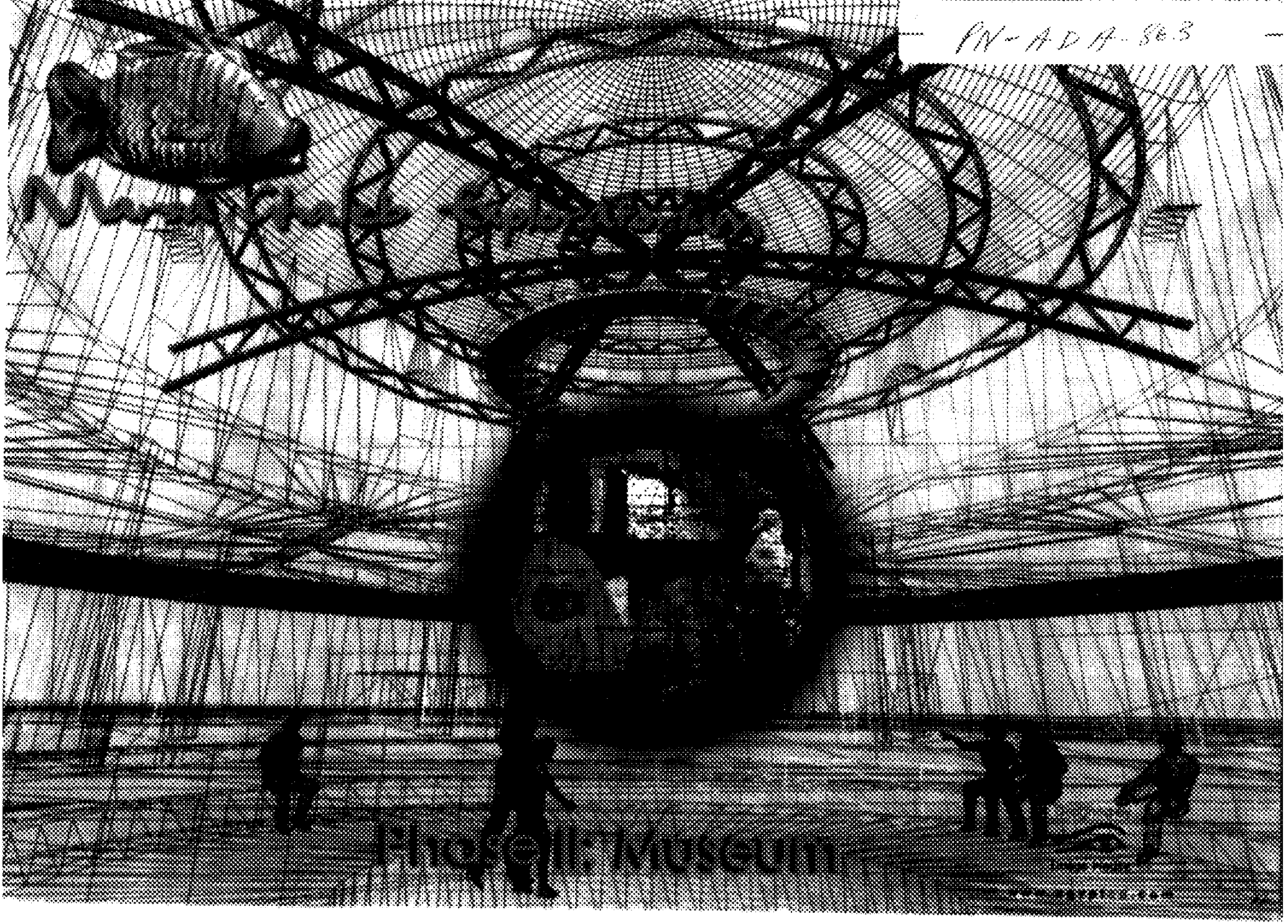
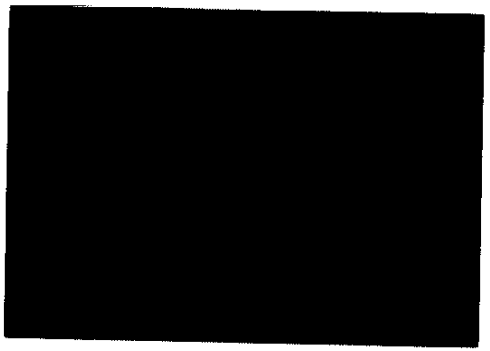




This replica of an antique glass vessel from Akentaen's era designed as a fish captures the brilliant hues of the colorful fish darting among the corals of the Red Sea. This piece is exhibited at the Cairo museum and will be used in the center's logo for its unique representation of cultural and natural heritage.

Introduction

The Exploratorium, so named for its gateway to exploring the Eastern desert and Red Sea, is a facility that serves visitors, local residents, researchers, and developers as a vital learning space.

The Exploratorium, owned by the TDA (Egyptian Tourism Development Authority), is situated at Port Ghalib, halfway down the Red Sea coastline of Egypt.

Healthy ecosystems and social systems are built upon webs of diverse, mutually beneficial connections. The more diversity, flow and exchange — the healthier and more vital the system. The web of human and natural relationships of the Red Sea is complex, fragile and, for the most part, not apparent. The Exploratorium seeks to make visible those relationships and the beauty and value of each of the elements within the system.

The Exploratorium will provide a comprehensive understanding of the Eastern Desert and Red Sea — its ecology, human culture and history. Through direct experience and knowledge, visitors and residents alike can obtain a comprehensive, holistic understanding of the complex web of relationships that underlie the vitality and sustainability of the region – something very few people, if any, have seen and understood its vast potential.

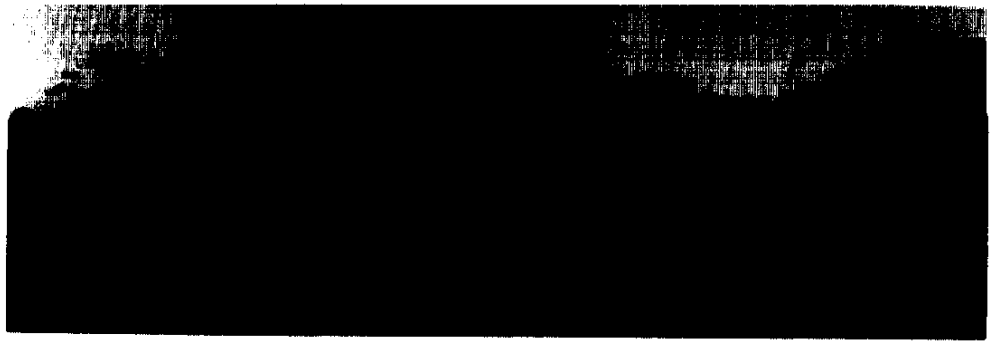
A wealth to exhibit: *the heritage of the Eastern Desert and Red Sea in focus.*

Lofty mountains, stones of dazzling colors, and a view of the blue-green emerald water of the Red Sea make the Eastern Desert a place of wonderment and joy. The marvels of this desert, with its gazelles and rich wildlife, dom palms, acacias, and Heglig trees; its springs and hidden oases, provide an incredible array of resources for exploration and discovery. More hidden and less known for most travelers and visitors is the distinctive and varied cultural heritage of the Eastern Desert ranging from its indefatigable inhabitants to ancient archaeological treasures.

This region possesses unique natural resources that are significant to zoologists. Three great zoogeographical zones meet here and the wildlife shows considerable variety. The diversity of Red Sea marine life has attracted the attention of investigators since early times. These unique environments offer a combined eco-system structure harboring a variety of flora and fauna that evolved over millions of years.

The people who inhabit the desert possess authentic and varied cultures, many of which will soon change forever due to the advancing and imminent intrusion of modern civilization.

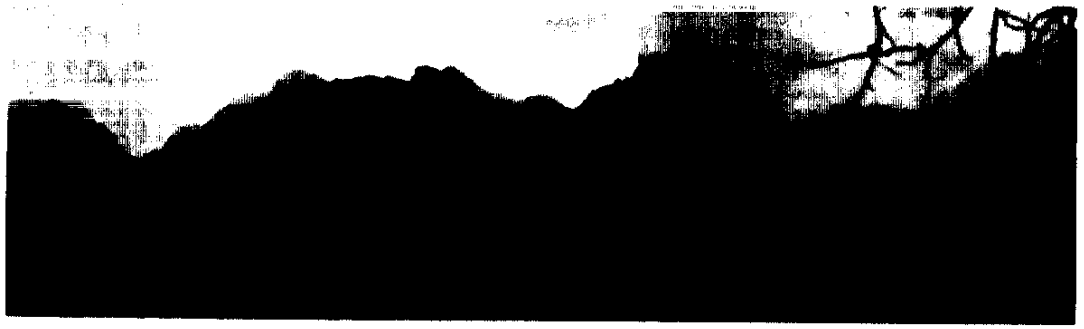
Today, these fragile ecosystems are under great pressures. The challenge is to safeguard these natural resources, while still allowing for sustainable economic growth.

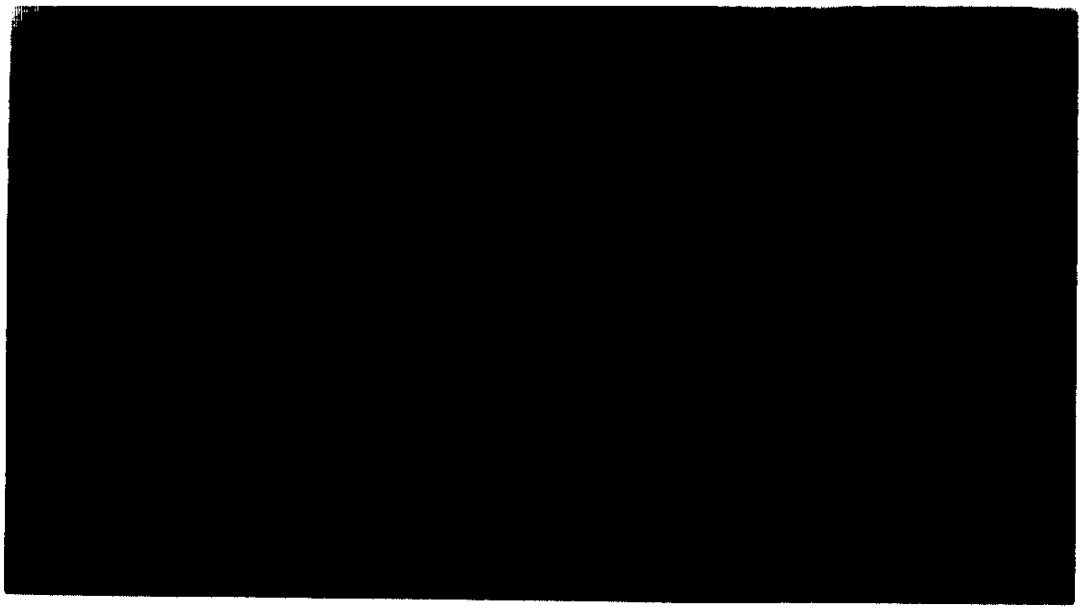


Geology

The Eastern Desert consists mostly of a series of rugged mountains flanked by layers of limestone in the north and sandstone in the south. The mountains are formed of the most ancient rocks in Egypt, dating more than 550 million years ago (ma). The Oligocene, from 37 – 24 ma, a period of violent earth movements and volcanic activity, witnessed the formation of the Red Sea rift. The landmass was ruptured, separating Africa from the Arabian Peninsula. Since then, Africa has drifted away from Arabia, moving in a clockwise direction. The newly formed rift was filled with seawater during the Miocene (24 – 5 ma). At that time the present outlines of the Red Sea were delineated.

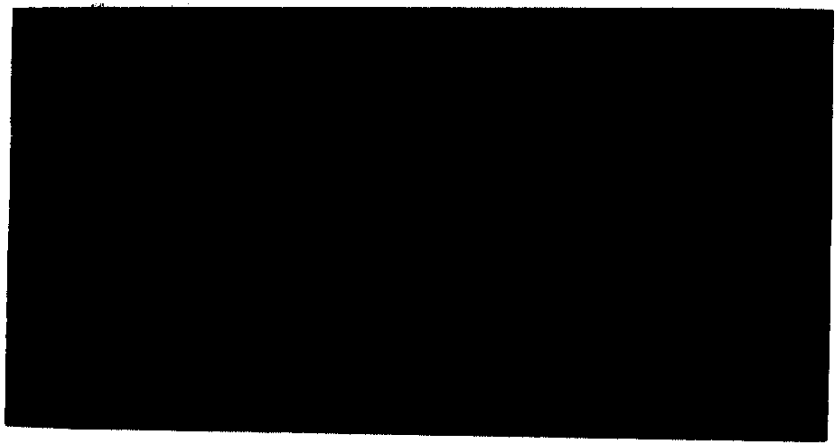
The rocks include igneous rocks like granite formed from molten earth materials and metamorphic rocks, such as gneiss and schist, formed under tremendous pressure and heat during mountain building movements. One of the most famous granites of the Eastern Desert comes from Mons Claudianus where huge columns were made and transported hundreds of kilometers across rugged terrain to build elaborate temples. Precious stones were also quarried. Emeralds were mined at Sokiet, where exotic temples remain witnesses to a glorious past. Precious metals like gold have also been mined from ancient to modern times. Other attractive rocks include the Imperial porphyry from Mons Porphyrites -nike named stone of the emperors- and breccia verde antique from Wadi Hammamat.

