MILES TO THE WEST AND SOUTH, DOUBLING FLORIDA'S PRESENT SIZE. THIS THEORY CAN BE PROVEN BY STUDYING THE FLOW STONE

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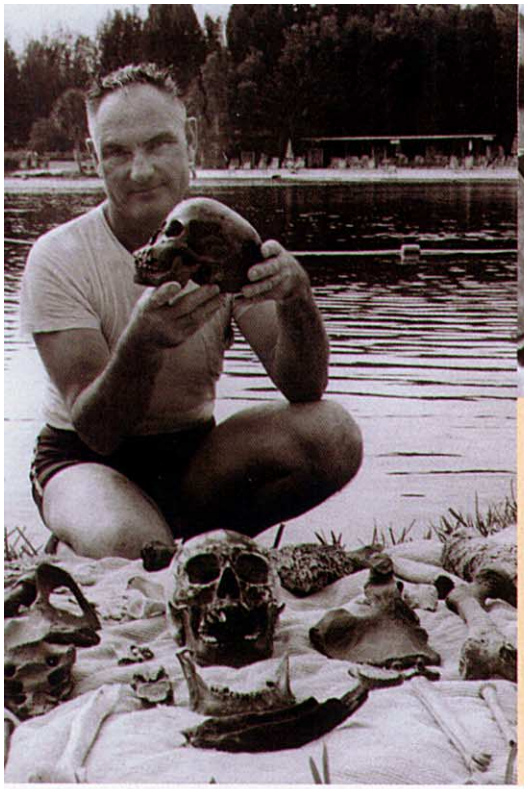
Rusty Farst, owner of Jaws Productions, systematically videos the stalactites formations around the spring at 20 feet. These video's are used to place formations in the proper locations on the final map.



Left: William Royal displays human remains discovered in Warm Mineral Springs. (1959) K-16 carbon dated back 10,000 +/- 200 years.

Above: Close-up view of a Paleo Indian skull discovered in a burial site along the 40 foot ledge in Warm Mineral Springs. This skull still contained some brain tissue.

formations found in Warm Mineral Springs which are believed to have opened to the surface as early as thirty-thousand years ago. Hundreds of flowstones were formed around the sinks upper lip at 20 feet with a few formations located as deep as 70 feet. Because flowstones can only form in a dry chamber for over thousands of years, this indicates that the oceans must have been considerably lower than they are today.

Today, Warm Mineral Springs is considered a health spa, visited by thousands of elderly people, seeking the warm soothing mineral waters believed to be helpful in healing many ailments. Fifty years ago, William Royal, the first diver to ever adventure below the surface, discovered extinct animal bones, stalactite formations, and human remains. At first, the archeological world dismissed his findings as a farst, because according to fossil records, it was believed that early man arrived in Florida no earlier than seven thousand years ago. For the last 40 years, several archeological projects have been conducted in and around Warm Mineral Springs resulting in many outstanding discoveries. The most astonishing, was the discovery of a ten-thousand-year-old human skull still containing brain matter.

The discovered human remains in Warm Mineral Springs were carbon dated back over ten thousand years, which changed the thinking of Homosapian movement across North America to 4,000 years earlier. These early American Indians followed, hunted, and scavenged along the banks of rivers, lakes, streams, and springs across America. These Indians finally made it to the Florida peninsula and eventually encountered the unique site of Warm Mineral Springs.

When the Indians arrived, Warm Mineral Springs was a giant pit surrounded by a huge forest. This giant pit dropped quickly from the surrounding forest vegetation. Water trickled down the walls and into the pit below, which is revealed today by the water channels sculpted into the walls at depths from 40 to 55 feet. At 32 feet, the walls undercut themselves making a natural shelter from the outside elements. These early Paleo Indians must have considered Warm Mineral Springs a sacrad place, because they buried their dead along the walls at 35 feet. Human remains and primitive tools have been excavated from the sink and the surrounding lands over the last 40 years which have dated from three to ten thousand years ago.

