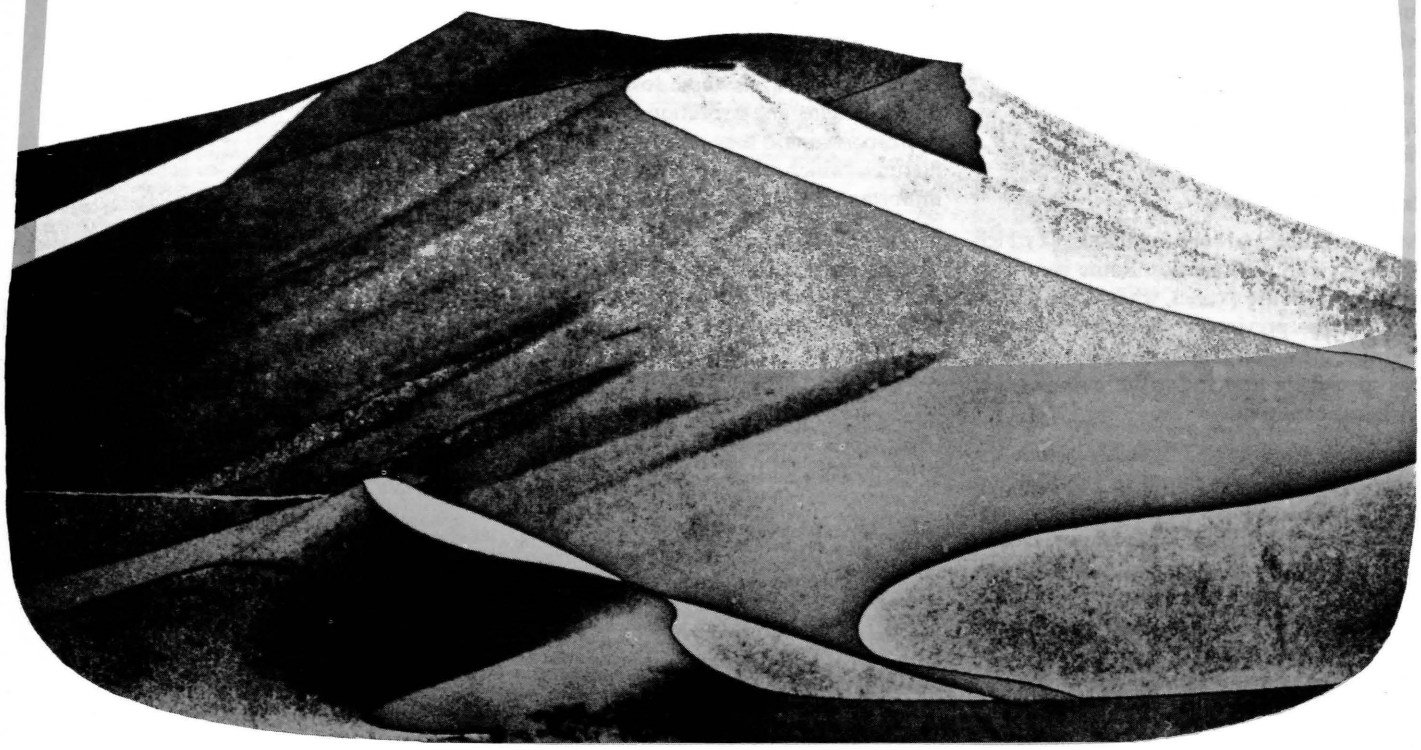
miracle of the namib

by Marais Malan

Science Editor
The Star



The skull of an extinct fox from Langebaanweg. This specimen represents the earliest record of a fox in Africa.

deposits and many belong to plants and animals which lived and died in the area.

The top layer is the Pelletal Phosphorite Member, which is by far the thickest and most extensive layer and also the source of the phosphate ore being mined. Fossils occur in only two limited areas, apparently remnants of old river channels. Most of the fossils in these channel deposits were washed into the area by the river and at least some may have come from inland habitats.

The fossils are often very well preserved and range in size from microscopic shells of invertebrates to large bones of elephants and whales. Scores of species are represented. Invertebrates, fish, frogs, lizards, snakes, tortoises, birds and mammals from a wide variety of habitats have already been identified.

