

World Deserts

ON a bright day, cacti and succulents cast sinuous shadows on the sand-colored boulders of the World Deserts. The peculiar shapes and menacing textures demonstrate how desert plants have evolved extraordinary adaptations to cope with harsh environments where water is scarce. Arid portions of Africa, Australia, North America, and South America make up about one-fifth of the Earth's land surface. The deserts spread across these continents can be hot or cold, flat, mountainous, or coastal, but they all receive less than ten inches of rain each year.

The succulent plants scattered along the winding path through the World Deserts are specimens from both Old World deserts (Euphorbiaceae) and New World deserts (Cactaceae). They demonstrate the remarkable similarities among plants that evolved independently in isolated sections of the world. The *Adenia glauca* from South Africa has a thick waxy stem similar to that of the elephant foot tree (*Nolina recurvata*) found in the American Southwest. These stems allow the plants to store water during rainfall for use later. The giant spikes of the octopus tree (*Didierea madagascariensis*) from Madagascar resemble those of the saguaro cactus (*Carnegiea gigantea*) found in the United States. The spikes provide protection from the wind as well as from predators.

The display includes trees, shrubs, perennials, and annuals, representing the entire range of plants found in the desert environments of the world. The tiny leaves of the blue palo verde (*Parkinsonia florida*), native to the American Southwest, may fall off during an extended dry period, but the green of the trunk allows it to continue with photosynthesis. The tall, skeletal shapes of the perennial cacti are familiar, even if their names are not. *Cereus hildmannianus* is a night-blooming cactus from South America. The rounded paddles of the towering



(ABOVE)
AN INTERPRETIVE PANEL
IN THE WORLD DESERTS.

(LEFT)
Echinopsis oxygona BLOSSOMS.
U.S. BOTANIC GARDEN

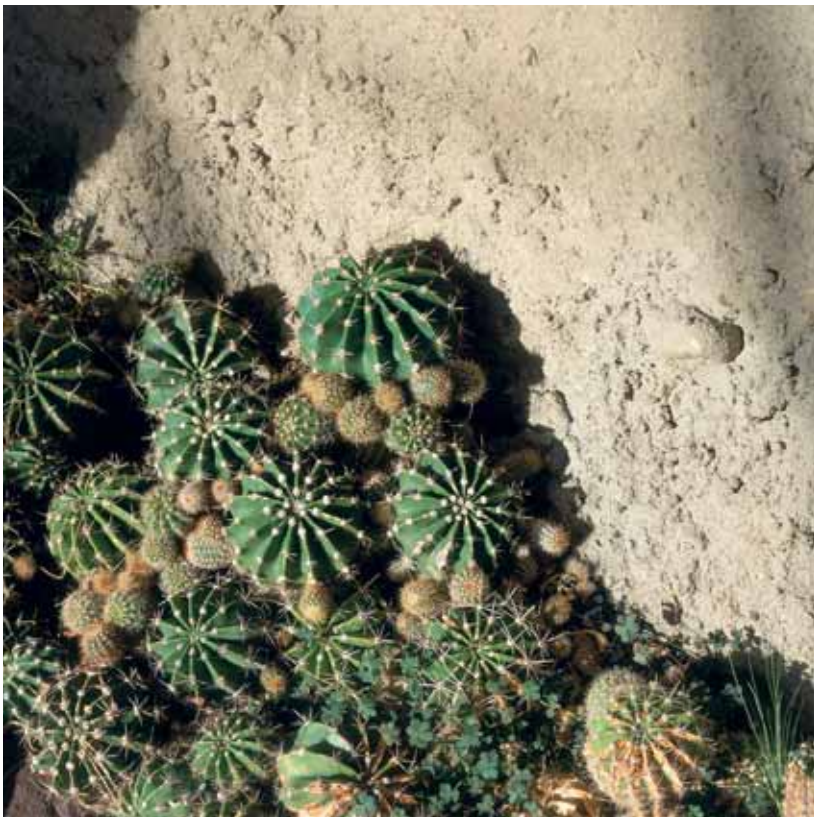
(OPPOSITE)
PARRY'S AGAVE
(*Agave parryi* ssp. *parryi*).

The subdued colors of the desert plants—gray-green, light blue, white, and silver—help reflect the rays of the sun. This striking silver agave is the source for tequila.



Texas prickly pear (*Opuntia engelmannii* var. *lindheimeri*) are lined with bright red “pears.” Tiny *Cleistocactus winteri* creep atop the rocks. Annuals, such as the Mexican gold poppy (*Eschscholzia mexicana*), are particularly successful in arid climates, where their seeds can lie dormant for years. When conditions are just right, seeds germinate and plants quickly complete their life cycles.

At almost any time of year, some species will be in bloom in the World Deserts. Whether it’s the waxy red-orange blossoms of the prickly pear, the delicate magenta puffs of the Baja fairy-duster (*Calliandra californica*), or the showy red and white spikes of a giant aloe (*Aloe mutabilis*), there is always a colorful surprise among the austere grays and greens of the desert plants.



(ABOVE LEFT)

Alluaudia procera.

(LEFT)

Echinopsis oxygona.

Tiny cacti nestle at the base of rocks along the path.

(OPPOSITE AND RIGHT)

GIANT ALOES

(*Aloe mutabilis*).

Perched on boulders in the bright sunlight of the World Deserts, giant aloes reach out to the sun. Their dramatic red and white flower spikes appear in winter.







(ABOVE AND CENTER)
CAM PLANTS.

All plants must take in carbon dioxide (CO_2) in order to have the carbon needed for photosynthesis. This intake is done through tiny pores in the leaves called stomata. In most plants the stomata open during the day to take in CO_2 and give off oxygen and moisture. To conserve moisture, however, most desert plants, like the saguaro (at right) and other cacti have a slightly different photosynthetic process called CAM (crassulacean acid metabolism). The stomata on CAM plants are closed during the heat of the day and open at night. The CO_2 is taken in, converted to malic acid, and stored until daylight, when it can be transformed into sugar, the end product of photosynthesis.





(ABOVE)

FEROCIOUS BLUE CYCAD
(*Encephalartos horridus*).

Living up to its name, the spiky appearance of the ferocious blue cycad intimidates any creature considering it for a meal. This plant from South Africa is one of four specimens that survive from the U.S. Exploring Expedition of 1838–1842.



(ABOVE)
BLUE PALO VERDE
(*Parkinsonia florida*).

(CENTER)
PACHYPODIUM
(*Pachypodium saundersii*).

Spines and hairs on desert plants reflect sunlight and deflect winds that can dry out their surfaces. Like the threatening spikes on this pachypodium, they also make the plants hard to eat.





(ABOVE)
BEAR'S PAW
(*Cotyledon tomentosa* ssp.
ladismithiensis).