Geologically, Warm Mineral Springs is a solution hole descending into one of the deepest Florida aquifers. The water flowing from this spring is anaerobic (low in oxygen) and is believed to have been trapped underground for over thirty-thousand years from depths exceeding seven-thousand feet. Under these great pressures, the water is geothermally heated to 97° degrees Fahrenheit and flows from several small caves located on the northern wall at depths from 195 to 210 feet. As the water rises towards the surface, it mixes with cooler water from colder vents. When it reaches the surface, the temperature drops to 85 degrees Fahrenheit. Eight million gallons of water a day flow down a

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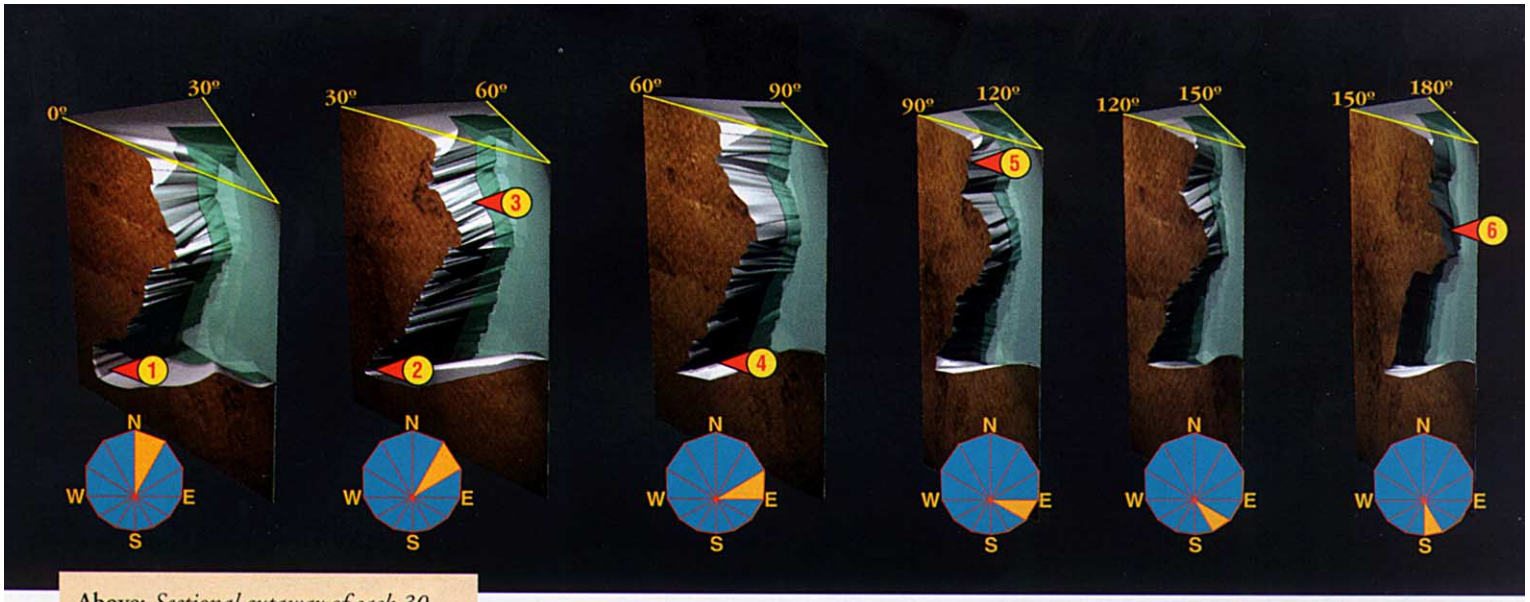
***Left:** William Royal examining the upper teeth of an extinct camel.*

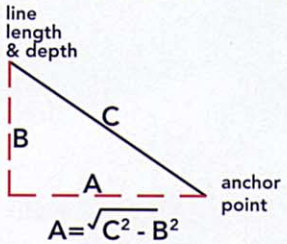
***Autobiography:** Bill Royal was born in Bay City, Michigan in 1905 and moved to Detroit when he was 20 to become a plumbing and building contractor. In the mid 30s he moved to Bradenton, Florida. Here he worked with Dr. Eugenie Clark, founder of Mote Marine Lab in Sarasota, FL. The author of "The Man Who Rode Sharks." He was the first person to recognize and prove the geological and archeological wonders of Warm Mineral and Little Salt Springs. Today, at 92 years old, he still lives beside Warm Mineral Springs and swims there for several hours each day.*