Interesting mammals

Most significant are the mammals, of which there are about 80 species. Some belong to groups which are extinct, while a few belong to groups previously recorded only in Europe, Asia and North America. Many of the species are new and so far recorded only in Langebaanweg.

The more remarkable mammals include the only bear fossil yet found in sub-Saharan Africa, the continent's only peccary (a pig-like animal), and a seal whose closest relatives occur in deposits in Argentina and the south-eastern United States. The bear is the largest land-dwelling carnivore known to have lived in South Africa and is represented by more specimens than any other member of its genus. The peccary is a miniature species, similar in size to the Indian pygmy hog, whose nearest living relatives are found in the southern United States, Central America and South America. The seal belongs to the 'true' seal family and is not closely related to the fur seal found on the Cape coast today. It is similar to the monk seals of the Mediterranean, Caribbean and Hawaii and is by far the best represented fossil species in the 'true' seal family.

The Langebaanweg fossils provide an unparalleled record of life in Africa between 4 and 5 million years ago. They are important in terms of the continental record as a whole and in addition the fauna has a regional character which differentiates it from contemporary fauna further north. Consequently, while these fossils cast light on the origins and evolution of the modern African fauna, they also have unique features which add to their interest and importance.

The Langebaanweg research project has already involved about 20 scientists from 7 countries who have recorded the results of their studies in over 40 publications, but an end to the research is nowhere in sight.

In the shimmering heat of the Namib, in the heart of one of the most arid and inhospitable deserts on earth, stands a lonely outpost of science – the Namib Research Institute at Gobabeb.

For more than 2 000 km the bleak, desolate Namib hugs the Atlantic coast from Angola to the Orange river mouth. To the east and south of the institute are the red, endlessly undulating, shifting dunes, some as high as 1 000 metres.

To the north and west stretch the sunbaked gravel plains, their monotony broken only by rocky outcrops. In between, abruptly dividing the two regions, is the Kuiseb river.

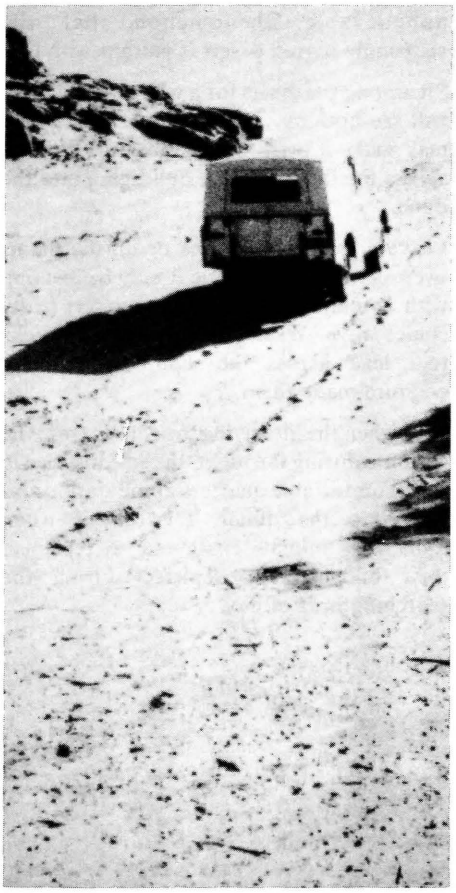
This is the setting where scientists from all over the world spend extended periods studying the desert. They investigate its geology, its climate, its archaeology and much more. But above all they study the supreme miracle of the Namib – the almost unbelievable phenomenon that the seemingly barren desert is vibrant with life.

Sit among the dunes for a while. At first you will see nothing. Then a tenebrionid beetle may make a brief appearance as it scurries across the sand before it dips again into the dune.

Leave a trap in the dune or on the plains overnight. Next morning it may be teeming with animals, for at night the desert really comes alive. Watch for the strange tracks that lead across the sand. Some living creature made them,

And when the life-giving fog rolls in from the Atlantic during the night, the scientists leave their comfortable quarters at the station and trek into the dunes, for this is when numerous animals come out to replenish their body water, depleted during the scorching heat of day.

