GEOGRAPHY OF OMAN

Oman, a country occupying the southeastern coast of the Arabian Peninsula at the confluence of the Persian Gulf and Arabian Sea. Much of the country’s interior falls within the sandy, treeless, and largely waterless region of the Arabian Peninsula known as the Rub’ al-Khali. The region is still the domain of Bedouin nomads, although today it is also crisscrossed by oil and gas pipelines.
WHERE IS OMAN?

Oman, officially the Sultanate of Oman, is an Arab country on the southeastern coast of the Arabian Peninsula in Western Asia. Holding a strategically important position at the mouth of the Persian Gulf, the country shares land borders with the United Arab Emirates to the northwest, Saudi Arabia to the west, and Yemen to the southwest, and shares marine borders with Iran and Pakistan. The coast is formed by the Arabian Sea on the southeast and the Gulf of Oman on the northeast.
Before the discovery of oil Oman had changed little since the Middle Ages. Oman was a naval superpower back in those days and were sea explorers. They were known for ship building expertise and they traded with states in the Indian subcontinent and in places as far as Africa. The people lived simpler lives without automobiles and electricity. After deposing his father in 1970 (removing him from his position forcefully), Sultan Qaboos opened up the country and embarked on economic reforms. He followed a policy of modernisation marked by increased spending on health, education and welfare. Slavery, once a cornerstone of the country’s trade and development, was also outlawed in this drive for development.
DAY 1: COASTAL ENVIRONMENTS

Map of destinations visited

Bandar Khayran Reserve

This reserve is 30-40 minutes by boat from Bandar Al Rawdha Marina, located in the heart of Muscat.

The 300 million year old coastline here does not have many natural ports so harbour areas have been created using hard engineering techniques such as breakwaters, revetments, sea walls and riprap.

Coral reefs permeate the Bandar Al Khayran waters, considered home to many diverse organisms and fish. The place is abuzz with divers, especially with the presence of more than 22 diving locations, each with its own charm and beauty.
COASTAL FORMATIONS

The north east coast is shaped mainly by the erosional influences of wind, rain and sea. The action of the sea slowly wears away at the base of the cliffs (wave cut notches) of these relatively soft rocks; undercutting them to an extent where eventually sections of the rock face are left unsupported and collapse into the ocean. The process then starts again on the new section of cliff wall.

In addition much of the surrounding rock at or near the surface has been affected by solution. Most of this area’s rocks are limestone; they contain calcite, a mineral which can be dissolved by carbonic acid.

This dissolving process mostly occurred long ago, during cyclic periods when Oman’s climate was much wetter than it is today. The last wet phase occurred between 11,000 and 6,000 years ago.

Wetter climates allow plants to grow and soil to be produced. Carbon dioxide in the soil mixes with rainwater to produce a weak solution of carbonic acid. As the water enters the cracks and fissures in the limestone it reacts with calcite in the rock, dissolving it; in this case only small holes have been dissolved, however in other parts of Oman, time and circumstance has allowed the development of huge caverns.
COASTAL LANDFORM FORMATION

Coastlines are littered with the evidence of erosion and the power of the sea. Erosion makes the coastline varied and interesting, and often give the coastline its “wow” factor. For each landform you need to understand how processes of weathering (freeze thaw, hydration, biological, salt crystallisation), mass movement (slumping, slides, rock falls) and erosion (Hydraulic Action, Corrasion, Corrosion) contributes to the formation.

Stacks, stumps and caves

These features are formed on cliffs or headlands. Waves attack vertical lines of weakness in the rock known as Faults. Processes such as hydraulic action and abrasion widen these faults into cracks and eventually the waves will penetrate deeply enough to create caves.

Over time, the cave will be eroded into an arch, accessible to the sea on both sides. Weathering will also play a role, with physical weathering processes such as freeze thaw and salt crystallisation and chemical processes such as carbonation weakening the rock surrounding the cave or arch making it more susceptible to mass movement and collapse.

Finally, the erosion and weathering continues and the arch collapses leaving behind a stack (a vertical column of rock). These stacks can be attacked further, and eventually the stack may collapse to leave a low lying stump.

Coves

Coves form where rock runs in bands horizontal to the direction of wave attack. There is a band of resistant rock closest to the sea and a band of less resistant rock inland.