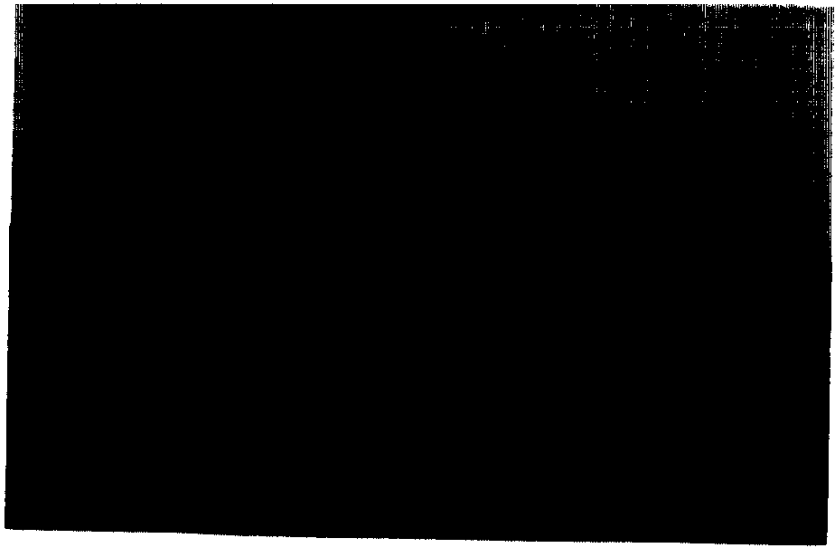




Habitats
There are four main habitats in this Desert Sea region: mountain, wadi, marine (including coral, mangroves and sea grass), and island habitats. Each habitat has distinctive and occasionally overlapping wildlife of flora and fauna.

Mountains: In the Eastern Desert, the mountains rise gradually from west to east. Among the most notable of these mountains are Gebel Shayib el Banat (2187m), Gebel Hamata (1977m) and Gebel Elba (1437m). In addition to rainfall of 50 to 100mm annually, higher mountains receive condensation of cloud moisture, creating mist oases on higher peaks.
Gebel Shayib el Banat is the highest mountain in the Eastern Desert (2187m)and is one of a series of mountains facing the Gulf of Suez. Due to the general aridity of the area, there are no permanent watercourses although some water is retained over harder rock and appears as springs. Vegetation depends on sparse rainfall and location but is mainly confined to upstream areas and hill slopes. Gebel Hamata (1977m) is located 90km WNW of Ras Banas and approximately 40km from the coast. This mountain is particularly rich in plant life although it has not rained there for some years.
Vegetation that is typical of mountainous terrain includes acacia trees, Acacia raddiana; the famous 'retam,' Lygos raetam, of the Bible (1 Kings 19:4) and several species of wild caper, Capparis spp.





Wadis: The mountains are much dissected by wadis that on the Red Sea side are relatively short, steep and more numerous, on the west they are longer and less steep. Because the Eastern Desert is so dry overall, plant and animal life is generally restricted to drainage systems. Plants grow on the sloping sides of the wadis or on islands within the main channels. The main channels are often without vegetation due to flooding, which makes it impossible for plants to take root. Springs in some wadis may support pockets of more water-dependant vegetation.

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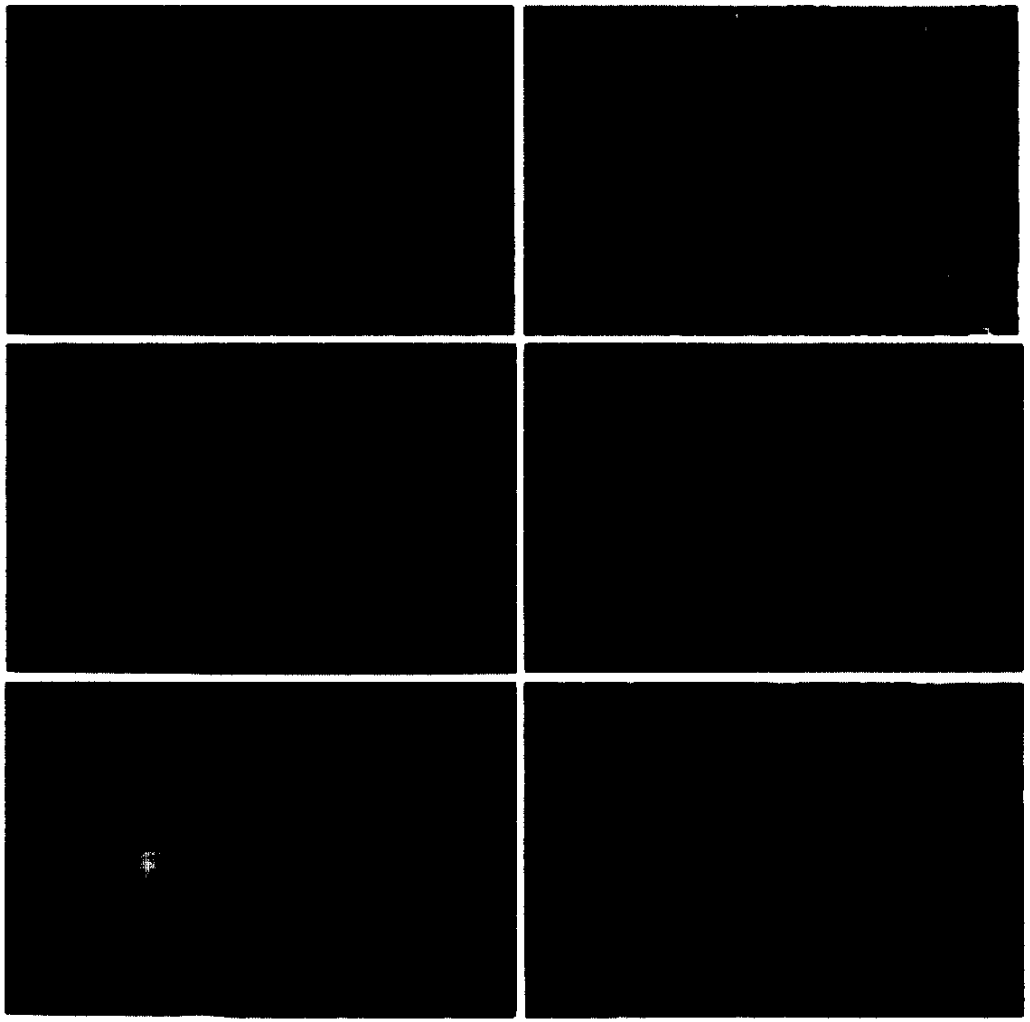
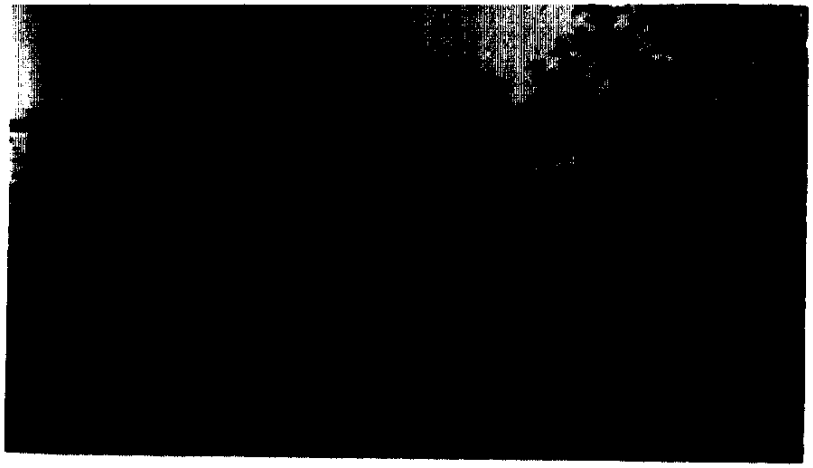
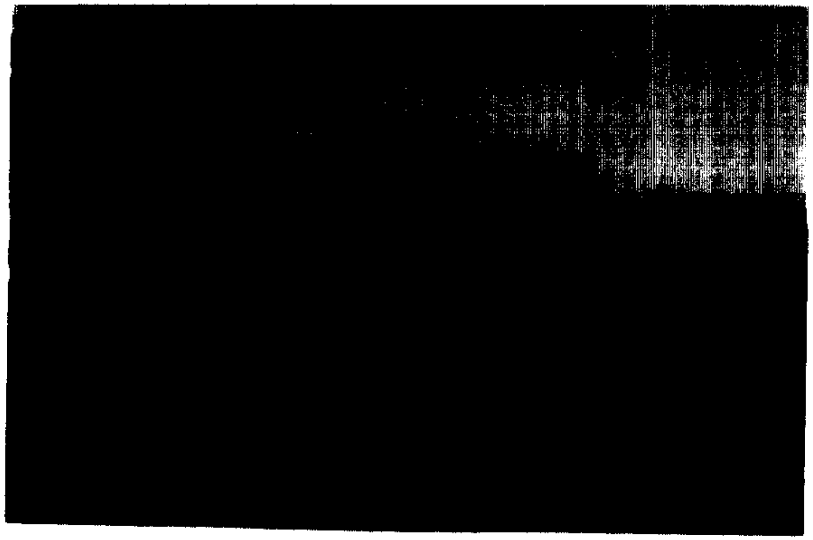
Wadis provide resting, feeding and roosting places for many small birds on their long migrations to and from northern Europe.

Typical vegitation include several species of Acacia. *Balanites aegyptiaca* trees ; the fruits of which are used medicinally to treat diabetes, Dense thickets of Arak, *Salvadora persica* are also found in wadis, the branches of this plant are used by the local people as toothbrushes. The red berries of Nitraria retusa, a typical desert shrub that endures drought and salinity The Wild Caper, *Capparis spinosa*, grows on rocky substrate or in rock fissures. Dom Palm, *Hyphaene thebaica*, the Sodom Apple (Oshar), *Calotropis procera*, Tamarisks and Date Palms also grow in wadis.



Marine habitats include coral, mangroves and sea grass eco-systems.
The Red Sea provides ideal environmental conditions for corals and they exhibit many shapes, sizes and colors. It is here that an enormous range of creatures can be seen, tiny crustaceans, colorful invertebrates, and brilliantly colored fishes, both large and small. Coral reefs provide habitats for many plants and animals. They form an ecological niche in which creatures can live, feed and take refuge from predators. Crustaceans, worms, starfish, and fish all benefit from the coral reef ecosystem.
The shallow shelves bordering the sea ensure sufficient light for calcification to occur and for photosynthesis in the algae on which some polyps feed. The more delicate branching corals thrive in shallower water where there is plenty of light. Suspended sediment can reduce light penetration. Many corals are unable to clean away sediment, which clogs the polyps so that they cannot grow. Corals that are more efficient at this do better in areas of relatively high sedimentation.
Symbiotic algae grow only on live corals and produce part of the food the polyps need. Other algae growing on reef faces are food for herbivorous fish and other creatures.
The rate at which coral colonies grow depends on the type of coral, the location and the amount of sunshine they receive. Some corals grow at a rate of 20 – 25cm per year in very good conditions. Others are slow growing at 4 – 5cm per year under very good conditions. Under normal conditions these rates are halved.
in common.

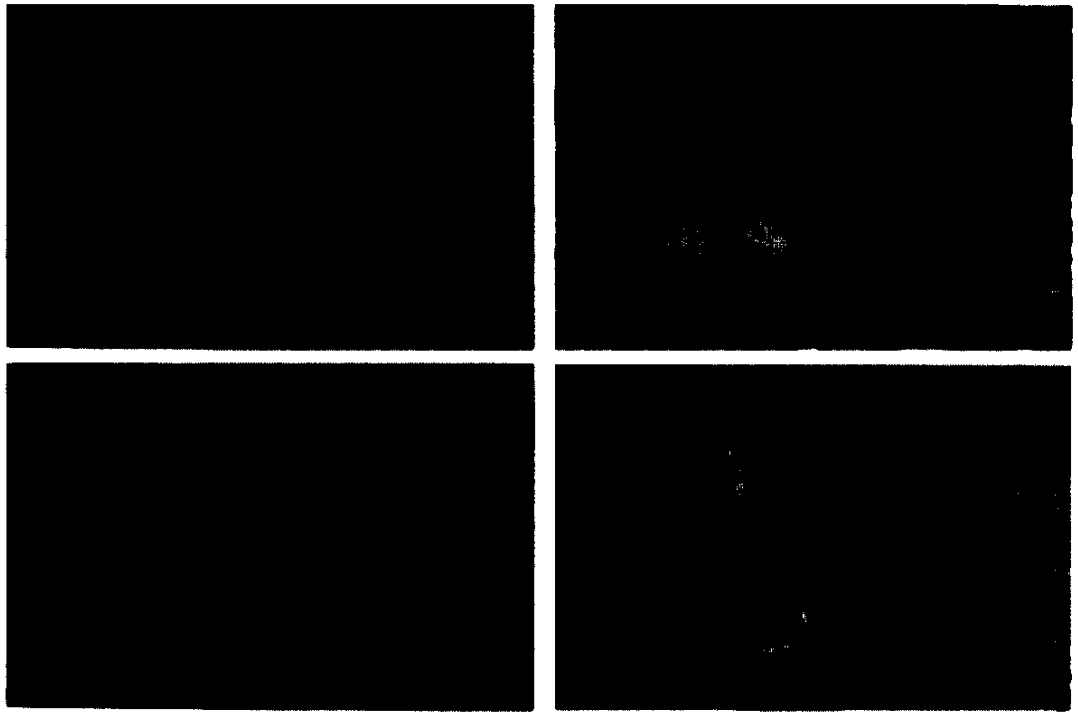




The mangroves are an important component of the coastal flora. Their roots provide breeding habitat and protection for several commercially important species of shrimps, crabs and fishes.

White Mangrove, *Avicennia marina*, grows in several places on the Red Sea coast and on some of the islands including those at the entrance of the Gulf of Suez. The most northerly stand of White Mangroves in the Red Sea is found about 26km north of Hurghada at El Gouna (Myos Hormos). They are also found on some islands. Mangrove stands become more frequent and extensive, with larger trees the further south they are. Between Bir Shalatin and Halayib uninterrupted mangrove forests extend for several kilometers along the coastline. South of latitude 23o N, the Black Mangrove, *Rhizophora mucronata*, are found. Occasionally the two are mixed.