The Namib Research Institute at Gobabeb — a lonely outpost of science in the heart of the desert.



Namib, in the Nama tongue, means 'desert' or 'emptiness'. Gobabeb has been romantically believed to mean 'the place where there is nothing', but this translation was based on a misunderstanding and it really means 'the waterhole by the fig tree'.

It was this place in the emptiness of the desert that the late Dr Charles Koch, the prominent Austrian-born entomologist, selected in 1959 for a research centre which was to become world famous.

He situated the station with care. Here scientists can study the three main biotypes of the desert on their doorstep – the dunes, the plains and the riverine forest of the Kuiseb river bed. This is important, for the three ecosystems do not mix. The degree of specialization of the desert dwellers is so fine that they die if taken out of their familiar environment.

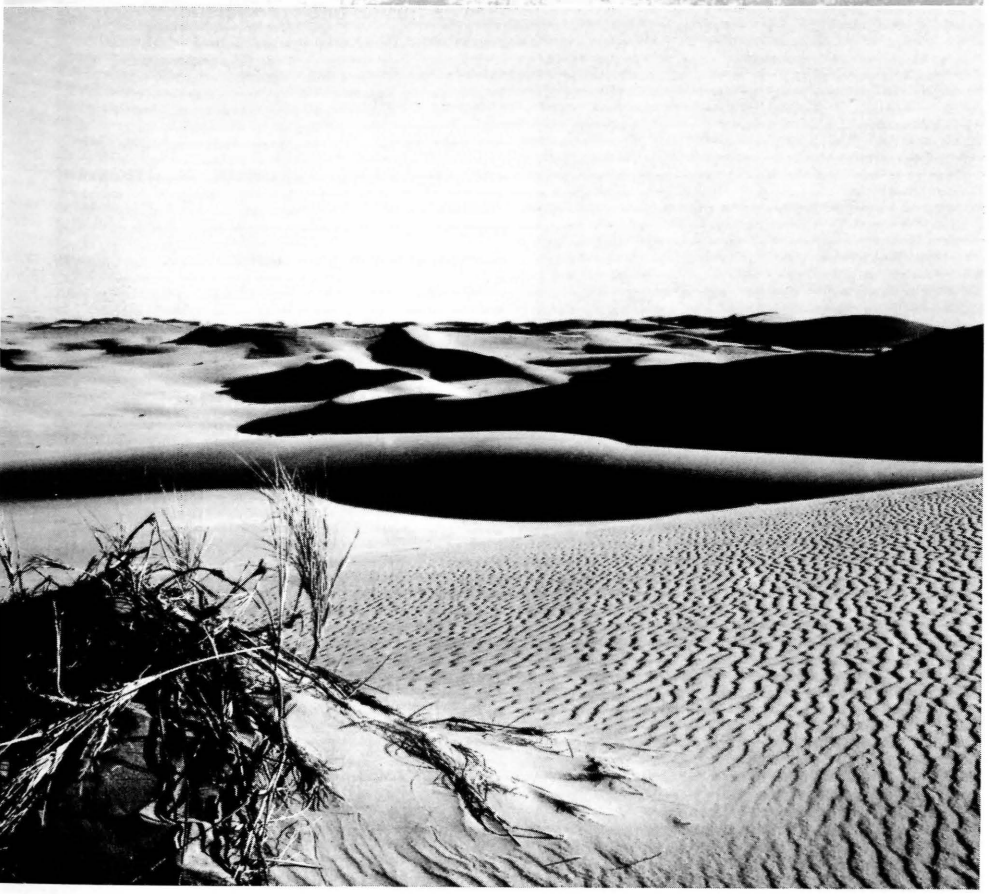
In 1965 he invited me to visit the station where he and his wife were living in happy but busy isolation, with visiting scientists as their only human company. With the Transvaal Museum he had established the Namib Desert Research Association, and well-wishers had provided a comfortable building, a well-equipped laboratory and vehicles.

But Koch was forever plagued with the need to find money with which to run the station, and he grudgingly spent much of his time raising funds instead of getting on with the research work he loved.