***Right:** William Royal surfaces from Warm Mineral Springs with his discovery of human remains carbon dating back 10,000 years. This discovery changed the current thinking of human migration across America by over 4,000 years earlier. Photo circa. 1959*



Above: *Sectional cutaway of each 30 degree increment and the location of important sites within the spring.*

To accurately survey Warm Mineral Springs, a method called triangulation was implemented. A permanent line, installed in the center of the spring from the top of the silt mound at 124 feet to a float 10 feet below the surface. The float was placed below the surface to prevent swimmers from disturbing it. All wall measurements are derived from this line. The survey tape is connected to the center line at set depths and a compass heading is chosen. The team used standard 200 foot cloth survey tapes that can be purchased at any major hardware store. The survey line is attached to the center line at set points. For the shallow section we used a depth of 40 feet and for the deep section, 90 feet. The spring was divided into 12 sections or every 30 degrees. The survey tape is stretched to the desired wall and depth. The length of the survey tape and the depth is recorded. The diver then descends taking a new measurement every 10 feet. Care must be taken not to bend the survey tape over or under a overhang or incorrect measurements will be recorded. In Warm Mineral, we separated the sink into two levels, the upper (0-70 ft), and the lower (70+ ft). The reasons for the separation was the shape of the sink (narrowest point at 70 feet) and the time restrictions below 70 feet. Due to the percolation off the ceiling under the 70 foot lip, measurements could only be taken upon the descent. This kept the visibility to three or four feet making reading the tape and depth gauge possible. Upon surfacing, the data is triangulated using this simple formula.



$$A = \sqrt{C^2 - B^2}$$

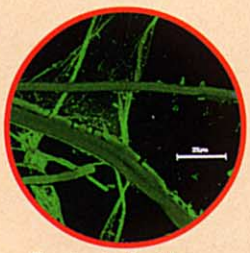
Chemical analyses of water from Orange Springs (OS), Alachua County, City of Palatka (PL), and Warm Mineral Springs (WMS), Sarasota County, Florida

Concentrations (mg/ml)			
Parameter	OS	PL	WMS
Cadmium	0.003	ND	ND
Copper	ND	ND	0.071
Fluoride	0.11	0.2	ND
Iron	ND	ND	0.12
Nitrate	0.14	5.45	ND
Sodium	14.4	54.2	4862
Calcium	38.0	43.1	476
Chloride	15.3	131	11250
Zinc	ND	0.29	0.196
Total Alkalinity	136	132	130
Magneium	10.5	0.012	0.10
Sulfate	13.4	34.4	1760
pH	8.38	8.00	6.94

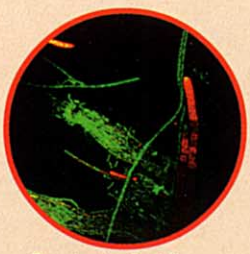
ND, Not determinable

Chemical characteristics of the surface water in Warm Mineral Springs as reported by Brigman (1992)

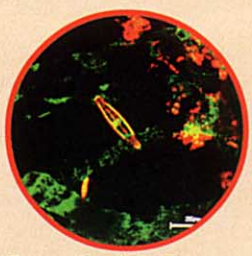
Concentrations (mg/L)	
Dissolved O2	1.0
Dissolved CO_2	16
Total dissolved solids	19870
Hardnes as CACO3	3500
Total Kjeldahl nitrogen	0.52
Biological oxygen demand	1.64



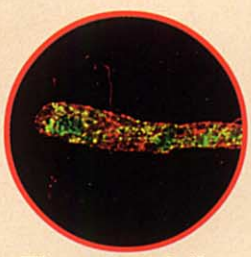
Bacteria & Algae
Depth 10 ft.