Sea grass beds occur throughout the Red Sea and contain eleven of the sixteen species known worldwide. However, the number and size of these beds is limited although they increase in size, number and species diversity, towards the south. While sea grasses are of no direct use to man, they are important spawning grounds and sources of food for numerous fish and other creatures. They are among the richest and most productive of marine ecosystems.. The sea grass beds provide food, shelter an d protection for the juveniles of many commercially important fish and crustaceans as well as for mollusks and echinoderms including starfishes and sea urchins. Sea grasses are the only source of food for the green turtle and the dugong.



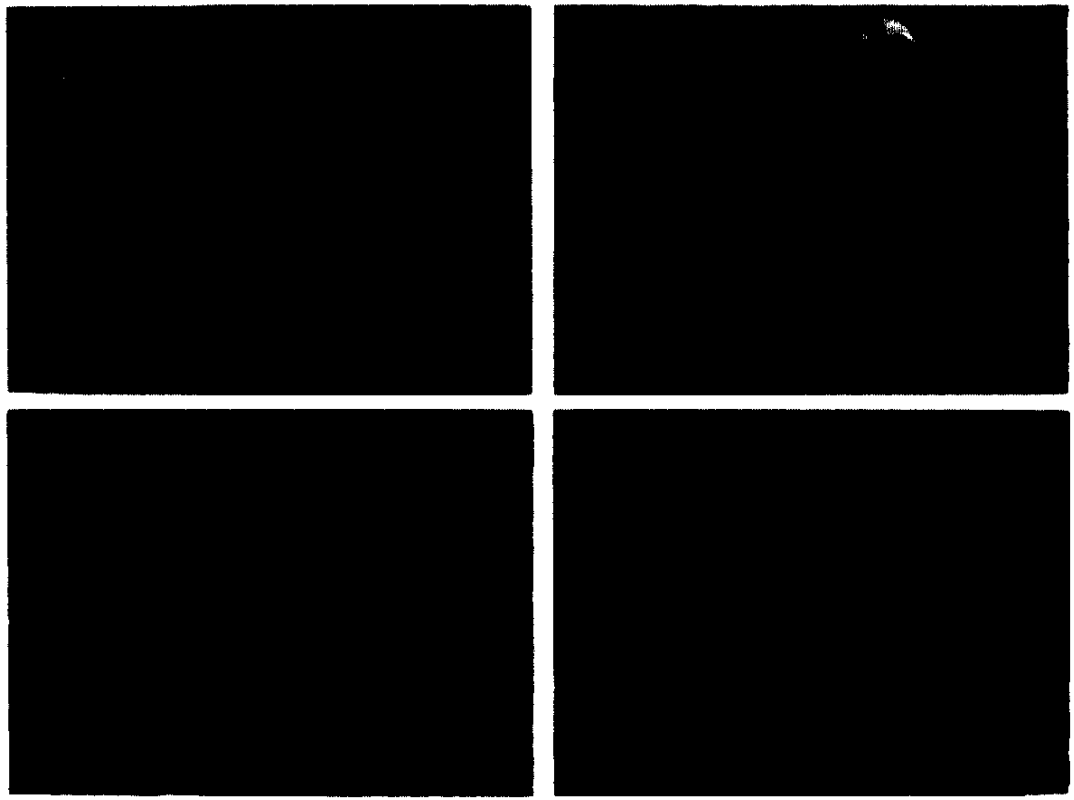
Wildlife

Egypt has a rich and diverse wildlife that reflects the country's unique position at the junction of three major zoogeographic zones, with species from each of these geographic realms represented. Mediterranean and Saharo-Sindian species form the largest component, with small numbers of Irano-Turanian and Afrotropical species that remain from past wetter ages. Only a few species are endemic to Egypt, but a number are restricted to Egypt and neighboring countries.

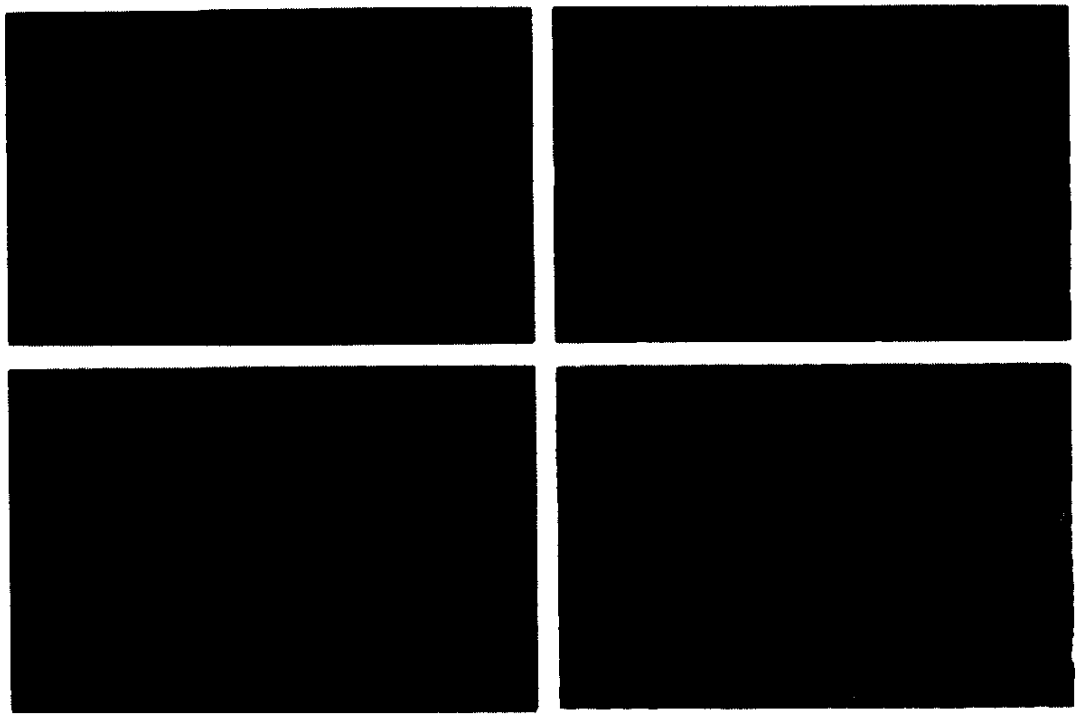
Egyptians have utilized wildlife resources since ancient times. No other culture has left behind such detailed documentation of its wildlife. From prehistoric times there are rock drawings, while from Pharaonic times there are wall paintings, relieves and mummified animals. The records show wild animals being hunted for food and sport, kept as pets and worshiped as gods. The Ancient Egyptians understood and appreciated the animals that were integral to their culture and way of life.

Birds

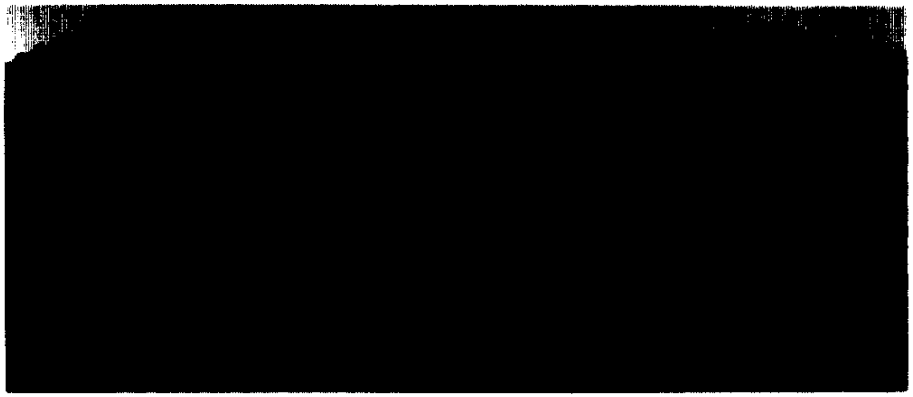
Birds are the most visible wildlife. The majority of birds in the area are migratory, passing through or spending periods in the country on a seasonal basis. Egypt is situated on major migration routes for birds traveling between breeding grounds in Eurasia and winter quarters in Africa. The Eastern Desert is important for migration and a significant number of migratory birds pass through the region. Many birds over-winter. The Red Sea islands are important locations for summer breeding seabirds and the Sooty Falcon



Mammals are the most difficult animals to observe in Egypt, many are rare, others are nocturnal or inhabit remote locations. Often, all one sees of mammals is tracks, feces, burrows or, unfortunately, carcasses.
Small mammals are the most numerous and diverse mammals found in the Eastern Desert. Large terrestrial mammals are also well represented and in the southeastern Elba National Park there are mammals that are found nowhere else in Egypt such as the Wild Ass, Equus asinus, and the Aardwolf, Protelus cristatus (the latter's normal range is from Angola to South Africa). Other mamels include:
Dorcas gazelle, *Gazella dorcas*, is a small gazelle that was widely distributed in Egypt but now considerably more common in the Eastern Desert. It is considered a globally threatened species and is legally protected in Egypt. In spite of this, it is hunted and declining in number.
Nubian Ibex, *Capra nubiana* is an inhabitant of the mountains of the Eastern Desert and the Sinai. Famed for its agility and ability to survive in the rugged, steep terrain.
Barbary Sheep, *Ammotragus lervia*, is one of Egypt's most enigmatic animals. Thought to have been extirpated but small populations have been recently rediscovered in the southern Eastern in 1998.
Striped Hyena, Hyaena hyaena, is an uncommon and elusive resident of Egyptian deserts, which has declined in recent years. Strictly nocturnal and hides during the day in caves and rock crevices.
Caracal, *Caracal caracal*,This elusive animal is a rare dweller in the deserts. It's sandy brown color camouflages it well in its habitat. Its main distinctive feature is its elegant ear tufts.



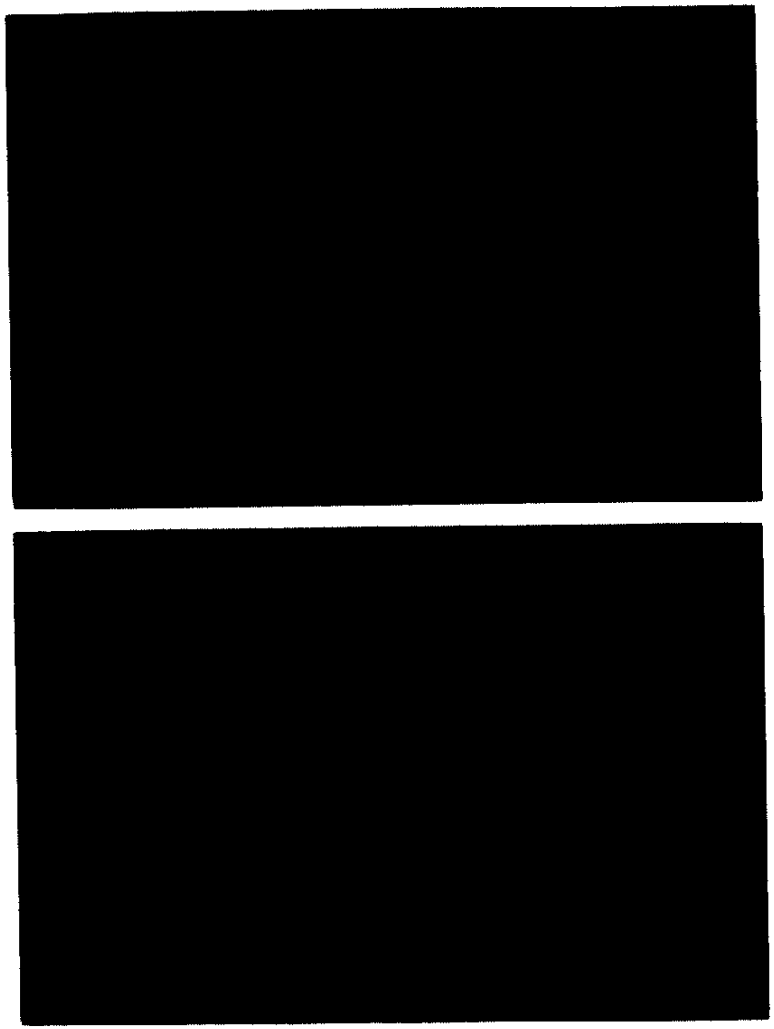
Reptiles and amphibians are the most numerous terrestrial vertebrate fauna. Lizards and amphibians are most abundant. Snakes are relatively scarce and only 23% of species are venomous.
Some reptiles are active during the day; others are nocturnal and yet others are active at twilight. Food preferences vary and most reptiles are carnivorous. A few species are vegetarians. Reptiles are cold blooded so tend to be less active in the winter and some species hibernate; others aestivate during the summer to avoid the excessive heat. Reptiles generally become more active in the spring and engage in breeding. While most species lay eggs, some snakes give birth to live young. All species need external warmth to regulate body temperature and can often be seen warming themselves in the sun.
Some of the reptiles in the Eastern Desert are:
Egyptian Spiny-tailed Lizard (Dab), *Uromastyx aegyptia*, A very large lizard, reaching up to 40 cm in snout-vent length.
Egyptian Gecko, *Tarentola annularis*, the largest of Egypt's geckos.
Agama, *Agama spinosa*, male Agamas flaunt their colours, as they become shockingly vivid during the breeding season.
Saharan Sand Snake, *Psammophis aegyptius*. a medium to large snake. It is a rear fanged snake which is mildly venomous. Inhabits a wide variety of habitats in sandy and rocky deserts.
Horned Viper, *Cerastes cerastes*, a medium to large-sized snake. Venomous. A nocturnal species. Inhabits wadi systems with some sandy patches and also sandy and gravelly plains. Often near well-vegetated areas.