Recently I returned to the Namib for a week and found that tremendous developments had taken place at the station in the intervening years. Nowadays the CSIR with the Transvaal Museum runs the Desert Ecological Research Unit which administers and conducts the research aspect of the work.

In 1970, the Department of Nature Conservation and Tourism of the South

The late Dr Charles Koch, the eminent Austrian-born entomologist who in 1959 selected Gobabeb as the site for a research centre which has since become world famous.



West Africa Administration enlarged the Namib Desert Park, in which the research station is situated, to 14 000 sq km. It took over the building and spent some R500 000 on a new building complex. Today it maintains the buildings and has two nature conservation officers living permanently on the site.

Mr B de la Bat, director of the department, explains his department's interest in the work there as follows:

'The park and the research facilities at the station are open to accredited scientists only. Before we can open it to the public, we must know everything about the flora and fauna of the Namib.

'We want to preserve what is there and ensure that later developments – such as public access, water schemes, roads and so on – will not destroy an ecology which is unique.'

For the Namib *is* unique. Its climate, age and its dunes make it so. In no other desert in the world do the same conditions prevail simultaneously. Thus the dunes of the Namib can sustain a fauna more abundant and more varied than deserts anywhere else on earth.

Firstly, the Namib is old, very old. It was probably during the Cretaceous period, between 135 and 65 million years ago, that the South American and African continents drifted apart. The South Atlantic anti-cyclonic wind system later developed, and this wind maintains the cold water upwelling along the coast of South West Africa. It is this, with the flow of the cold Benguela current, that maintains the climate of the Namib and causes the desert conditions prevailing there.

The dunes of the Namib probably came from the Orange river many ages past when it was far bigger than it is today. The current swept up the sand from the river mouth and

A sand-diving lizard — going, going .... nearly gone!

on turtles in Costa Rica. A full-length documentary film developed which was shown on BBC-TV in 1974 – and broke all viewing records. A film on the Okavango swamps followed and by now his latest documentary, *Namib — the sheltering desert,* is in the can.

Dave's scientific training provides the ideal background for his film work because it enables him to incorporate the discipline of science with the art of cinematography.

'Each shot requires time, observation and a lot of preparation because so little is known about the behaviour of many species', he explained. 'To get absolute authenticity I spend a long time on a project, and by the time I leave here I will have spent at least eight months in the desert.'

He kept a miniature menagerie of desert creatures in a side-tent – snakes (including a huge puff-adder), lizards, scorpions, spiders and others – which he used in some film sequences.

There were many other people living at the institute for a time, and many globe-trotters seem to find their way there. During my visit, for example, there were a physiotherapist and a nurse from England temporarily assisting Dr Seely.

And then there was Mr Pieter Mostert, senior nature conservation officer, who is responsible for station maintenance, weather readings at widely distributed weather stations, and numerous other duties.

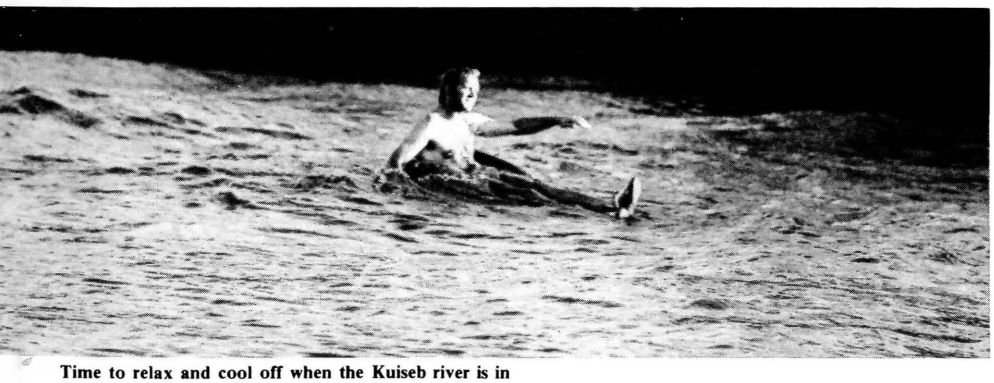
In spite of the harsh desert environment and climate, life at the station is easy. The permanent staff live in roomy houses designed for desert conditions. They are built in the form of a square enclosing a quadrangle with a garden in the centre onto which all rooms open.