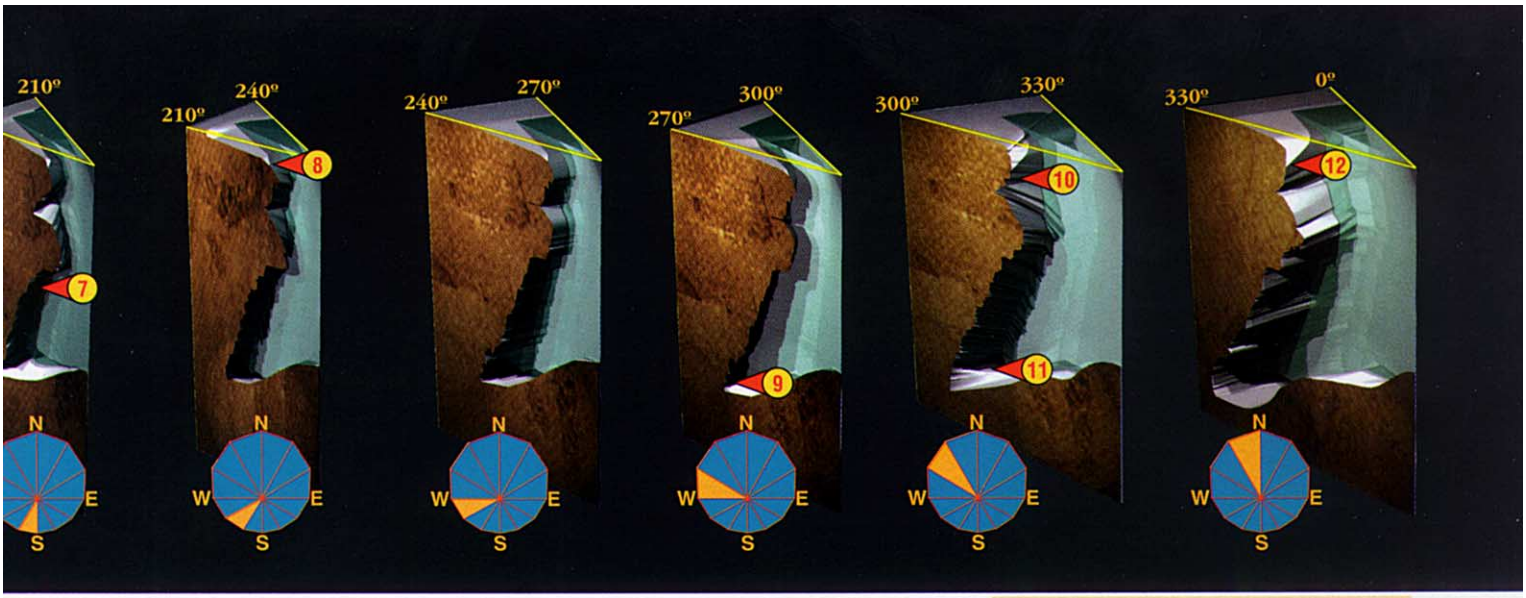
Bacteria & Algae
Depth 10 ft.