The Archaeological Resources of the Eastern Desert

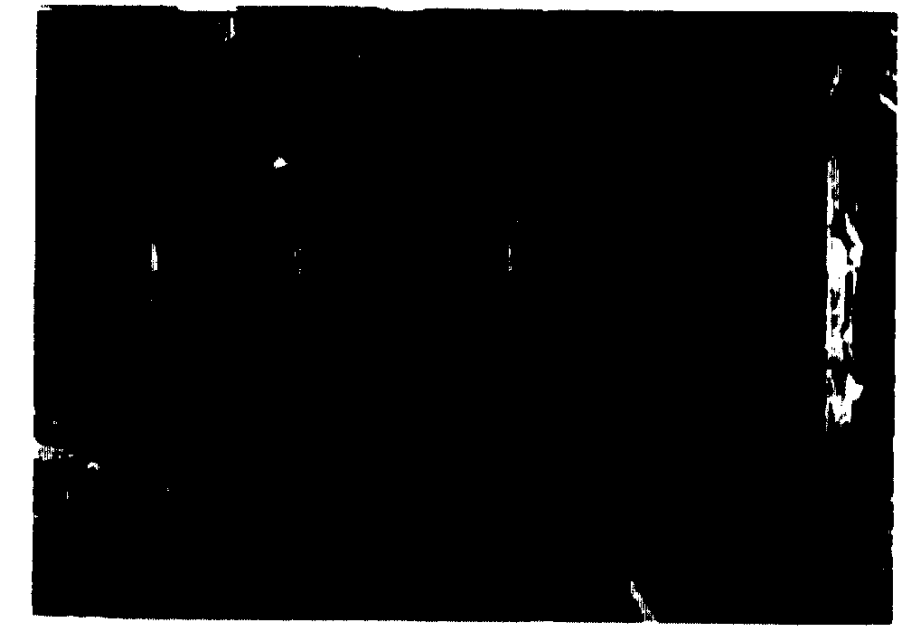
The Eastern Desert is undoubtedly one of the major cultural areas in Egypt. Its archaeological resources are distinctive, and are related mostly to ancient mining and quarries, as well as to desert roads leading from the Nile Valley to sea ports that have linked Egypt since Pharaonic times with other parts of Africa, Arabia and India. The rich resources of the Eastern Desert include, among many other things, New Kingdom gold mines, Ptolemaic quarries, Mameluk sea ports, Byzantine temples and prehistoric caves. Such resources provide an opportunity for cultural and eco-tourism that can be managed to safeguard antiquities and natural resources and contribute to local and national economic development.

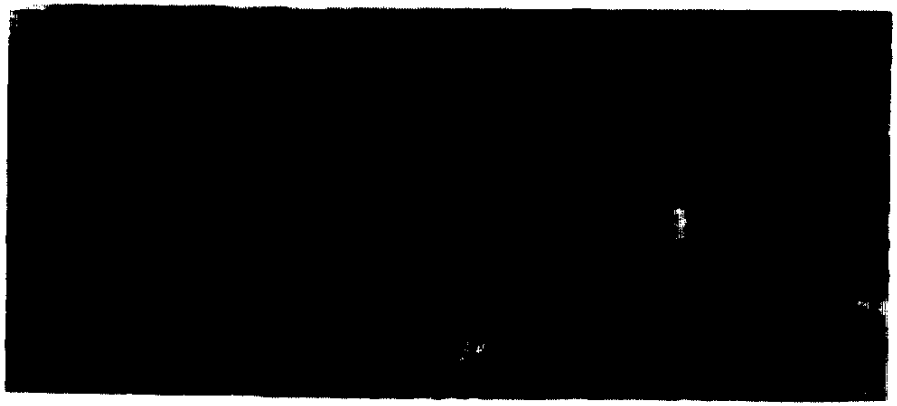
The Eastern Desert was, for hundreds of thousands of years, home of prehistoric people who lived when rain was more abundant and more regular. The earliest recognized prehistoric artifacts date back to the Acheulian (1-0.5 million years ago at Wadi Mubarak), and to the Middle Palaeolithic (e.g., at Wadi Barramyia, Bir Samut), dating from approximately 100,000 to 35,000 years ago. The latter indicate the presence of modern humans (the direct ancestors of all living human beings) in the hills of the Red Sea at a time when they drifted out of Eastern Africa to populate the world. Other prehistoric sites from the Upper Paleolithic Period to the final Paleolithic Period attest to a continuous presence of prehistoric peoples in the Eastern Desert Hills (e.g., at Wadi Abu Had and Wadi Dib, north of Hurghada, Um el-Hueitat and Gebel Wassit, near Safaga, Wadi Gassus, Gebel Duwi, Wadi Syatin north of Qusseir, Wadi Gimal, Ras



Honkorab, and Abu Ghousoun). Prehistoric remains include open-air sites (e.g., Lakeita, Jebel Abu Khuruq, Ras Samdai), caves with evidence of prehistoric occupations (e.g., Veermersch's Cave), tombs (Laqeita, Ras Samdei, Wadi Hammamat, W. Mueilha) and rock drawings (e.g., Nimr Cave), as well hundreds of sites with amazing rock art (Wadi Hammamat, Wadi Abbad, Barramyia, Wadi. Muawad, Wadi Mineh, Wadi Abu Markab el-Nes, Wadi Um Salam, Bir el-Shellul, Wadi Alaqi, Gebel Elba) attest to a cultural dynamism attending the rise and development of the Egyptian civilization in the Nile Valley.

Prehistoric peoples hunted ibex, gazelle, oryx, and fought with panthers, lions, and wild dogs. Their drawings show hunters with bows and arrows chasing animals or lasooing them. The drawings also include representations of boats of religious significance with images of deities denoting the spread of a cult centered around resurrection and life after death contributing to the religious ideology of Ancient Egypt. Connections between the Nile Valley and the Eastern Desert were fully established during the formative years of Egyptian civilization (the Predynastic period dating from 7000 to 5000 years ago) when desert dwellers exchanged desert resources (such as leather, wild game meat, ostrich feathers, ornamental rocks and minerals for grain, fish, and oil). Later, the quest for gold and copper led to active exploitation of the mineral resources of the Eastern Desert by organized expeditions and campaigns. Under the Ptolemies and the Romans, roads crossed the Eastern Desert connecting key Nile towns with mining and quarry sites (e.g., Memphis-Wadi Tumeilat Road, the Myos Hormos Road, Wadi



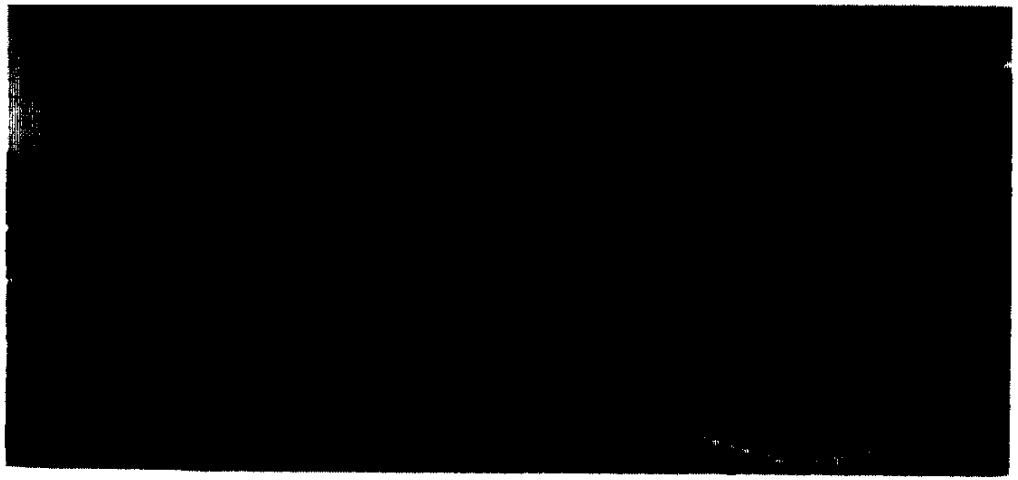


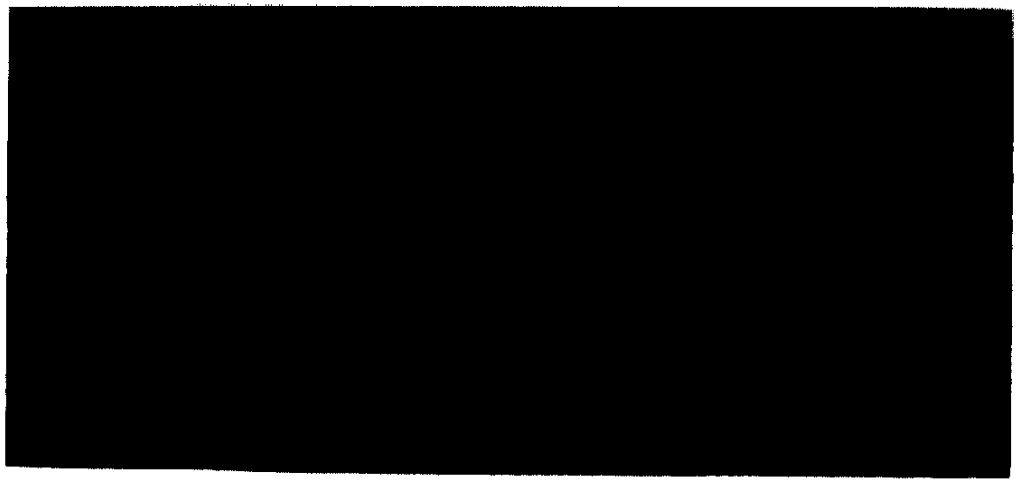
Hammamat Road, Road from Kainopolis (Qena) to Mons Claudianus, Road from Mons Claudianus to Albus Portus (Qusseir), Edfu-Nugrus Road, Berenice/Hamata—Qift/Edfu, and Via Hadriana). Watering stations, tax collection points and forts were located at regular intervals along these roads. Their archaeological remains provide now an exceptional perspective on human activities on these ancient routes (e.g. Qasr el-Banat, Bir Samut).

The mineral resources included in addition to gold (Um Balad, Wadi Dara, Wadi el-Urf, Wadi Dib, Fawakhir, Um Eleiga, Um el-Russ, G. Fatira, Hamash, Bakari, Sukkari, Attud, Hangalia) and copper (Wadi Um Balad, Dara, el-Urf, Attawi, um Samiuki, Abu Sweil, Hamash), soapstone (Atshan, Dirheib, Mekke, Bir weizi, Wadi Kharit, Bir Hamr), breccia verde antique (Wadi Hamamat), white granite (Mons Claudianus), Imperial Porphery (Gebel Dokhan), schist (Wadi Hamamat, Dokhan volcanics (Gebel Dokhan), galena (Zog el-Bohar, Um Gheig), emeralds (Skait), and amethyst (Wadi el-Hudi).

The Eastern Desert bordered the Red Sea and was thus a vital link between the Nile Valley and other trade centers with access to the Red Sea. Accordingly, roads from the Nile Valley were extended to sea ports along the Red Sea Coast from as far north as Suez to as far south as Berenice.

The mineral resources of the desert continued to be exploited in Byzantine times as indicated by inscriptions at Skait and the settlement at Bir Fawakhir. However, the most pronounced developed during that period was the establishment of monasteries (

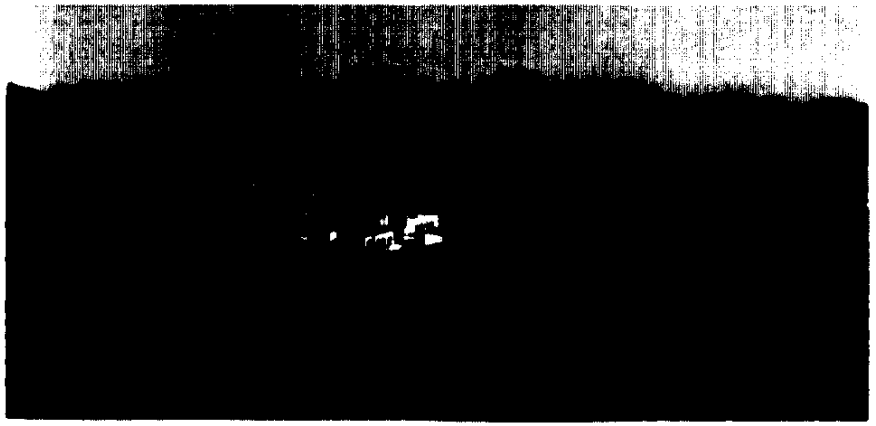




the most reputed are St. Paul and St. Anthony) marking the beginning of monastic life in the world.

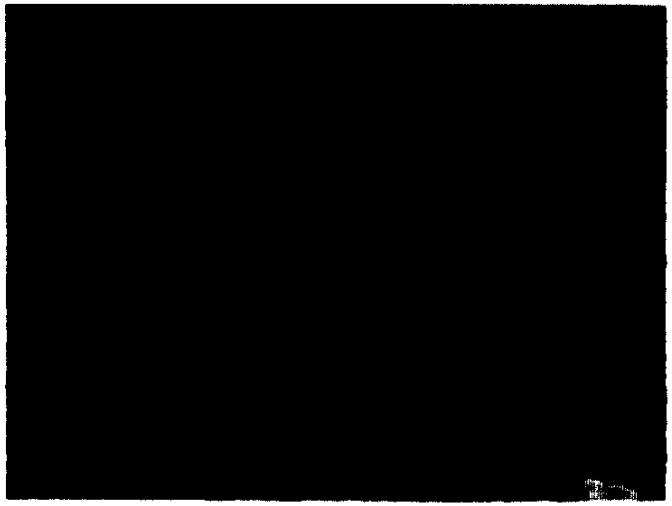
Following the Arab conquest of Egypt, Arab tribes settled in the Eastern Desert ca. 645 AD. With the establishment of Islam, the Roman roads were used by pilgrims heading for the Red Sea ports that would ferry them across the sea to Arabia.
The Arabs fought with the local Beja tribes before peaceable relations were established. The inhabitants of the region today include the Arab Bedouin tribes of the Ma'aza (northern sector to the latitude of Qena-Hurghada), the Ababda (Safaga/Qusseir to Shalatin-Sayla) and the Bisharians (Alaqi-Gebel Elba Region). The Beja may be traced back to the time of Sety I who employed them as soldiers. The Beja also resisted Roman presence in the area. Rock drawings show horsemen that may date to 1000 BC and camel riders that may date to 500 to 1 BC. The Ababda played a key role in the relationship between Egypt and the Sudan both in securing trade routes and in the military campaigns of Khedive Ismael (1820-1821) and in the armed conflict between the Mahdi and the Egyptian administration. 1884-1897).

