SAUDI ARAMCO world
September/October 1990 Volume 41, Number 5

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Meeting Place of the Spirits

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I pushed off from the overhang lip and began rappelling downward into the dark. A short distance down, the shaft opened out, and as I dropped lower, turning slowly in midair on the rope, a stupendous panorama was revealed: This was by far the biggest cavern I had ever seen. Majlis al-Jinn (The Meeting Room of the Spirits), now the largest known subterranean chamber in Arabia and the second-largest in the world, had just been discovered.

The dimensions of Majlis al-Jinn are staggering. Some 340 meters (1115 feet) long and 228 meters (738 feet) wide, with a ceiling height of 120 meters (389 feet), it is roomy enough to hold more than a dozen new Boeing 747's, parked wingtip to wingtip. The largest indoor stadium in the world, the Superdome in New Orleans - 207 meters (679 feet) in diameter and 83 meters (272 feet) high, with a seating capacity of 97,365 - could easily be contained within the cavern's volume, with room for a 1600-car parking lot besides.

I had begun looking for major caves when I arrived in Oman, in September 1980, to work as a hydrogeologist in the Karst Research Program of Oman's Public Authority for Water Resources. The purpose of the program is to define how water is distributed in this type of limestone terrain that is characterized by subterranean drainage and caves. The information is vital to understanding and developing groundwater resources in arid Oman.

After two years, however, our search had produced few results. Then, in 1982,1 found an exciting aerial photograph of the Bani Jabir mountains in the Sharqiyah Region of northeastern Oman. It showed a karstic plateau whose low relief stood out starkly in mountains so broken by escarpments and deep gorges that they were considered to be one of the most inaccessible areas of Oman. My interest in the photo was focused on several large "swallow-holes" - places where past or present streams disappeared into the ground - which disrupted the drainage patterns on the plateau; these looked promising! At the north edge of the plateau, I also noted two tiny black dots- much smaller than the swallow-holes. Each about the size of the period at the end of this sentence, the dots gave no clue, even under magnification, to the scale of the discovery hidden in their featureless depths.

In January 1983, my wife, Cheryl Jones, and I reached the plateau I had seen in the photographs. It lay 1400 meters (4593 feet) high, at the end of a strenuous six-hour hike. But we had run out of time getting there, and we had to turn back before locating any of the karst features on the airphoto. The only habitation we had encountered on our route in from the coast was the small herding camp of Sukun, partway up the mountain; although we had not reached our objectives, we now appreciated the difficulties of an approach to the plateau on foot.

Despite the lure of the karst, I didn't return to the plateau again until June, when Adventure Training Instructor Doug Green arranged for seats on an Omani air force helicopter operating in the area. Doug and I.were dropped off in the middle of the plateau and, exploring on foot, located three of the large swallow-holes. Only two more features, the two dots, remained to be located and checked out.

We moved north across the light tan rubbly surface, past scattered thorny *sumra* trees and a small deserted herding camp. We continued on our compass course and climbed the hill above the plateau. Just beyond the crest, the ground fell sharply away before us into a deep vertical pit. And just a hundred meters farther on yawned a second pit with overhanging sides, ready to swallow the unsuspecting or clumsy. We measured each drop using a small weight and a spool of fine copper wire; one was almost 120 meters (389 feet) and the other 140 meters (454 feet) deep. It was a great end to a most successful "ridge-walk" - five cave entrances located in one day: five potential entrances to the deep subsurface drainage systems!

Doug booked me a seat on the next helicopter flight two weeks later and I packed the equipment that would be needed for descending one of the deep drops - helmet, electric miner's lamp, 180-meter (583-foot) caving rope, rope pads, chocks, slings, carabiners, rappel rack, ascending rig, compass, notebook, water, survival equipment and more.

The morning of June 23 found me again standing on the plateau, with the tan dust-cloud of the helicopter landing dispersing on the wind. The pilot yelled to me above the engine

noise to be back on the surface for pickup in four hours, when he returned. Then the roar and whirlwind of the AB205 were gone - and I was totally alone.

After dropping my equipment beside the overhung pit, I carefully climbed around the 18-meter-wide (58-foot) opening looking for the best rigging point. I tied one end of the rope around a large rock and fed the other over the edge. It hummed as it sped frdm the duffel bag into the pit. I put on my rappelling harness, checked my equipment and rigged into the rope.

As I began rappelling downward toward the black silence of the cavern, the glare and hot wind on the plateau were immediately forgotten. The bright orange rappelling rope, hanging free in space, disappeared toward the dim floor, scattered with huge limestone blocks, that lay over a hundred meters below. Suddenly the rock walls around me seemed to leap back into the distance, to stand barely discernible in the diffuse light from another large hole in the ceiling - the other pit!