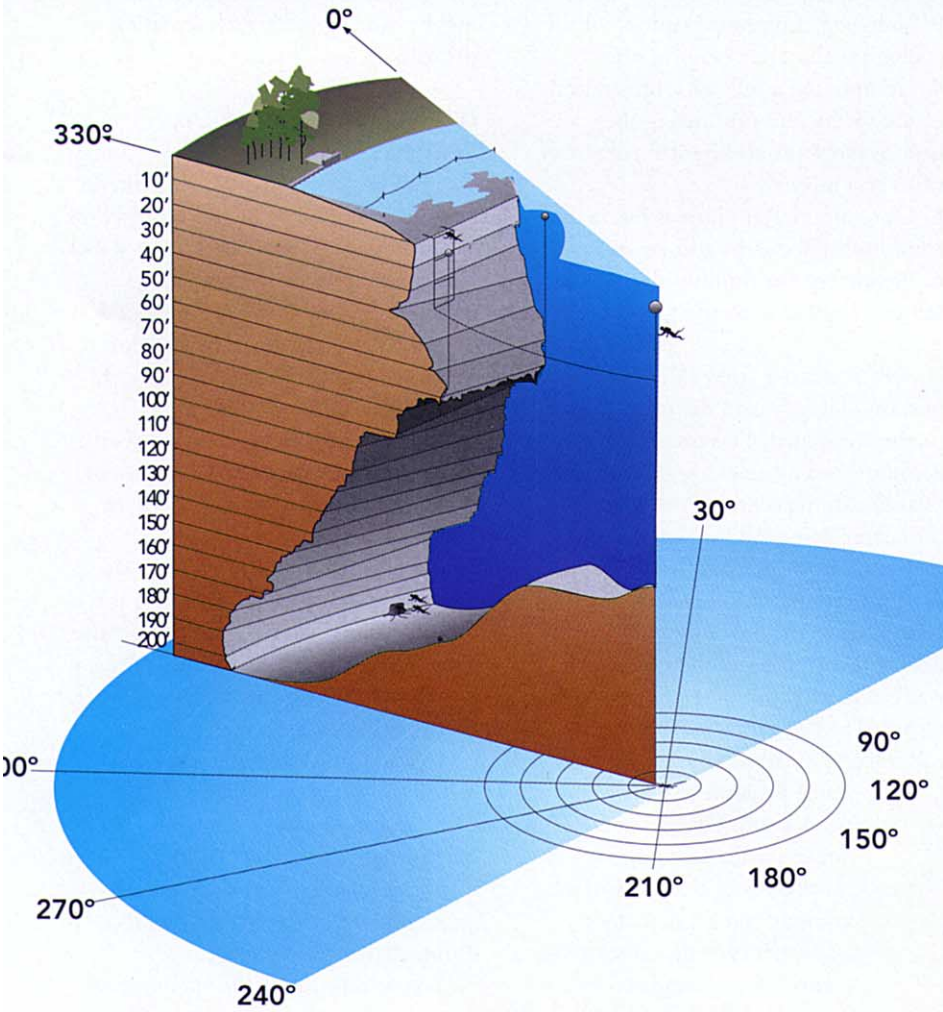


Bacteria with Diatom
Depth 25 ft.



Filamentous Sulfur
Bacteria
Depth 50 ft.

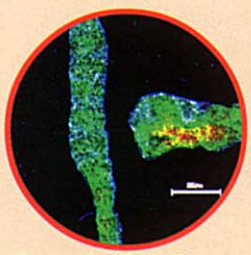




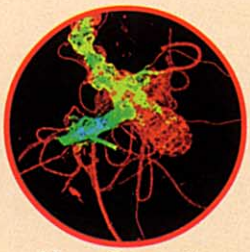
1 *Warm Spring vent #1, temp 97°* ..... 209 ft.
2 *Cool vent, temp 76°* ..... 198 ft.
3 *55 Gallon drum* ..... 55 ft.
4 *Steep slope of silt mound (east side)* ..... 185-155 ft.
5 *Group #1 stalactite formations* ..... 21 ft.
6 *Water run gutters* ..... 45-60 ft.
7 *Deepest shelf* ..... 90 ft.
8 *Cold water vent* ..... 8 ft.
9 *Steep slope of silt mound (west side)* ..... 185-155 ft.
10 *Group #2 stalactite formations* ..... 20 ft.
11 *Warm vent #2, temp 97°* ..... 195 ft.
12 *Decompression rack* ..... 10-40 ft.

DISCOVERED SPECIES AT

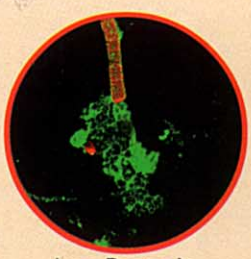
Warm Mineral Springs: Catfish, SunFish, Crappie, Bass, Toads, Frogs, Turtles, Snakes, Alligators, Blue Heron, Hawks, Falcons, Pheasants, Turkey, Owls, Crows, Opossum, Shrews, Moles, Ground Sloths, Modern Man, Rabbits, Squirrels, Mice, Gophers, Weasels, Skunks, Otters, Foxes, Wolves, Raccoons, Saber-toothed Cat, and Deer.



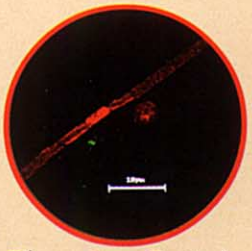
Bacteria (Beggiatoa)
Depth 50 ft.