Dr David Hughes, zoologist and documentary film-maker, with his sand 'arena' in which he is photographing a sidewinder adder and her four babies.

Part of the attractive Namib Research Station complex. For housing visiting scientists there are comfortable bungalows with doors opening onto semi-enclosed breezeways.

Visiting scientists are housed in comfortable bungalows by the Department of Nature Conservation. Here, the front doors open onto semi-enclosed breezeways, each with its small garden, to temper the fierce desert sun. Overflow guests are housed in caravans. Electricity, gas and hot and cold running water are available in all the houses. In the main block are three well-equipped laboratories – one of them air-conditioned, offices and a common-room.

But away from the station, life can be dangerous for the unwary. It is easy to get lost in the featureless desert, or a vehicle may break down at a place which is so far off the beaten track that no one is likely to visit it again for a long time to come. So elementary precautions are taken by the institute staff. Before they leave on an expedition they enter in a book their destination and expected time of return. If they fail to return in time a search is started.



Time to relax and cool off when the Kuiseb river is in flood.

Only four-wheel-drive vehicles are used in the desert, and those driven in the dunes are fitted with sand tyres. All of them carry water, and the drivers always follow their own tracks back.

Once a researcher was bitten in the hand by a sidewinder, the small but highly venomous adder of the dunes, while digging in the sand to free his vehicle which had got stuck. Happily, he recovered.

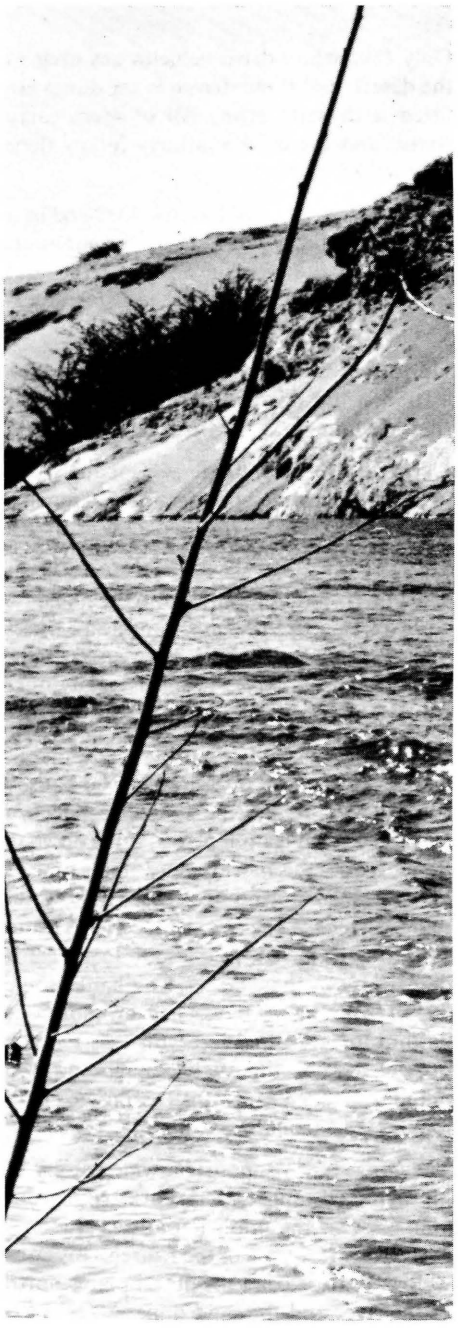
During my second visit to the research station, I did not recognise the desert. The first big rain since 1934 had fallen.

Average annual rainfall at Gobabeb is a mere 15 mm. But on this occasion 50 mm fell in less than a month and while I was there it drizzled on two days.