The importance of the Red Sea and its ports was not overlooked by Napoleon who hastened to occupy Suez and then Qusseir to control the route to India via Mari.. A fleet was dispatched from Suez to Qusseir which was defended by a fort (remains of which still exist). The campaign failed. However, in June 1799, Qusseir was attacked by the French who traveled across the Eastern Desert from Qena. The French occupied Qusseir but in August of the same year, the English attacked the city from the sea. However, it



was not until 1801 that 3000 British troops from India and 2000 from South Africa landed in Qusseir in support of the Turks. The British left within a month, but a well dug 23 km west of Qusseir, the English Well is an extant memorial from this episode. The French savants like modern travelers were fascinated by the monuments and watering stations along the Wadi Hammamat road, one of the nearest to the Nile Valley is at Laqeita.

The Eastern Desert is a sacred landscape. In the earliest times, the inhabitants portrayed on the rocks images of deities and religious symbols, later they erected temples to Isis, Hathor and Min with dedications to them in numerous inscriptions. Later, the monasteries of St. Paul and St. Anthony served as abodes of Christian devotees. With coming of Islam, the roads of the Eastern Desert had carried myriads of pilgrims to their port of embarkment to Mecca. Many saints and scholars resided in its wilderness. The tomb of Sheikh Shazli who died in route to Mecca is now a pilgrim site on its own right.



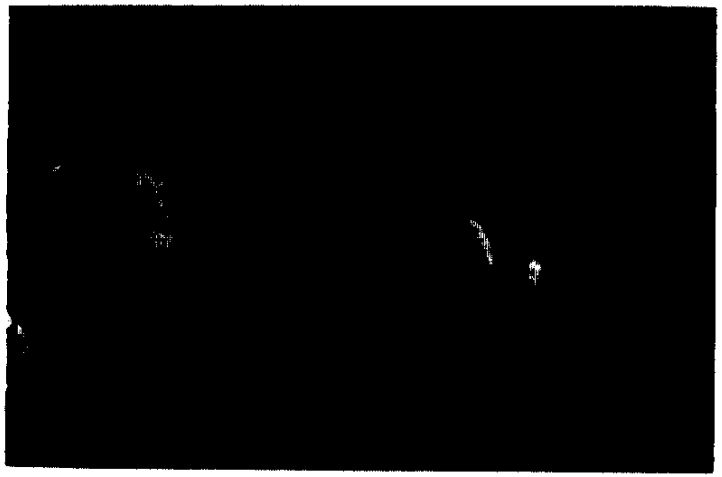
Tribes of the Eastern Desert
Four tribes share this inhospitable land. They are the Ma'aza, whose territory lies between Zafarana and Quseir; the Ababda, living between Quseir and Baranis (Berenice); the Bishari, who occupy the land from Baranis south to Port Sudan and the Rashida, who are centered round Kassala in Sudan but from time to time enter the Egyptian Eastern Desert.

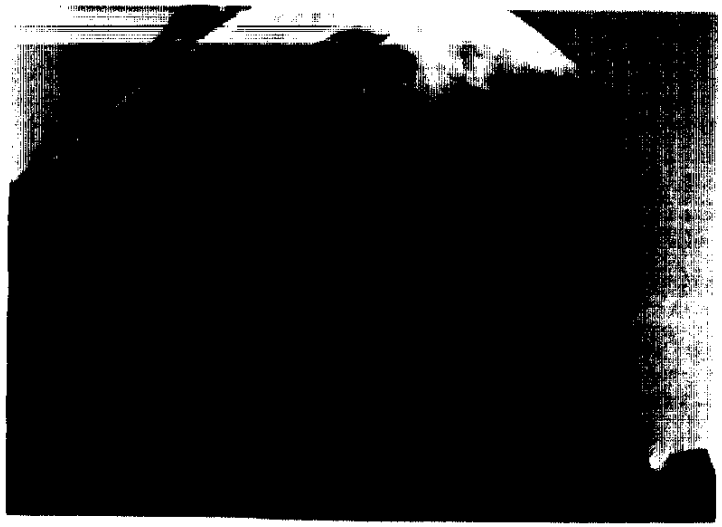
Ma'aza: When the Ma'aza arrived in the Eastern Desert is unclear. It has been said that, in the eighteenth century, 250 Ma'aza families left northwestern Arabia on the same date to come to Egypt. The Ma'aza themselves say that Arabian Ma'aza had for long traded with the people of Egypt, exchanging their goat cheeses and dates for grain, cloth and sometimes livestock. The Ma'aza live in a patriarchal society, tracing their lineage from father to sonback to the founder of the tribe, Ma'iiz ibn-al-Jabal, who lived "long ago" in northwestern Arabia. Their lifestyle is that of true pastoral nomads. They follow the available water and herbage, setting up their beit ash-sha'ar, 'houses of hair' (tents) for a while and moving on when necessary.
Their relationship with their environment is an intimate one and they know and understand the plants and animals. They know when and where the plants grow and whether they are good for food, medicine or forage. They understand the animals and their habits and movements and they have their own conservation ethic. The Ma'aza way of life is, inevitably, being eroded with time but, harsh as it was and is, it is a good life — a life of the freedom they value so highly and a life of honor.

Ababda, like the Ma'aza, are said to have originated in Arabia. Their lifestyle closely parallels that of the Ma'aza.

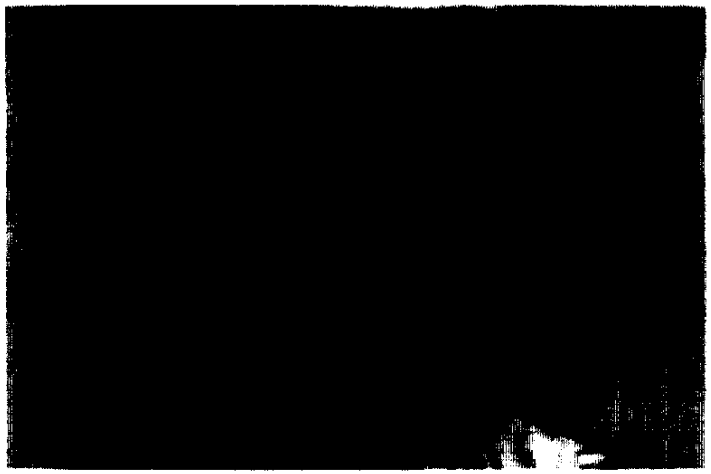
During the late eighteenth century, they and the Ma'aza raided into each other's territory and many people were killed; blood feuds arose and the enmity between the tribes lasted for many years. Today however, the two tribes live peaceably side-by-side, often wandering without hindrance into their respective regions.

The conservation practices of the Ababda may be a model for conservation everywhere. Their custom is that individual families take responsibility for protecting resources within specified areas. This has created a patchwork of areas that are each watched over by a particular family and the results are said to be excellent.The Ababda people have developed a way of life that suits them and suits the barren countryside in which they live.





Rashida are an Arab tribe descendants of 19th-century immigrants from Saudi Arabia , presently they occupy the area centered around Kassala in Sudan, though occasionally wandering around the Eastern Desert. They inhabit a few settlements scattered around Shalateen.They are easily identified with their lighter skin color.The men wear clothes tinted in shades of violet. They are a proud and hardy people often commanding camel herds across rugged terrain from Sudan to sell the camels at the camel market in Shalateen.



Bishari's are centered round Gebel Elba and their lives revolve round this impressive mountain.

The origins of the Bishari are obscure but it seems that they are an ancient Hamitic people, who have lived in the area for over 4,000 years. Their legend tells that the founder of the tribe was a man called Bishar. His grandson, or great-grandson, was a holy man whose name was Koka. Koka married two wives. One, Umm Nagi, gave birth to the plants and animals, while the other, Umm Ali, gave birth to the Bishari. Thus, the relationship between the people of Gebel Elba and their environment is a close one.

Due to this relationship it is not surprising that the Bishari should care for their environment and that tribal laws severely punish those who abuse it. Traditional methods of hunting are still practiced and firearms are seldom used.

After the winter rains, many of the tribespeople move to the highlands to take advantage of the extra water and forage. In early summer they return to their tribal lands to be by the permanent water sources.

In the last twenty years many Bishari have moved to settlements on the coast. They support themselves by working locally or by maintaining a semi-nomadic life. Those who have stayed in the traditional homelands continue to live as nomads. An ancient people pursuing an ancient way of life.

The site

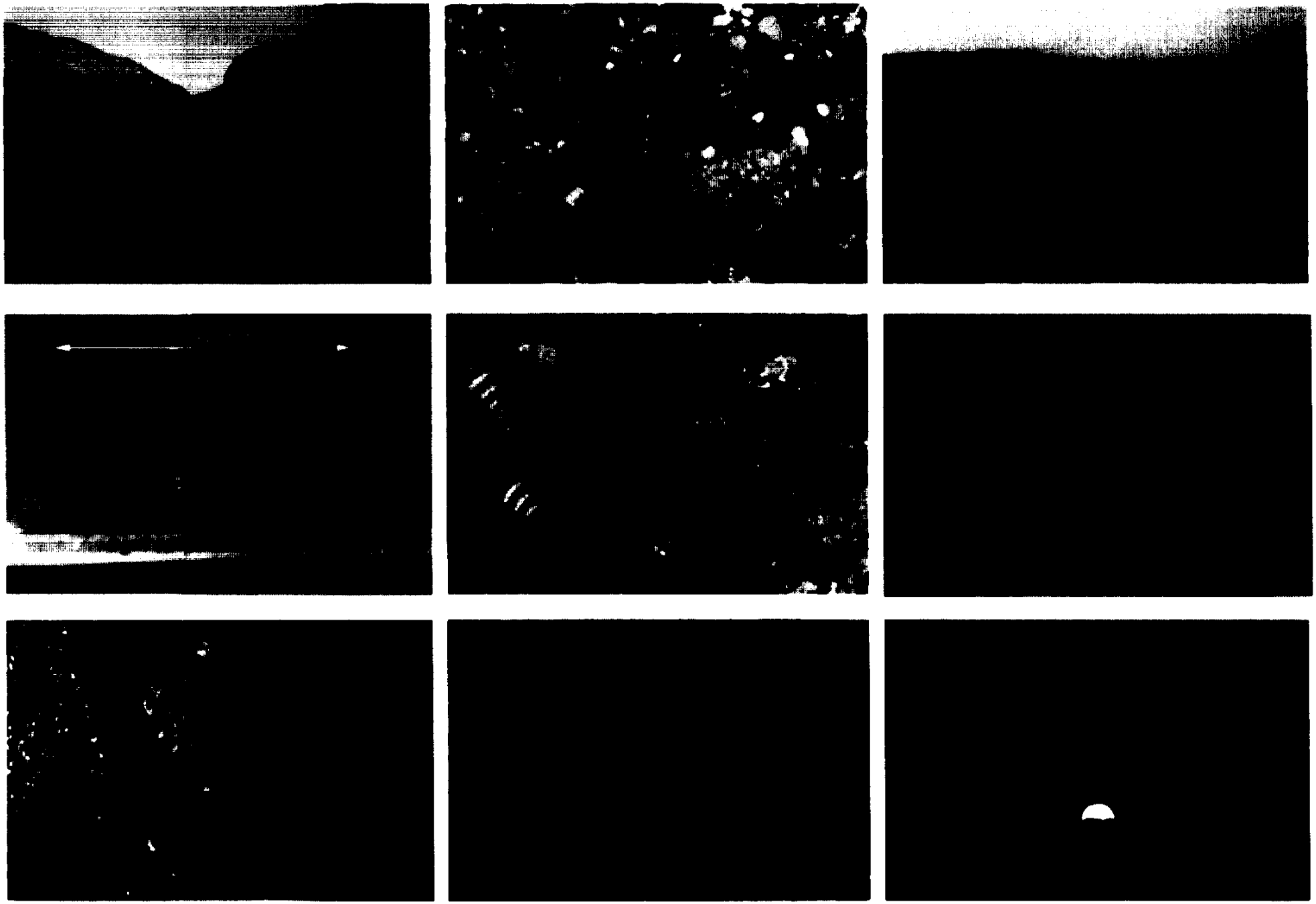
Situated at Port Ghalib, halfway down the Red Sea coastline of Egypt, The Exploratorium is located in the center of an extensive development (Integrated Development Corporation or IDC) currently under construction by a Kuwaiti real estate development company. An international airport, a large marina, extensive infrastructure and several resort, residential and commercial complexes are in various stages of planning. The are is projected to grow considerably over the next few years.