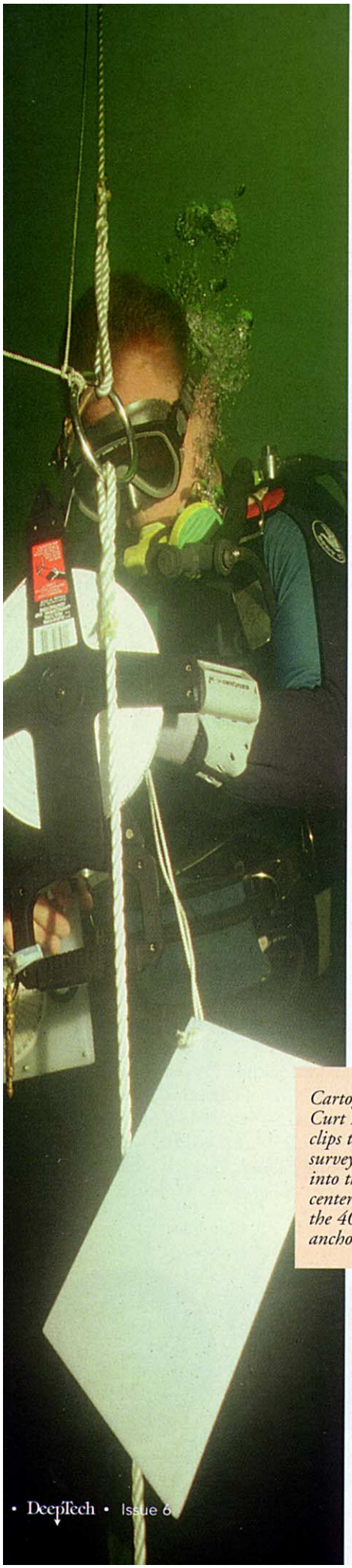
Algae Consortia
Depth 50 ft.



Iron Bacteria
Depth 150 ft.



Filamentous Bacteria
Depth 200 ft.



Cartographer Curt Bowen clips the survey reel into the center line at the 40 foot anchor ring.

natural run on the surface and eventually into the Gulf of Mexico.

SURVEY PROJECT

In January 1996, a proposal submitted by Curt Bowen was approved to conduct an extensive survey of the entire Warm Mineral Springs system. The project was separated into the following phases:

1. Taking measurements of each wall from the surface of the spring to the bottom in 30 degree increments.
2. Creating a photo collage of important geological and archeological sites around the spring.
3. Videoing and photographing of the geological and archeological sites.
4. Completing a full color illustration of the spring and submitting the findings to multiple scientific organizations and journals.
5. Obtaining water samples for analysis from multiple depths and vents.
6. Presenting our findings during seminars and to specialty groups.

To accurately survey the sink portion of the system, the triangulation method was used. This procedure is accomplished by anchoring a permanent float line in the center of the sink, called the center point. All measurements for the walls are taken from this line at designated depths. A survey tape is connected to the float line at the designated depths and then run to the wall being surveyed. The line length is recorded at 10 foot increments during the descent. Small sketches of the wall's actual shape are also made during the descent. The cave at the bottom of the spring was surveyed using the standard line, azimuth, and depth method.

After each dive, measurements were triangulated by using the $A=\sqrt{C^2-B^2}$ formula. This formula calculates the exact distance the wall is from the center line and provides the shape and size of the wall. After measuring each 30 degree interval from the surface to the bottom, the data is entered into a CAD (drafting) program, were it is drawn to scale. After basic line drawings are created in the CAD program, they are imported into a drawing/illustration program. In this program, the fine detail taken in the underwater sketches are added to better illustrate the wall contours, rock layers, and important formations. Next, the illustration is imported into a 3-dimensional program were it is extruded into a 3D object. The 3D program allows the entire object to be rotated in any direction and adds texture, color, lighting, and shadows to produce a life like illustration. Finally, the illustration is imported into a photo manipulation program were the color, sharpness, and any desired special effects are added. All points of interest are then added to the illustration along with photos and charts resulting in a final highly visual, graphic representation of the spring.