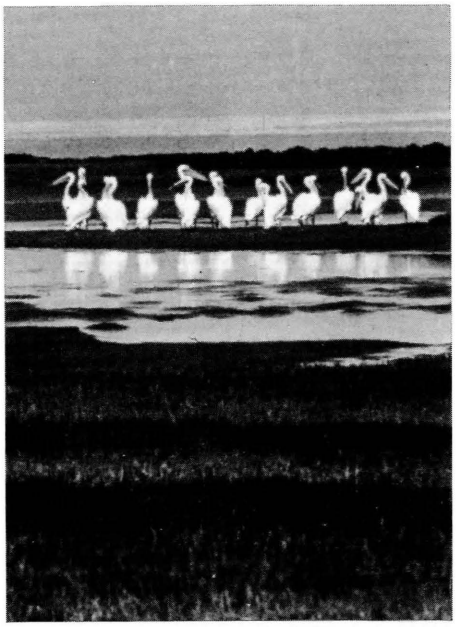
The desert gratefully sucked in the moisture and woke up from a long, long sleep. Knee-high grass now covered what used to be barren plains; lilies, succulents and other plants were flowering, and animals were out in profusion.

Miracle was piled on miracle. The Kuiseb river, which divides the southern dune sea and the central Namib plains, came down in flood. It does this most years, but this time its flow seemed unending. The river water seldom reaches the sea; between 1837 and 1963 this occurred only about 15 times. It disappears in the sand at Rooibank, some 30 km from Walvis Bay, where an enormous natural underground reservoir exists which provides water for Walvis Bay, Swakopmund and the Rio-Tinto-Rössing uranium mine inland from Swakopmund.

The Kuiseb also supports a wide variety of life in the Namib Desert Park. Numerous animals visit the pools left after a flood – permanent residents of the Kuiseb canyon as well as visitors from the desert plains north of the river and the sand dunes.



When the rains come ..... the Kuiseb river comes down in flood (left), clearing the river bed of its accumulated sand and holding back the otherwise relentless progress of the southern dunes across the plains; the river has also turned Sandwich Harbour (now known as Sandvis) into a haven for bird life. Rain over the Namib may also bring about another small miracle — germination of the *Welwitschia mirabilis,* which has been described as the earth's most unearthly plant.



'The river bed with its trees and occasional waterholes can be thought of as an extended oasis between the sand dunes and the plains', says Dr Seely. 'Thus the Kuiseb provides both food, through the vegetation it supports, and water for numerous desert inhabitants which otherwise would not be able to survive in the central Namib.'

But she warns: 'Careful management rather than indiscriminate draining of this valuable resource is required all along the Kuiseb's course to maintain sufficient supplies for all the users of Kuiseb water in the future.'

Perhaps the river's most important function, which it has probably been performing for thousands of years, is to hold back the otherwise relentless progress of the southern dunes across the plains. At each flooding the flowing water helps to clear the river bed of its accumulated sand.

The Kuiseb has also turned the area popularly called Sandwich Harbour (probably originally Zandvisch Haven and now renamed Sandvis), 65 km south of Walvis Bay, into a haven for bird life. In a journey which may take many years, river water seeps for long distances underneath the dunes to the sea, where a wide variety of birds nest in the marshes and reeds and wade in the small lakes between the towering dunes and the shore.

Sandwich Harbour was known to the Portuguese navigators as far back as 1486, and has been a haven from storms for ships of various nations through the centuries. At one stage the natural harbour was used to smuggle arms to rebellious Hereros and Hottentots.

It sanded up over the years and today there is a large lagoon, usually open to the sea, in which certain species of fish come to spawn.

The area falls within the Namib Desert Park, and hence public access is restricted. Ecological studies of the region, including the lagoon, are in progress, and the institute also carries out dune studies, as the food pattern is somewhat different from that of the dunes in the vicinity of Gobabeb.

The journey to Sandwich Harbour is rough, and not be undertaken in anything but a four-wheel-drive vehicle. There are no roads – only tracks made by previous visitors. Part of the way lies through vast flat mud plains stretching for miles in all directions. Then one drives along the sides of the dunes where they slope down to the sea.