Five awe-filled minutes after leaving the surface, I landed atop the mountain of breakdown debris, formed when part of the chamber roof collapsed, creating First Drop entrance - as it came to be called - through which I had just descended. The skeleton of a large snake was beside me. Nearby, a brightly colored cloth bundle, thrown in from the surface, contrasted with the brown hues which dominated the cave. I undipped from the rope feeling somewhat disoriented. The immediate terrain was real - its dimensions, from dust to the five-meter-high (16-foot) limestone blocks, were familiar. But farther off, the scale seemed somehow distorted in the deep gloom. The plain in the middle distance, still well below me down the slope, was crossed by stream beds - but how far away *was* the middle distance? My sense of scale could not immediately accommodate such huge distances being under a roof-"indoors," so to speak. I took off my harness and started to work my way down the unstable debris slope.

At the bottom of the blocky rubble, the slope eased, and I stepped over a dry stream channel. Its bed was composed of sand and gravel, mixed with myriad large and small bones from the breakdown cone on which I had landed-mute testimony that many other animals had not made the entrance drop quite as slowly as I. I followed another stream channel onto the silt and clay plain. The surface was broken , into hummocky mud-cracked polygons, occasionally punctuated by an' embedded rock or cave formation that had fallen from the ceiling high above. The stream bed separated into smaller channels leading to a damp and muddy area against the north wall. This was the lowest part of the cave room, but I could find no exit passage above the mud line. I turned over a piece of decaying wood to discover a family of white, translucent pill bugs. Because they were cave-adapted, they had no visible eyes.

The plain is the drying bed of a shallow lake which only floods during infrequent storms, when runoff pours into the cave entrances. The sediment settles out and the water slowly seeps away through the mud. The lowest part of the lake bed remains damp for many weeks because the cave temperature is cool - a maximum of 17 to 18 degrees Celsius (63-65°F) - and there is little air circulation. On the north wall, the tips of flowstone "draperies" - rippled calcium carbonate deposits - have been slowly buried by the thin layers of deposited mud, which raise the level of the floor in this part of the cave after each storm. If the sediment deposit is thick, its deeper layers may, with plant spores and animal bones, preserve a record of species native to Oman some thousands of years ago, when the climate was wetter and cooler.

I paced the lake bed - 200 meters long and 50 meters wide (650 by 160 feet) - a "yardstick" for estimating the size of the whole cave. But my visual sense of scale was still not calibrated. I stood on the southern edge of the plain, near the center of the chamber, and surveyed the scene. From all directions the limestone walls smoothly transirioned into ceiling and then continued curving higher, finally merging 120 meters (389 feet) overhead to form a single immense unsupported dome - as if a gigantic hemispherical limestone cover had been set down over hills, small valleys and plains. The east and west walls stood over 300 meters (972 feet) apart while the north and south walls were separated by 250 meters (810 feet).

Majlis al-Jinn was formed in limestone of the Dammam Formation, laid down in a warm shallow sea 40 to 50 million years ago, during the Middle Eocene geologic epoch. Many millions of years later, compressional forces associated with continental drift folded, faulted, fractured and gradually forced the bedrock above sea level, when the chamber started to form.

Although Oman is presently an arid country, in the recent geologic past - the last million years or so - the climate has repeatedly alternated between dry periods and wet periods called pluvials. Most of the cave development occurred during these many pluvials - as weakly acidic groundwater slowly dissolved and carried away the limestone bedrock. The development of Majlis al-Jinn was controlled by the location of the faults and fractures along which the rock-dissolving groundwater moved. The most recent pluvial period peaked approximately 7,000 years ago, when gradual desiccation of the area began.

The shape and stability of Majlis al-Jinn's free-standing dome is due to the fact that any

large blocks of limestone that were not held in place by compression, as in a gigantic Roman arch, have fallen to the floor. The resulting debris blocked the original lower exits from the chamber and gave rise to the lake bed. How deep beneath the debris the original bedrock floor now lies is unknown.

Near the highest part of the ceiling, I caught a hint of soft light on the wall of an apparent small alcove. I never did get into position to see sky through the hole, but took bearings from the two main entrances, planning to look for this narrow third entrance when back on the surface. I left the edge of the dry lake bed, heading west across fine gravel toward the far end of the room.