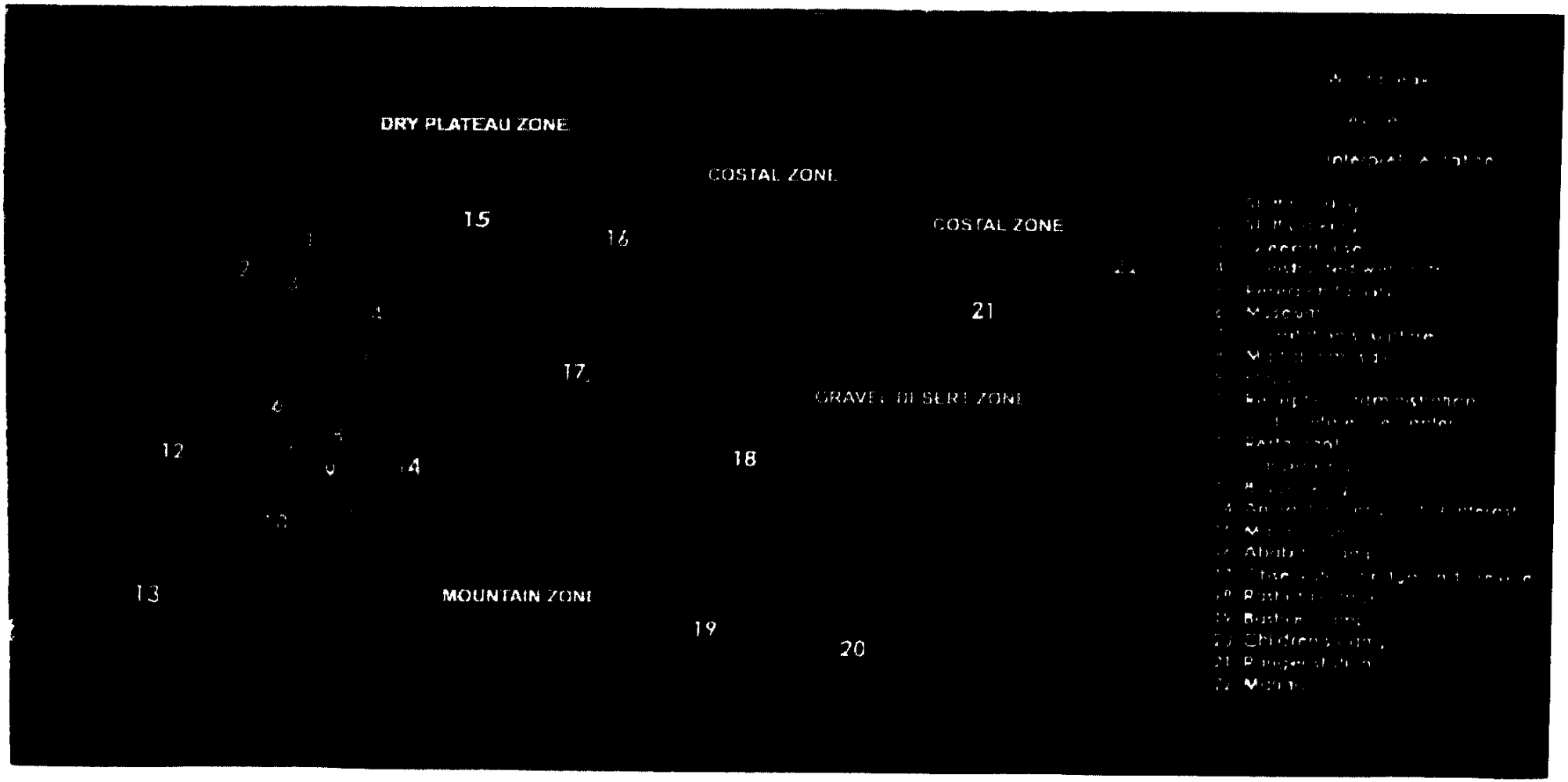
The site itself is a coastal desert plateau comprising around six acres along the Red Sea coast.

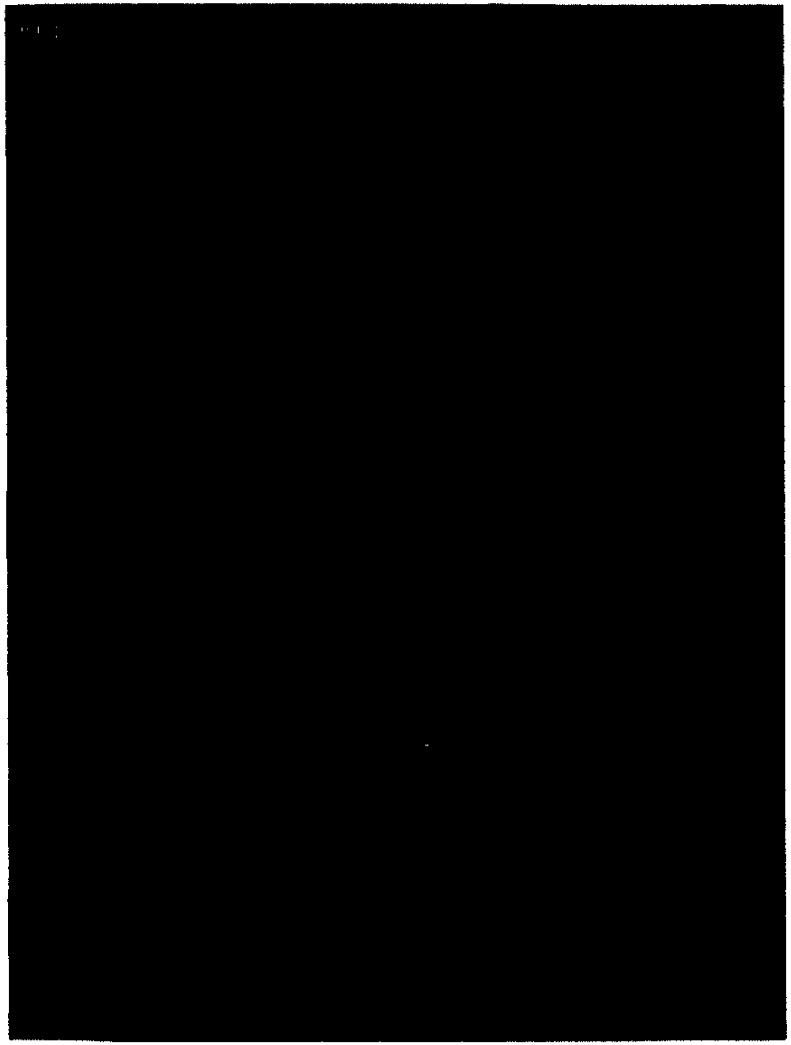
The site is very unique, bound to the West by the Red Sea and superb coral reefs teaming with marine life.

A geological crevice forming several saline pools extends in the property for around a hundred meters with a depth of up to 16 meters. The saline ponds are up to 8 meters in depth. This geological phenomenon is unique to the region and presents great opportunities. The saline pools are also very interesting with unique forms of life thriving in it. The animals observed and collected by our researchers include: 1. Jellyfish Class: up-side down jellyfish, *Cassiopea sp.*, including juveniles and adults. 2. Shrimp - species unknown. Body length (not including antenna) approximately 1.0 - 2 cm 3. Two species of gastropod 4. Two species of ascidians (marine invertebrate attached to the substratum)

All the above components offer the best location for such a center in the Red Sea region.



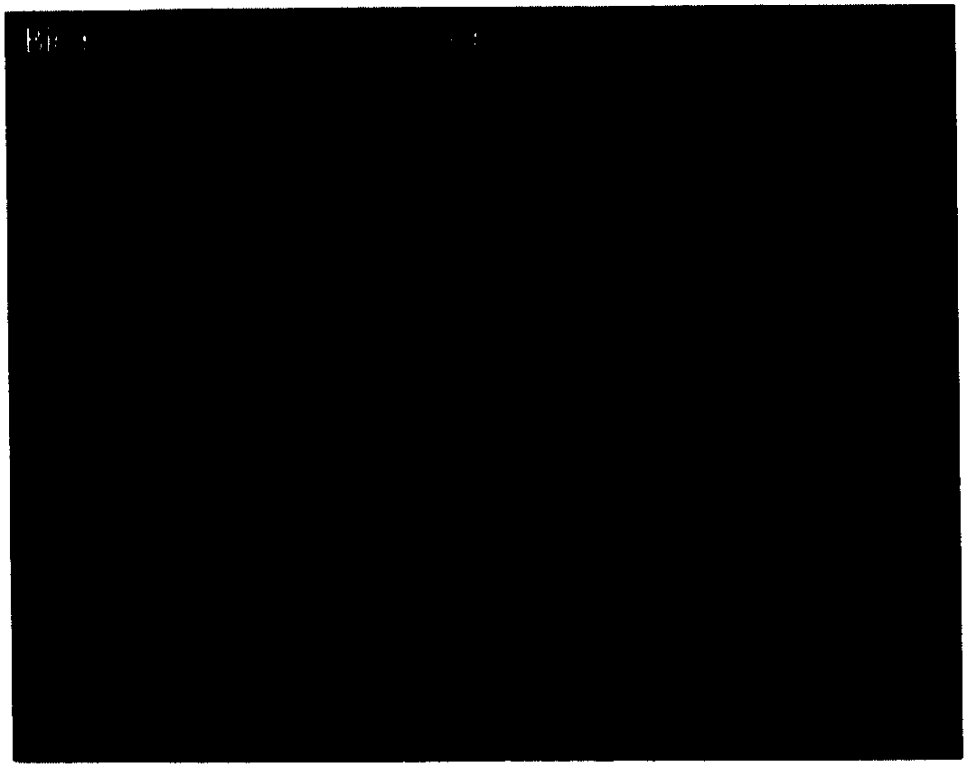




Architecture and design approach

Design Theme: the essence of the design theme for the Exploratorium is "audacious sustainable adaptation and pageantry". The Exploratorium will replicate natural systems of the Eastern desert and the Red Sea, and showcase the remarkable, unique and colorful adaptation made by indigenous species. We propose creating structures; interpretive exhibits and experiences that mirror the nature of the nearby wadis, mountains and coral reefs, each are examples of audacious sustainable adaptation. Each embodies natural evolution of rich colonies of diverse life forms that have adapted to an inhospitable environment. Moreover, these adaptations are elegantly expressed in jubilant, beautiful, colorful, life-affirming ways.

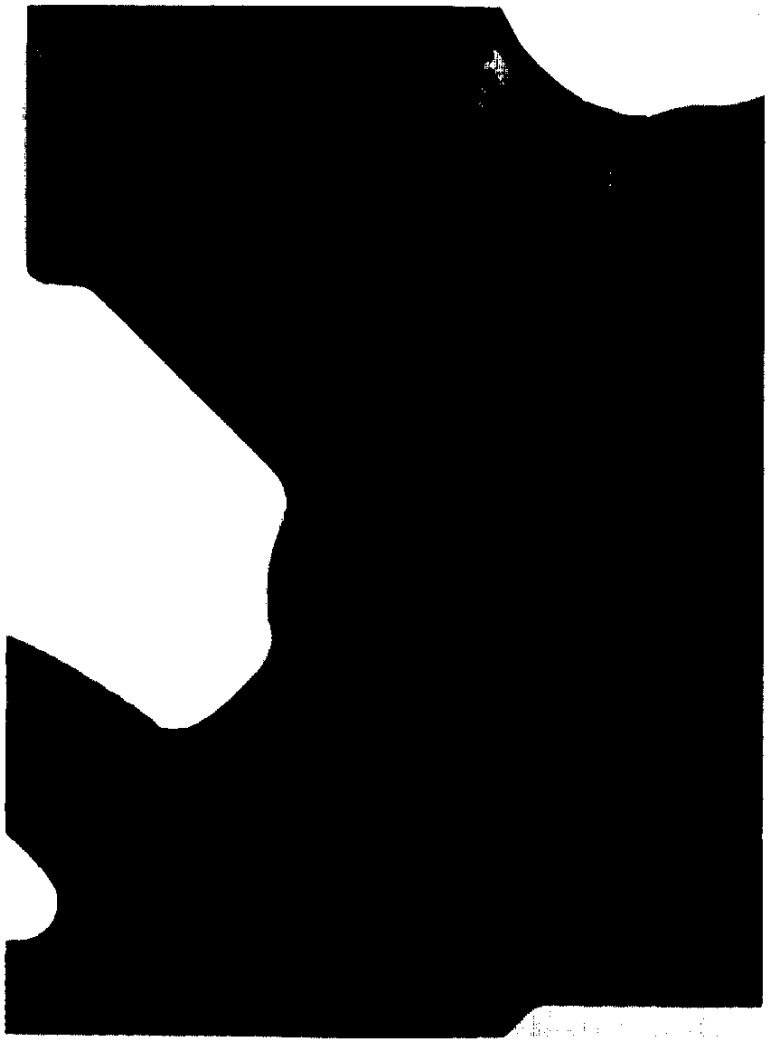
The design must provide for education, conservation, scientific research, value and inspiration and primarily promote the welfare of local people
The various elements of the integrated design concepts have been carefully chosen and placed in order to:
achieve the stated purpose of the Exploratorium;
provide experiential learning opportunities that are linked to exhibits and displays within the building complexes and on the landscape;
demonstrate sustainable development practices;
provide visitors with a sense of the surrounding region and its inhabitants; mirror a healthy ecosystem;
foster human community.



The integrated design concept is based on natural systems design practices, particularly permaculture. Permaculture is a holistic, integrated, sustainable design system based on ecology and ethics. It integrates human and natural systems in ways that are beneficial for all the elements engaged. The practice involves:
closely observing healthy, natural systems, and
designing human systems on the basis of the patterns observed in the natural systems

Project components

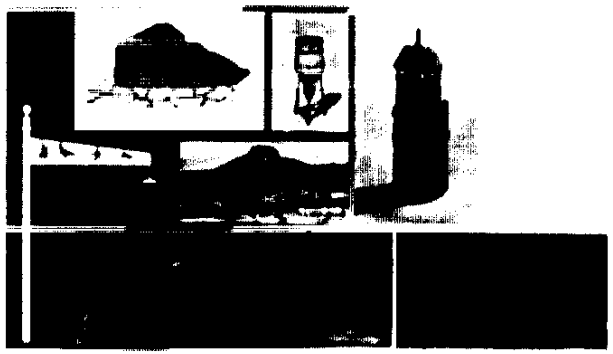
Landscape: when visitors arrive at the Exploratorium, they will immediately see and sense that they are entering a different place. The wild shapes and colors of abundant native plants — the curving driveway constructed of diverse and colorful stone from the region — animated groups of people moving in and out of various buildings — a wetlands with a myriad of birds calling to each other — and, off in the distance, a glimpse of people on trails leading toward tribal desert camps and the sea ..... all greet visitors with the welcoming feeling of an oasis and the excitement of exploration.
With the aid of interpretive display stations, visitors access meaningful information about the region and ways for humans to live in a sustainable world. Each will link to exhibits and displays located in the building complexes. The is generally divided into three main areas: an oasis of buildings, plants, wild life and human activity.