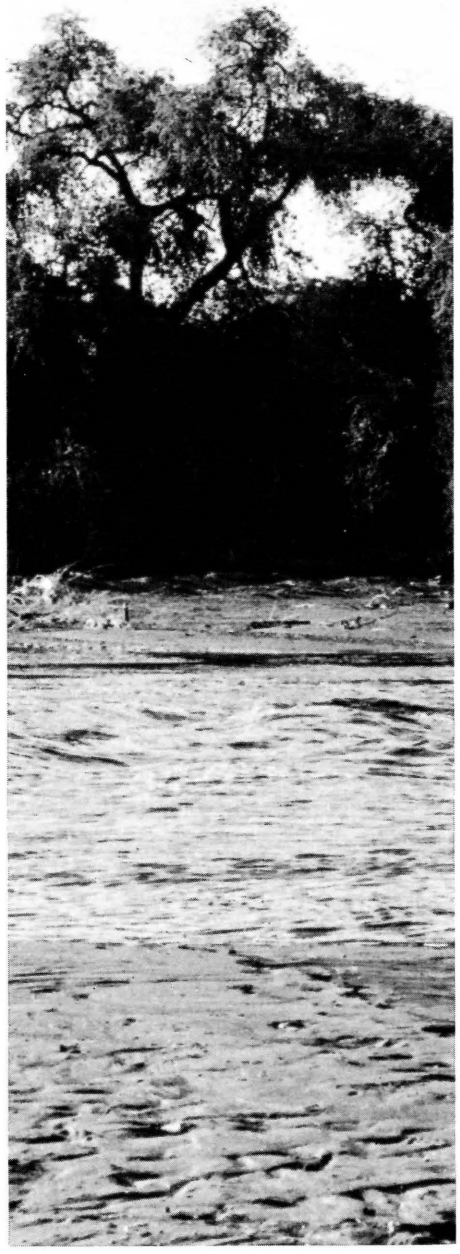
The last leg of the journey, to a hut on the shore of the lagoon which used to be the home of a fisherman and which has since been taken over by the Parks Administration, has to be done at low tide. When the next tide comes in one is utterly isolated from the rest of the world.

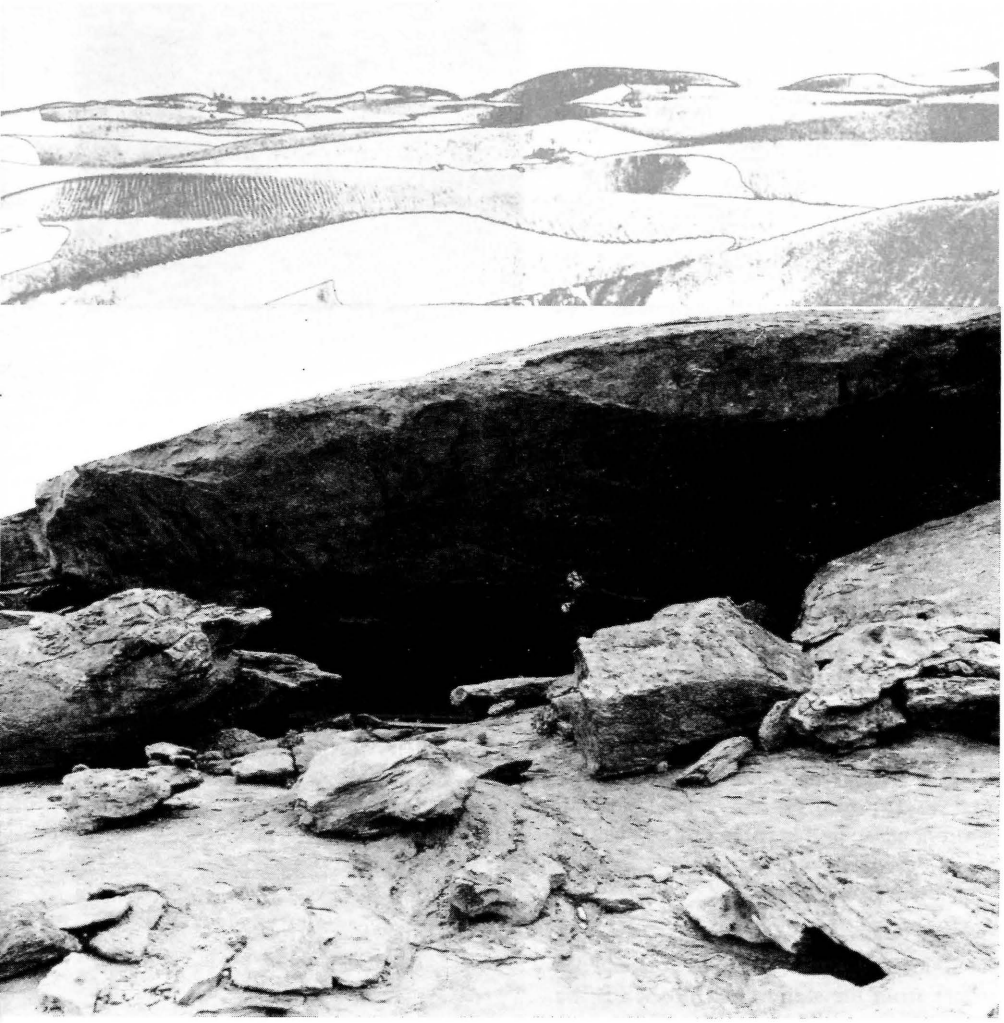
The rain over the Namib may have brought about another small miracle. A few kilometres from the station at Gobabeb is the southernmost colony of *Welwitschia mirabilis,* described as the earth's most unearthly plant.