The waves seek out faults in the hard rock and erodes using the processes of abrasion/corrasion and hydraulic action through to the soft rock behind.

Wave processes erode the softer rock faster and this leaves a circular cove with a narrow entrance where the sea enters. The waves are also refracted within the cove, spreading out to erode in all directions.
LIMESTONE FORMATION

Most limestones form in shallow, calm, warm marine waters. That type of environment is where organisms capable of forming calcium carbonate shells and skeletons can easily extract the needed ingredients from ocean water. When these animals die, their shell and skeletal debris accumulate as a sediment that might be lithified into limestone. Their waste products can also contribute to the sediment mass. Limestones formed from this type of sediment are biological sedimentary rocks. Their biological origin is often revealed in the rock by the presence of fossils.

Some limestones can form by direct precipitation of calcium carbonate from marine or fresh water. Limestones formed this way are chemical sedimentary rocks. They are thought to be less abundant than biological limestones.
COASTAL ECOSYSTEMS

The coral reefs of the Persian Gulf and Oman Sea are critical habitats of cultural, socioeconomic and scientific value. However, their development is constrained by a variety of oceanographic factors including: extreme temperatures and salinity, high levels of suspended sediments, limited surface area suitable for the settlement of recruits and the scoring action of mobile sediments. Disease and outbreaks of Crown-of-Thorns starfish represent naturally occurring threats to coral reefs though the former may be aggravate by stressor derived from human activities.

Dolphin shoals also visit the shores of Oman in large numbers. Muscat is famous for dolphin watching. The types of dolphins that visit Oman are: Indian Ocean Dolphins, the Indo-Pacific Humpback Dolphins, Risso’s Dolphins, Common Bottlenose Dolphins, Indo-Pacific Bottlenose Dolphins, Rough-toothed Dolphins, Pantropical Spotted Dolphins, Striped Dolphins, Spinner Dolphins, and Long-Beaked Common Dolphins.

Tourism is, however, the fastest growing industry in Oman and without careful monitoring could greatly damage these ecosystems.
CORAL REEF FORMATION

The first stage of the formation of a coral reef is the coral larvae attaching themselves to rocks or soil near the coasts. The coasts may be of an island or a continent. The larvae become polyps and excrete calcium carbonate, which forms their exoskeleton.

The polyps live only in those waters which have enough sunlight seeping though. They have a symbiotic relation with the microscopic algae Zooxanthellae, which helps them grow. As they grow, they secrete more calcium carbonate.

The secreted calcium carbonate sediments on the rocks and provides a substrate for more polyps coming to attach themselves to the formation. As more and more polyps attach to the substrate, a coral reef is formed.

Calcareous Algae also add their sediments to the structure. The marine animals and plants also add their own remains to the reef as they die and sink. It strengthens the reef and now it can withstand any storm.

The reefs that are initially formed near the coast are known as fringing reefs. Over a period the calcium carbonate converts into lime stone due to pressure.
DAY 2: CULTURE AND WADIS
SULTAN QABOOS GRAND MOSQUE

In 1992 Sultan Qaboos directed that his country of Oman should have a Grand Mosque. A competition for its design took place in 1993 and after a site was chosen at Bausher, construction commenced in December 1994. Building work took six years and seven months.

The mosque is built from 300,000 tonnes of Indian sandstone. The main musalla (prayer hall) is square (external dimensions 74.4 x 74.4 metres) with a central dome rising to a height of fifty metres above the floor. The dome and the main minaret (90 metres) and four flanking minarets (45.5 metres) are the mosque’s chief visual features. The main musalla can hold over 6,500 worshippers, while the women’s musalla can accommodate 750 worshippers.

A major feature of the design of the interior is the prayer carpet which covers the floor of the prayer hall. It contains, 1,700,000,000 knots, weighs 21 tonnes and took four years to produce, and brings together the classical Persian Tabriz, Kashan and Isfahan design traditions. 28 colours in varying shades were used, the majority obtained from traditional vegetable dyes. It is the second largest single piece carpet in the world. This hand-woven carpet was produced by Iran Carpet Company (ICC) at the order of the Diwan of the Royal Court of Sultanate. The carpet measures over 70 x 60 metres. The chandelier above the praying hall is 14 meters tall and was manufactured by company Faustig from Italy. It is the world’s largest chandelier.
DESERT DESIGN

Temperature Control

Shade is an essential element for a house in the desert. Outside, deep overhangs keep the interior cooler and provide an outdoor setting for days when the weather cooperates. Inside, high interior ceilings capture heat, and ceiling fans set in “summer mode” pull the warmer air upward.