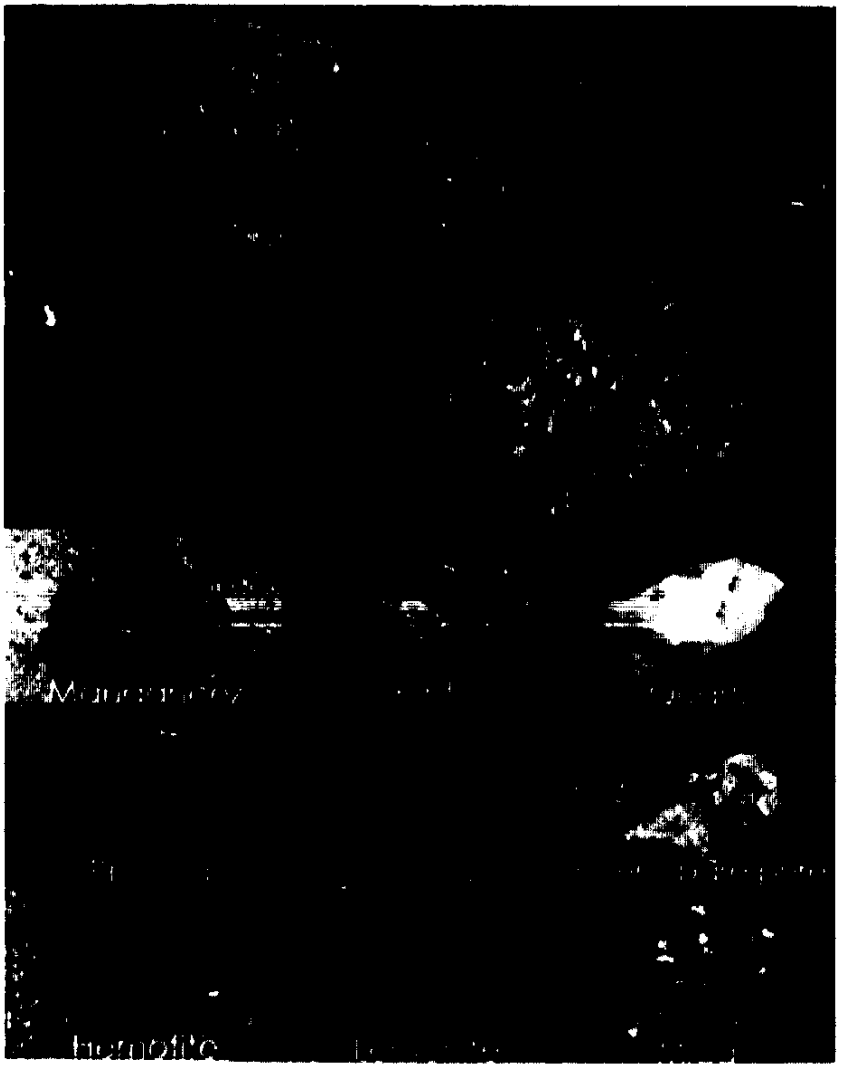


Hardscape: there is basically an endless supply of varied natural stone in the Eastern Desert which is largely made of igneous and metamorphic rock (like granite) and other stones in many beautiful yet earth tone colors.

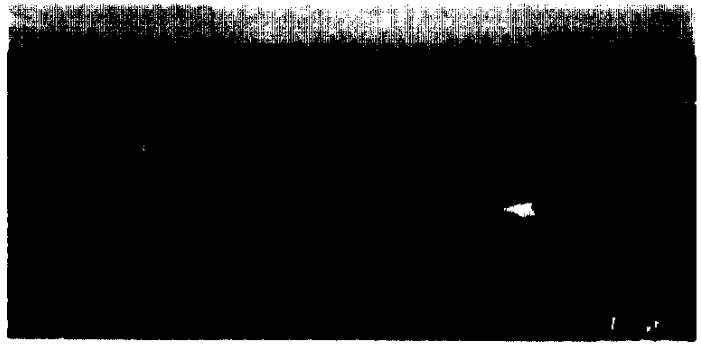
Most of these stones are extremely durable and perfect for constructing driveways, walkways, etc... As you see in the photographs below, they are used in driveways which are slightly bumpy, effectively controlling speed limit in the site among the many pedestrians. The variety of stone available gives the designer a lot of flexibilityin applying different patterns, some of which reflects local art patterns. No wonder the ancients who exploited the Eastern Desert always built using these stones.

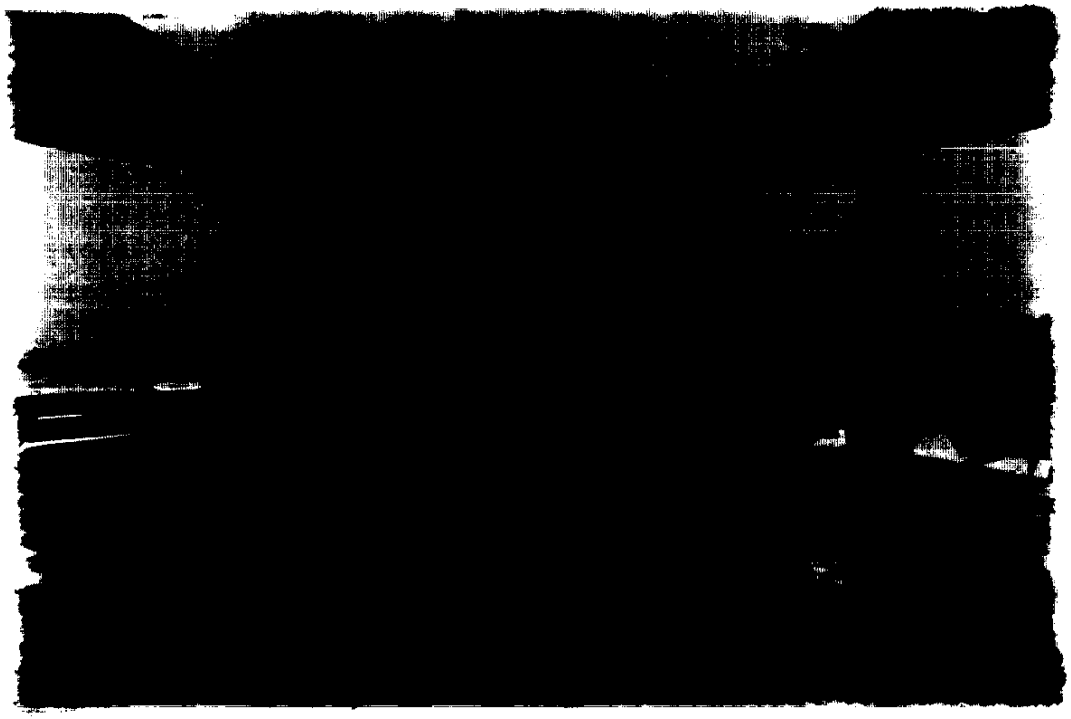
Along with other elements of the design, the hardscaping is thus rooted in the cultural and natural heritage of the area, educating visitors of the rich geological features of this region, features uniquely formed by earth activities resulting from the Red Sea rift.

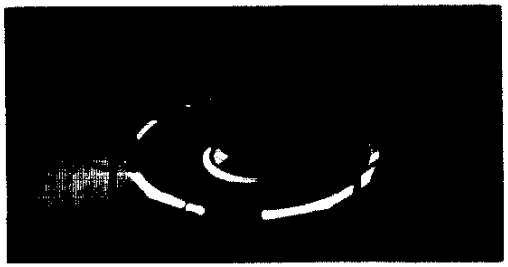




Pathways: Leading to the bridge are the paths, they are defined in the landscape with dead coral fragments available in sufficient amounts on site. These dead corals have very interesting and stunning shapes as shown in the photos (at left) and demonstrate an organic design approach while suggesting a use for this abundant resource on the Red Sea shore. This resource is often discarded by developers of sea side resorts; it is abundant to the extent that in antiquity, it was used as building blocks in many sea side structures (far right at bottom). The paths are marked with nine characteristic types of rocks quarried in the Eastern Desert. Each type of rock with its distinctive color and appearance laid at equal intervals of about 15 meters will lead the visitor to a specific location on the site. At the start of the trail a key map will be provided with the name of each type of rock and where it leads. Kids and adults alike will be amused by locating and following a rock's trail to a specific location while learning of the rich geological diversity of the Eastern Desert.



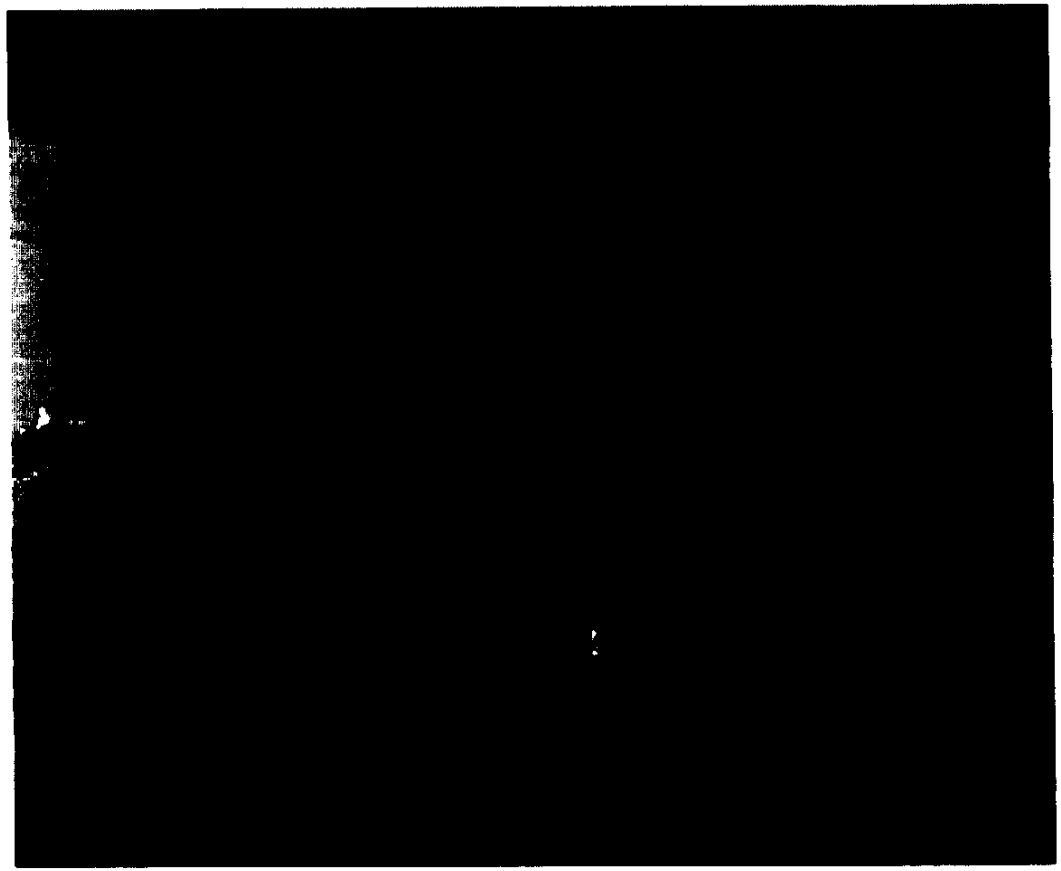




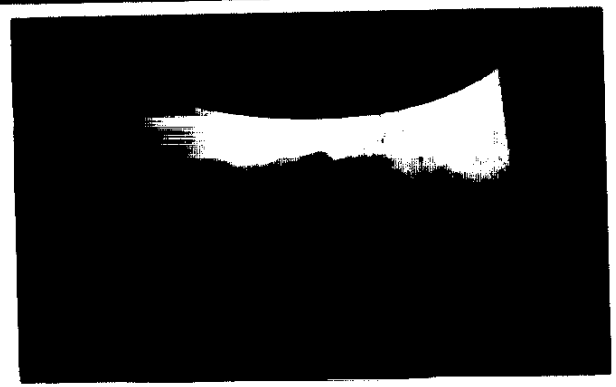
Orientation sculpture: welcome, you are at 25°32.41 N and 34°38.23 E, Marsa Ghaleb , Red Sea, Egypt. Situated in the main pedestrian circulation conduit between the reception building and the museum is the orientation sculpture. A two meter Hurghada Granite world carving is situated in the center of a round metal shed supported by five metal columns sculpted to resemble acacia trunks. The metal ceiling is perforated with the shapes of many local animals casting their silhouettes on the surfaces below. Flags of many countries are positioned in their locations on the granite globe and a welcome message in seventy languages is carved around the circular bench. Here the visitors will find a shady spot and a warm welcome.

Maadaba map

Ancient mines point of interest:
The Eastern Desert boasts a variety of ornamental stones. Through the Pharaonic and the Greco-Roman eras, even today man continues to quarry a rich variety of stone. Large settlements were built in the desert to exploit the riches. The rock include igneous rocks like granite formed from molten earth materials and metamorphic rocks, such as gneiss and schist, formed under tremendous pressure and heat during mountain building movements.
One of the most famous granites of the Eastern Desert comes from Mons Claudianus which is the best preserved of all Roman remains in the Eastern Desert. Other attractive rocks include the Imperial porphyry from Mons Prophyrites, breccia verde antique from Wadi Hammamat and emeralds at Gebel Sokiet. Various scaled replicas are displayed at this point of interest to educate and arouse the visitor's interest about the ancient mines and promote eco-archeological tourism.