DIVING WARM MINERAL SPRINGS

Upon arriving at Warm Mineral Springs, we notice the strong smell of sulfur emitting from the spring water. Hundreds of white plastic chairs encircle the spring which are filled with elderly patrons. After backing up to the sidewalk beside the bath house, the team prepares their equipment for the days survey work. As the team prepares the equipment, many of the patrons look on, their heads filled with questions such as, "How deep is the spring?" "Are we looking for gold?" "Is the water just as good as last year?" Visibility in the spring is better during the morning hours and may run as high as 30 feet. As the mid day approaches, the visibility diminishes due to photo reactive bacteria and the constant churning of the water from the bathers on the surface. After adjusting our equipment in the shallows, we make our way through the bathers doing their daily exercise.

As we approach the spring, the bottom drops away from seven feet to over 40 in one step. The first thing noticeably unique during the descent is the amount of bacteria covering every inch of the sink. This bacteria can be up to seven inches thick in some places. The bacteria grows at an amazing pace and can recover any rock fanned clean in just a few short weeks. Dropping to 20 feet, we place our oxygen cylinders on the pre-made

Eight million gallons of water exit the spring each day and flows down this small run.

PVC decompression rack which is attached to the wall from 10 down to 40 feet. Just off the deco rack is a down line which takes us under the 70 foot lip where we attach our nitrox 50 percent for decompression from the 70 to 30 foot stops. Descending, we follow the wall as it undercuts sharply down into the darkness. At a depth of 175 feet, we hit a reverse thermocline, the water temperature instantly goes from 84 to 97 degrees, and the visibility increases to over 80 feet. Reaching the bottom at 205 feet, hot water can be seen flowing from several small vents along the walls. Turning to the right, we quickly come upon the main cave system connected to the sink. This is were most of the water originates. The entrance to the cave is just large enough to squeeze though with a set of doubles. Extreme caution must be taken not to disturb the thick silt on the floor. The small cave makes a sharp turn to the left. After 150 feet of back to belly passage, the cave opens into a room where multiple smaller vents flow in. This room is 25 feet long, 10 feet tall, and 10 feet wide with white chalky walls and a maximum depth of 223 feet. After looking around for several minutes, the visibility drops to a few feet because of ceiling percolation from our bubbles. It is now time to turn our dive.

Upon returning to the sink, A giant silt mound slopes sharply up into the murky water towards the middle of the sink. The floor is made up of thousands of years of debris that has fallen into the pit. We can sink our arms up to the elbow into this soft matter as it rises 80 feet to a depth of 124 ffw. Everything that has ever fallen into this pit over the last thirty thousand years is buried in this ever rising silt mound. Only one attempt to excavate the mound was attempted by Archeologist Sonny Cockrell in the 80s. His team of divers dug a small eight-feet-wide by 10-feet-deep excavation pit into the mound. Ascending slowly towards the first decompression stop at 70 feet, we scan the walls for the possibility of any new discoveries. Retrieving our stage cylinders, we swim around the sink taking notes of formations and dig sites as we watch our times and depth restrictions. At 35 to 40 feet is an undercut ledge where most of the archeological discoveries have been found. Many tarps still cover the dig sites, to prevent silt and sand from covering them. Large sections of stalactite formations and boulders which have fallen from the ancient ceiling lie on this ledge. Once we reach our 20 foot stop, we retrieve our oxygen cylinders and continue our survey work of the sink. Hundreds of stalactite formations are located around the sink at 20 feet. After decompression obligations are completed, we return to the surface with a vast amount of survey data.

The amount of discoveries still trapped in this site could be staggering, but due to the depth of the sink and the restrictions on diving procedures from collages and commercial regulations, they may never be discovered.

DIVERS ON THE PROJECT

Curt Bowen-*Coordinator & Cartographer*
Dr. Robin Brigman-*Hydrobiological*
Jim Cutway-*Diver* Coordinator
Rusty Farst-*Videotographer*
Peter Gomez-*Hydrobiologist*
Robin Gruters-*Photographer*
Harris Martin-*Hydrobiologist*
Steve May-*Photographer*
Tom Morris-*Diver*
Billy Pugh-*Survey Assistant*
Jason Richards-*Diver*
Mark Steingart-*Survey Assistant*
Brian Young-*Survey Assistant*