Exterior Materials

Stone and adobe are common exterior finishes because of their cooling qualities. Painted light colours, they don’t fade in the sun, help keep the interior temperature cool and withstand the extreme desert weather. Wood is not a good choice for a desert exterior because seasonal strong rains, wind and the intense heat cause wood to warp and deteriorate.

Light

Desert homes are positioned to take advantage of dramatic views and avoid the glaring afternoon sun. Floor-to-ceiling windows are often tinted to protect the interior from heat and sunlight and to save energy. When open, windows allow air to flow in all directions. Window coverings are lightweight, if used at all. Linen, sheer fabrics and shades provide privacy while maintaining a cool interior.

Interior Materials

Stone and rocks found in the desert feature in desert interiors. Cement, terrazzo, granite, marble and tile flooring keep the inside cool and clean up easily after a sandstorm. Wood flooring should only be placed in interior areas not affected by the sun.

Outdoor Spaces

Most desert homes have covered seating areas that open to the outdoors. Water feature enhance the serenity of the desert lifestyle. The rotating water cools the immediate area.
WADI BANI KHALID

Wadi: An Arabic term that refers to a valley. In some cases it can also refer to a dry riverbed that only experiences water when there is a heavy rain fall. Unlike other valleys a wadi has been cut and eroded by water however because it is in desert it rarely experiences any constant water except for during the rainy season. Deposition is very common in a feature such as this because of the fact that the water dries up and is no longer able to carry a load of sediment that it has.

Wadi Bani Khalid is a valley in Oman. Despite its arid surroundings, the wadi is characterised by streams and spring water that bubble up from underground. A number of small villages and some plantations sit near these water sources. Bani Khalid also has colourful rock formations that get their hues (green and red) from a high concentration of minerals.
INTO THE DESERT

The Sharqiya Sands (formerly known as Wahiba Sands, or Ramlat al-Wahiba) is a region of desert in Oman. The region was named for the Bani Wahiba tribe. The area is defined by a boundary of 180 kilometres (110 mi) north to south and 80 kilometres (50 mi) east to west, with an area of 12,500 square kilometres (4,800 sq. mi). The desert has been of scientific interest since a 1986 expedition by the Royal Geographical Society documented the diversity of the terrain, the flora and fauna, noting 16,000 invertebrates as well as 200 species of other wildlife, including avifauna. They also documented 150 species of native flora.
DESERT FORMATION

The desert was formed over the last 3 million years as a result of the forces of south-west blowing monsoon and the northern shamil trade wind, coming from the east. Based on the types of dunes found in the area, it is divided into the high, or upper, Wahiba and low Wahiba. The upper area contains mega-ridge sand systems on a north-south line that are believed to have been formed by monsoon. The dunes of the north, formed at some point after the last regional glaciation, measure up to 100 metres (330 ft) high, with peaks accumulating in the areas just beyond the strongest wind speeds, where declining velocity wind deposited sand. Beneath the surface sands are an older layer of cemented carbonate sand.

Inhabitants

The area is occupied by Bedouins who congregate at Al Huyawah, an oasis near the border of the desert, between June and September to gather dates. Tribes present in the area at the time of the Royal Geographical Society expedition included, predominately, the al-Wahiba (or Yal Wahiba) for whom the region is named, the al-Amr, the al-Bu-Isa, the Hikman, Hishm and Janaba.

Seif sand dunes

Seif, a long, narrow sand dune or chain of dunes, generally oriented in a direction parallel to the prevailing wind or in a direction resulting from two or more winds blowing at acute angles to each other. The dune crest consists of a series of peaks and gaps, and the steep, or slip, face may change sides of the dune according to changes in wind direction. Most seif dunes occur in the open desert and rest on a coarse sand sheet.
The Bedu evolved as nomadic herdsmen, living off the products of their animals, drinking their milk, weaving their hair, making leather from their skins and eating their flesh. Their lifestyle was the supreme adaptation of man to the hostile environment of some of the hottest, driest areas on earth. The land is too sterile for them to stay long in any one place. The vegetation is too thin and grows too slowly. Instead the Bedu learnt to move, following the limited rains, grazing their animals on small patches of grass wherever they could be found. It was not an easy life, but it was survival. T.E. Lawrence wrote that “the Bedouin ways were hard even for those brought up in them”, that they were “a death in life”. If one asks the Bedu today what life was like in the old days, their tales are of constant thirst and hunger, of great journeys to bring water from wells or to look for areas that had received some rain.