Museum: the word "museum" covers a wide range of possibilities and it must be clear to the design team not only the specific character of the museum they are to envision but the potential related purposes which can be sensed and foreseen in addition to the dominant theme.
The museum which is only a component -though a main one- of the visitor center, would be classified as a "small museum" which is generally a museum "consisting of 10 to 12 medium sized rooms" *-Time-saver standards for building types Mc Graw Hill*. This rationale is dictated by site limitations and is adequate for such a center. Museums tend nowadays to be regarded as "cultural centers". The site with its components will be an outdoor museum and a natural extension of the museum providing more diversity for people with different backgrounds. The beauty of the museum is considerably enhanced by the site which will be planted to exhibit certain flora and replicas of ancient (eg. Ancient mines point of interest) and contemporary sculptures (eg. Orientation sculpture and Maadaba map). Due regard will be given to the special character of the museum and its tune to the architectural vocabulary of this desert region. This does not mean replicating ancient buildings or making it excessively organic with comical curves in a false attempt to mimic nature. We are all acquainted with deplorable instances of new buildings constructed in the imitation of the antique or the natural world, the building will rather show its heritage by displaying elements rooted in the



architectural and historical thesaurus of this desert region and selecting natural materials which are locally available and sustainable wherever possible. The setting created should not only be pleasant but above all functional with due respect given to pedestrian site circulation and natural forces while displaying eco-friendly advances in construction, sustainability and natural schemes. Architectural interest should be subordinate to the purpose in view: "the work exhibited."

Theme:

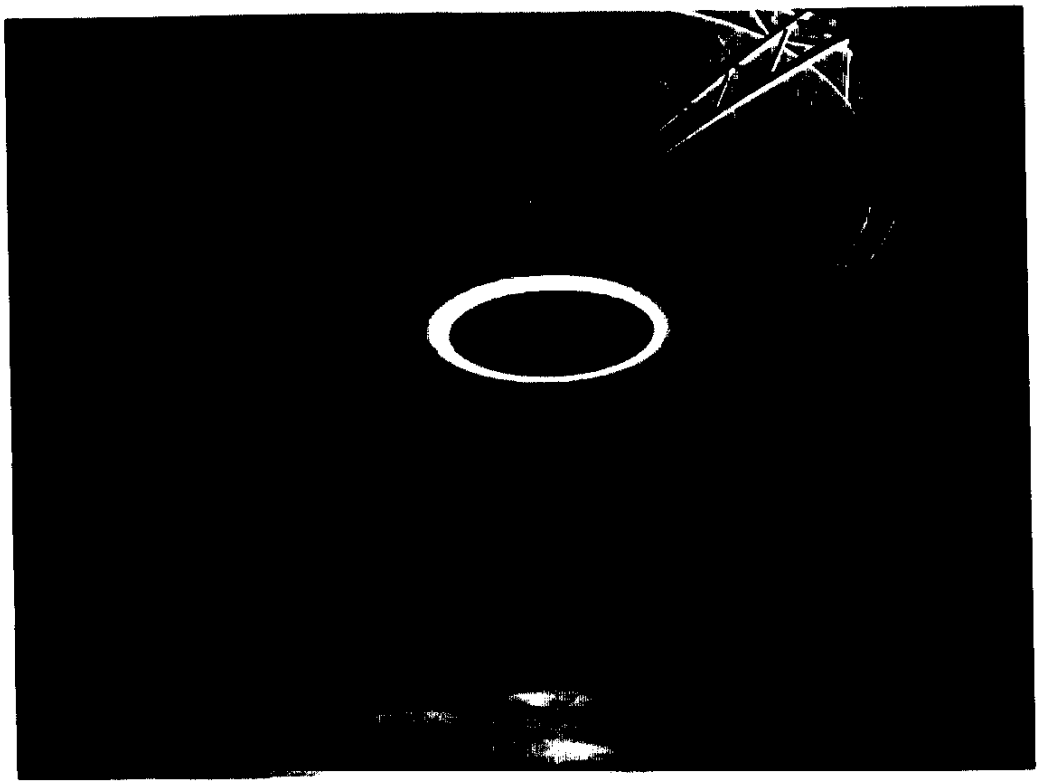
The overall objectives of the museum which will dictate its specific themes and logistics is to provide visitors with the means to explore, appreciate, enjoy, and conserve the delicate natural resources of the Red Sea desert habitats and the rich, varied cultural heritage of the region.

The theme of the museum is one were the exhibit rooms are arranged in a one way circulation route (which is always desirable for a small museum) in such an order as to tell the story of this fascinating region. It is divided into two main sections: Natural heritage and cultural heritage.

Section 1 :Natural heritage

Exhibit Room 1: The beginnings: Dedicated to Geology, promoting eco-geological tourism. These geological upheavals evolved into today's diverse habitats. Exhibit Rooms 2 through 7: present habitats with their flora and fauna (promoting marine and terrestrial eco-tourism) :

Exhibit Room 2: Dedicated to mountain habitats with its unique flora and Fauna. Exhibit Room 3 : Dedicated to wadi habitats with its unique flora and



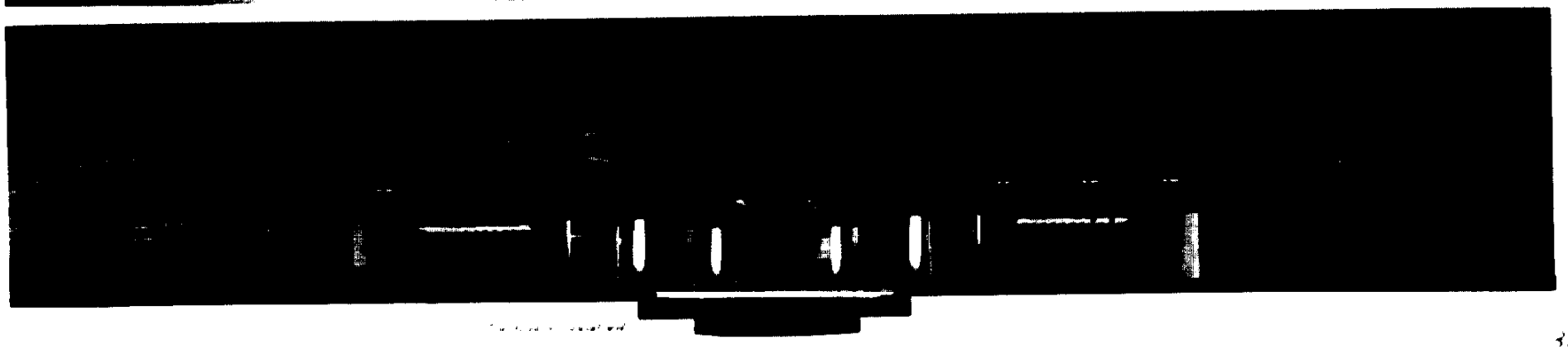
Fauna. Exhibit Room 4 : Dedicated to coastal habitats including mangroves and intertidal zones habitats with its unique flora and Fauna. Exhibit Room 5 &6 : Dedicated to marine habitats including coral reefs and islands.

Section: 2 Cultural heritage

Exhibit Room 6 : Dedicated to Prehistory with emphases on Rock-art. Promoting eco-archeological tours. Exhibit Room 7 : from Pharaonic to pilgrimage roads... Dedicated to roads in the Eastern Desert. Exhibit Room 8 : Dedicated to mining and quarrying...from ancient times to the present. Exhibit Room 9 : Dedicated to Red Sea ports and coastal towns.Exhibit Room 10 : Dedicated to the tribes that presently live in the Eastern Desert: Exhibit Room 11 : Into the future...Dedicated to sustainable tourism and conservation.

Other spaces:

Entrance lobby, Control counter and office, Gift shop, Interactive educational game, back stage, storage and water closets.



EXPLORATORIUM STAKEHOLDERS

Organizations
Several organizations and agencies are natural partners of the Exploratorium, sharing similar goals in relation to specific aspects of the project. The following reflects a partial list:

EEAA and Rangers
Red Sea Governorate
PERSGA (Protection of Environment of Red Sea and Gulf of Aden)
Institute of Oceanography (Hurghada)
Academy of Scientific Research & Technology (incl Desert Institute)
Regional NGOs
Various research organizations
Various funding organizations
Universities

Neighbors
Several businesses and communities located near the site can serve and be served by the project, including:

Tribal communities (education and cultural exchange, arts and other economic development programs, plant research)

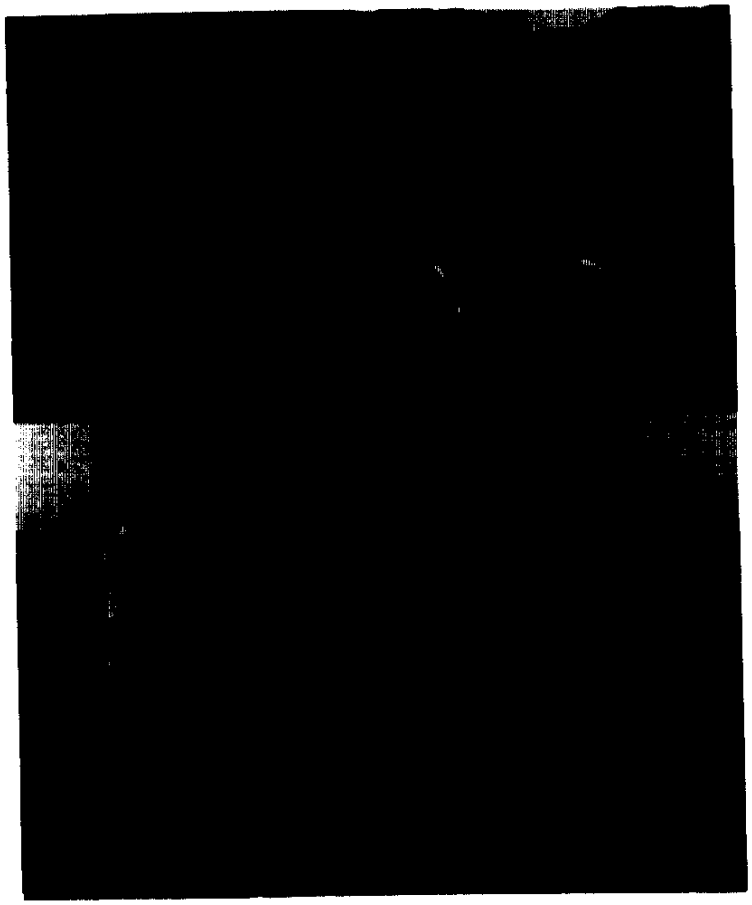
Cities and villages (research and resource, economic development)
EMAC (developer of the Port Ghalib IDC) and its plant nursery
Resort developers and operators
Tourism businesses (tour operators, etc.)

Project Team
The Exploratorium is a project of TDA in cooperation with various Egyptian and international agencies and organizations. Until recently, Dr. Adel Rady (past CEO of TDA) directed the project and was the primary architect of the overall vision. Ayman Morsi (architect and planner in the Red Sea office of TDA) continues to provide onsite direction.

The Academy for Educational Development (AED), in collaboration with TDA, developed the master plan and the conceptual design for buildings and exhibits. In addition, AED supervised the initial installation of the interpretive landscape.

Design Team
In coordination with TDA, the design of the Exploratorium and the creation of this document have been completed by a team of professionals assembled by AED.

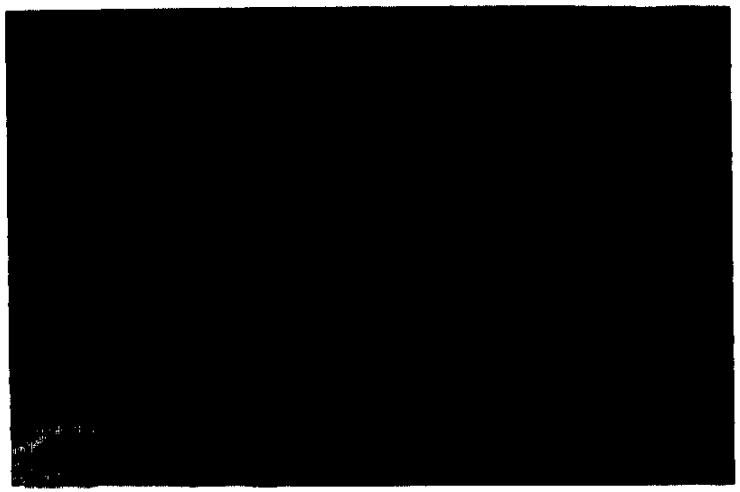
Dr. Lynn Mortensen (overall direction, education, liaison with TDA)



Gabriel Mikhail, Architect, AIA (program research, architecture and site planning, exhibit and multi-media design, photography and concept document)
Dr. Shacker Helmi (botany and ecology)
Hany Farid, Professional Engineer, (marina design and onsite support supervision.
John Wallace (site plan and sustainable design, concept document)
Keith Wheeler (interior exhibit design)

Project Management
The new CEO of TDA will need to assess the project, approve or revise the plan, and acquire funding. An Operations Plan will also need to be developed, in conjunction with the Concept Plan. A Project Director will need to be hired to direct the remaining construction, supervise the creation of educational programs, manage operations, and nurture and maintain relationships with the various stakeholders in the project.

Advisory Board
An esteemed team of advisors has been assembled to provide expertise, guidance and counsel. Each is committed to the overall vision of the Exploratorium



and each brings unique and valuable insight, perspective and wisdom to the project.

Dr. Mohammed Abd el Fatah el Kassas (environmental science)
Dr. Loutfy Boulos (botany)
Dr. Fekry Hassan (archaeology and geology)
Dr. Mahmoud Hanafy (marine biology)
Dr. Sherif Bahaa el Din (zoology)
Dr. Mahmoud Khamis (geology)
Dr. John Grainger (protectorate management)