I stopped abruptly; the ground before me was covered with white "cave pearls" lying by the thousands in shallow dry pools! Each cave pearl had grown as layers of calcite - the crystalline form of calcium carbonate - formed on sand grains or pieces of fine gravel in the pool. In the past, rainwater percolating downward dissolved minerals from the limestone of the chamber roof; dripping from fractures in the high ceiling, the mineral-laden water struck the pools with sufficient force to agitate the cave pearls so that a uniform coating of white calcite was deposited all around each grain, including its underside. In this way, the pearls grow larger and yet remain loose and free. When cave pearls grow too large to be moved by the falling water, they are gradually cemented to the bottom of the pool. This had happened to some of the very large pearls before me, four centimeters (1.6 inches) in diameter. Although cave pearls are chemically similar to pearls that form in oysters, they have no luster and no economic value. The conditions which created these cave formations might never exist at this spot again, I realized: A detour was in order.

A sharp report, from the First Drop end of the chamber, abruptly turned my head, and shattered the silence. A piece of the ceiling had fallen and the sound of the impact echoed through the chamber. This was not the last disconcerting crash during my circuit of the room, but fortunately all the other impacts were also distant.

I struggled up the dusty debris cone at the west end of the room, slipping half a step down for each upward effort, but at the top, 50 meters (162 feet) above the floor, again found no passage. The view was impressive, though: From this high position, the chamber resembled an immense amphitheater - the lake bed a stage, with natural seating for tens of thousands on the slopes of the debris cones.

I screed down the slope, crossed a long, narrow, flat-bottomed depression and started to climb a slope toward the other large hole in the ceiling - an entrance later named The Asterisk. My way was now blocked by a forest of unusual meter-high white stalagmites decorated with erratic mineral growths extending upward like dense clumps of branching coral. The formations were aligned under a set of long fractures in the ceiling - probably the source of the water-drops that formed them. There were flat areas on top of some stalagmites which, together with the surrounding fuzzy fringe, led us to call them "Friar Tuck" stalagmites,

I bypassed the formation forest and stood atop the Asterisk debris cone, looking upward. The fracture lines responsible for its existence were very prominent. The two major entrances, First Drop and The Asterisk, had been formed where three families of fractures intersected. As the roof became thinner over time, these highly fractured areas became unstable and were the first to collapse. The smaller entrance was formed at the intersection of only two fractures.

As I headed back toward the lake bed, I became aware of a softly glowing spot some 150 meters (500 feet) away on the gloomy north wall. The rock hadn't been glowing before, and I couldn't see a cause. I stared in fascination as the eerie glow grew in intensity and size and then suddenly brightened at the center. Moments later, its cause, a single sunbeam from the First Drop entrance, became visible by the dust it illuminated along its 300-meter (972-foot) path.

At the bottom of the debris cone, I passed an area which was 50 to 100 millimeters (two to four inches) deep in loose, dry dust. The dust had been blown in from the plateau above and slowly accumulated in the dry protected area, away from the stream channels and driplines. Tracks on its surface betrayed the recent presence of insects and a lizard, while a sinuous groove recorded the passage of a snake. Less distinct tracks, masked beneath subsequent fine layers of dust, recorded earlier crossings. In another section, myriad small white rocks sat partially buried in their impact craters, among dusty wing brushings and drag marks that led to the carcass of a pigeon.

I climbed back up the First Drop debris cone to the rope and unpacked my ascending gear, clipped onto the rope and began to climb out of the cavern. The slow turning of the rope continuously varied my view of the chamber as the features of the cave floor became gradually smaller and my view of the roof grew more detailed. Above the chamber ceiling, the heat and glare of late morning greeted me. Twenty minutes after leaving the cave floor, I crossed back over the lip to stand on the surface again - the coolness of Majlis al-Jinn just a memory.

After pulling up the rope and packing the caving equipment, I followed the compass

bearing toward the small hole in the ceiling I had seen from below. I found myself looking over a sharp cliff, at whose base was the third entrance. In contrast to the grand scale of the cave's other features, it was only two meters (6.5 feet) wide.

The status of Majlis al-Jinn among the large cave chambers of the world was not known until Cheryl and I completed our mapping survey during five trips in April and May of 1985, and it was only then that we gave the cavern its name. Our mapping revealed Majlis al-Jinn to be the second largest cave room in the world, after Sarawak Chamber in Malaysia.

Majlis al-Jinn has a floor area of 58,000 square meters (more than 14 acres) and a volume of more than four million cubic meters (5.2 million yards). The only entrances are three free-fall drops through the roof: First Drop of 118 meters (382 feet), The Asterisk drop of 140 meters (454 feet) and Cheryl's Drop, the small, narrow third entrance, which was the cave's one final surprise. For Cheryl's Drop, first descended by its namesake in March 1984, remains, at 158 meters (512 feet), the longest free-fall drop in Arabia.

And it all began with two tiny dots on a photograph!

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This article appeared on pages 16-23 of the September/October 1990 print edition of *Saudi Aramco World*.