No close relative of this amazing living fossil has been found and it is believed to be the product of an evolutionary dead end.

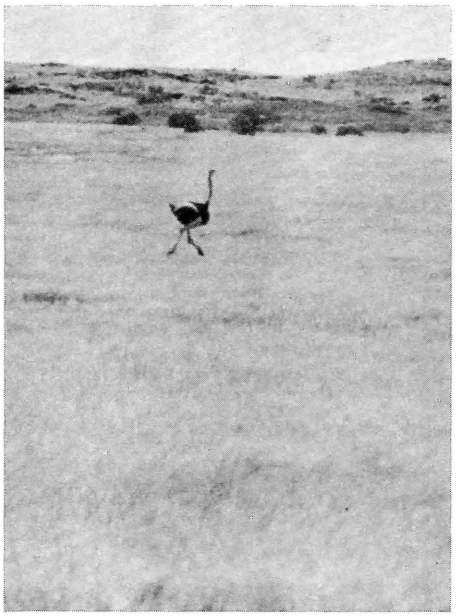
Its two stiff, leathery leaves, growing in opposite directions, can creep out over 5 metres of desert. These leaves, which usually split longitudinally into many sections, serve the plant for its lifetime, which, according to carbon-14 tests, may exceed a thousand years.

There are only about 200 of these plants in the area and no germination of new ones has been recorded since the rain of 1934. There is now every possibility that the recent rain may have caused new germinations to give this old, and probably gradually dying colony, a new lease of life.





The Mirabib Hill shelter north-east of Gobabeb where numerous remains of ancient human occupation have been found.



Biological research in the Namib is not confined to plants and the lower animals. Dr Seely took me about 40 km north-east of Gobabeb to the Mirabib Hill shelter where Dr Beatrice Sandelowsky has, in her excavations, found numerous remains of ancient human occupation. No human bones have been found in the soil underneath this rock overhang, but what appears to be graves are situated nearby.

The sun was low and the dunes glowed red in the distance as we returned from the quiet rock shelter in the desert to Gobabeb along the road that Kiewiet the Hottentot had recently scraped with his giant grader to which he hooks the caravan which is home to him and his family.

A large herd of gemsbok took off in fright at our approach, and isolated springbok watched the Land-Rover curiously as we passed by and a flock of kelkiewyn flew off noisily from the roadside. A lone ostrich sped gracefully across the plains, veered to one side and became a speck on the horizon.

Soon the diurnal animals would disappear from the scene, the crickets and barking geckos start their chorus, and the predators of the dunes their nightly search for food. Another daily cycle of the desert, as it had known it with unvarying regularity for a million years, had ended, and a new one was beginning.

In the words of Edward Ross, the American scientist who visited this desert some years ago, the Namib may truly be considered a one-of-a-kind place on earth.