Whenever one thinks of the Bedu one imagines them with their camels and their goat-hair tents. The bait sharar (“house of hair”) is synonymous with the Bedu. The reality is slightly different. There are tribes who have never lived in tents and those who have traditionally only used tents during winter when a shelter from the cold, wind and occasional rain has been a necessity. In Oman, it is only the tribes of the Empty Quarter, the Bait Kathir and Rashid that have used tents. Previously the tribes of the stony plains, where trees are more plentiful, built their camps around the shade of these natural shelters, often covering them with blankets or cloth to improve them. Other tribes, especially on the coast, used palm fronds to build easily assembled and dismantled shelters called barasti. These are still a common sight around the Wahibah Desert in Oman and along the coasts of the Arabian Gulf. More recently the Bedu have started to use metal grilles to form temporary shelters. These are common among the Bedu on the Jiddat al Harasis in Oman, where they resemble metal bedsteads suspended and joined together to form small cabins.
DAY 3: COASTS AND SINKHOLES
BEACH FORMATION

A beach is a landform alongside a body of water which consists of loose particles. The particles composing a beach are typically made from rock, such as sand, gravel, shingle, pebbles, or cobblestones. The particles can also be biological in origin, such as mollusc shells or coralline algae.

Some beaches have man-made infrastructure, such as lifeguard posts, changing rooms, and showers. They may also have hospitality venues (such as resorts, camps, hotels, and restaurants) nearby. Wild beaches, also known as undeveloped or undiscovered beaches, are not developed in this manner. Wild beaches can be valued for their untouched beauty and preserved nature.

Beaches typically occur in areas along the coast where wave or current action deposits and reworks sediments.
SINKHOLE FORMATION

The formation of sinkholes involves natural processes of erosion or gradual removal of slightly soluble bedrock (such as limestone) by percolating water, the collapse of a cave roof, or a lowering of the water table. Sinkholes often form through the process of suffosion. For example, groundwater may dissolve the carbonate cement holding the sandstone particles together and then carry away the lax particles, gradually forming a void.
ADVENTURE AND INFRASTRUCTURE
WADI SHAB

The final adventure a trek through a palm lined wadi to reach a hidden cave with a waterfall.
SULTAN QABOOS

Sultan Qaboos is a popular moderniser, but has eschewed far-reaching democratic reform.

Sultan Qaboos seized power in a coup against his father, Said Bin Taimur, in 1970.

As sultan, he took on the role of prime minister and heads the foreign, defence and finance ministries.

His policies have proved popular in spite of the lack of a democratic government. He instigated the use of oil revenues to develop the country’s infrastructure and modernised the government structure with the establishment of a Consultative Assembly in 1981, replaced by the Consultative Council - the majlis al-shura - in 1990 and the Council of State in 1997.

However, all important decisions are still made by the sultan.

Oman saw a rare outbreak of discontent in 2011 when demonstrators gathered to demand jobs and political reform. Their action followed a wave of pro-democracy protests across the Arab world. Sultan Qaboos responded quickly by promising more jobs and benefits.
THE NEW INTERNATIONAL AIRPORT

The new Muscat International Airport will be the new gateway to the Sultanate of Oman. It will have capacity to handle 12 million passengers per annum (MPPA). To have enough space to develop this the airport has been sited on the outskirts of the city.

The new airport has been designed to accommodate the world’s largest aircraft, the Airbus A380. The runway has been designed to enable independent parallel operation.

The passenger terminals are designed to the latest "state of the art" technology and in accordance with IATA Service Level A standards.

The total gross area for the new Muscat International terminal building is 580,000 m² with an overall airport land area of 21 km². Further expansions is planned for Muscat International airport in three subsequent phases, ultimately boosting the airport’s capacity to 24, 36 and 48 MPPA.