

## Organpipe Cactus: Bringing in the Rainfeast

A SOFT stream of sound reaches the cactus-covered Quitovac hills on a full moon night in late July. Songs rise from the small Papago-settled Vak oasis below. They rise from the Vi'igita, an O'odham ceremony variously interpreted as a cactus fruit harvest feast, a rainmaking rite, a blessing of newly sown crops, or a community identity renewal. The masked Naviju dancer has already gone around to sanctify the houses that still stand, as well as those fallen down, rubble piles of stone, mesquite posts, mud and cactus bones. Most Papago have returned to the bare earth of the dancing floor, across the wash from the houses, to celebrate some more. During the next few nights, they will watch the pantomime of remnant tribal lore, sing the barely remembered songs, and splash down hundreds of liters of saguaro and organpipe wine. Whether Arizonan or Sonoran by citizenship, these Papago are glad to be together again with old friends, distant relatives, and seldom-seen spirits.

Up on the rocky slopes where the sung notes drift, the columnar cacti stand, lively in the moonlight. Organpipe, saguaro, and senita reach above the squat, spinescent shrubs of the desert scrub. There, another feast is in the works, one which even fewer people witness, but one which is ever more ancient and persistent.

This feast takes place near the tops of organpipe, or *pitahaya dulce*, as it is called in Mexico. Pale, funnelform flowers flare out laterally from the sides of the tapering branches. By eight at night, they are fully open, laden with cream-colored pollen. At the base of the floral tube, nectar is welling up. These pastel-tinged flowers stand out in the drab landscape, and give off a skunklike scent.

Nectar-feeding bats hover around the flowering, towering cacti. Perhaps they will linger within reach of this dense stand for several weeks before moving to where agaves bloom to the north. As one bat approaches an open organpipe blossom, a drop of crimson stains the perianth. The bat turns its head slightly and its snout glints in the moonlight, shining blood-red. As its tongue dives into a flower to lap up nectar, it treads in mid-air, then darts away. Other droplets blotch the organpipe blossom, remaining after the bat has gone.

Not blood but pitahaya juice taints this pollinator and flower. For in addition to administering the cross-pollination necessary for organpipe fruit set, bats are among the seed dispersers of this succulent, *Stenocereus thurberi*. Since flowering and fruiting periods overlap on any single plant, a long-nosed bat may feed on both nectar and fruit during the same evening.

Donna Howell discovered that another kind of bat gathers rewards from pitahayas too. Visiting a mine shaft full of desert pallid bats near the Arizona-Sonora border, she noticed that many of them were red in the face, much the same as the long-nosed bats. At first she wondered if they had been in a massive fight, for they are quintessential insectivores, not fruit eaters. Then she observed that the fresh feces on the mine shaft floor consisted of one part cactus pulp and seed and three parts moth fragments.

Moths and cactus fruit together? As the fruits ripen, their frontal ends become soft, and their thin skins are easily punctured by the frugivorous long-nosed bats that slurp up pitahaya pulp and juice. Noctuid moths then enter the openings left by the bats, drinking juice in a frenzy. Desert pallid bats, primordially strict insectivores, block the opening through the fruit's skin and glean any moths attempting to escape. They primarily consume the trapped moths, but they must gain some nutrients from the organpipe adventitiously. They feed on this protein- and calorie-rich combination, then return to their mine shaft roosts as the sky begins to lighten.

In the desert heat following dawn, fermentation occurs within the remaining juices of the punctured fruit and in the nectar of still-open blossoms. Fruitflies and bees go to drink in these ephemeral pools. They become drunk, fall in, and drown. Doves and hummingbirds get in on the dregs. A multitude of insects swarms in as the day proceeds, working to finish off the mild wine before mid-morning, for the flowers close by then. They soon forsake the wine and escape for shade, about the same time that the Papago do below, down on the burning desert flats.

Drinking wine. Dealing with the desert heat. These are old, old rituals.

Have these old organpipe rituals been commonplace? We don't know. The only sites where organpipe cacti have been studied in any detail are near where they reach their northernmost limits, and no one is sure how representative this information is. They peter out in the Papago country of southern Arizona near Ajo, Ventana Cave, Hecla, and the Pichacho Mountains. Such locales are closer to desert research labs and universities than they are to the heart of organpipe's range. In terms of their ecological relations with other species, Arizona organpipes may be out on a tangent.

This holds true too for the borderline pitahayas featured at Organ Pipe Cactus National Monument, situated within the hundred kilometers between the Sonoran oasis of Yuma and the floundering mining town of Ajo, Arizona. Because the monument sits at the northwestern limits of the genus *Stenocereus*, the spotlighted plants are chubby, stubby, scarred from frost damage, and few and far between. In the monument, organpipes are restricted to rocky slopes above where cold-air drainages settle. They cling to slopes facing the south and southwest, where extra solar exposure keeps the air and soil temperatures up a few more degrees. In this habitat they may be kept from being killed by most freezes, but they still show the wounds of close calls.

It seems that organpipes have been studied where it is most convenient for U.S. citizens to visit them, but in populations that are atypical for the species as a whole. The sparsely distributed dwarf organpipes of the north may tell a different story than those which dominate the landscape for hundreds of kilometers to the south. In their heartland, we are not sure that nectar-feeding bats still slurp up pitahaya fruit juice as they do in the north, nor do we know whether other species become more important in pollination and seed dispersal.

As for native cultural interactions with pitahayas in the north, they have been limited by low densities of the plants within reach. Certain Arizona Papago families formerly walked or rode wagons a hundred kilometers to the south to harvest the fruit they call *chuchuwis*. However, most Papago in Arizona would simply stay closer to home, gathering the abundant saguaro or *bahidaj* within a half day's walk. Whereas saguaros figure prominently in Papago folklore and religion, organpipes are on the margins.

It was supposed to be a gathering of experts on organpipe, its environment, and its management. Yet by nine o'clock, the few desert biologists that were in the room had begun to glance at the door off and on—wasn't someone else going to

arrive who knew something about the topic at hand? There were a few state-level land managers from Phoenix and landscape architects from Tucson whom they had seen away from their offices once or twice before. Then there were government agency administrators from Denver, Albuquerque, San Francisco, and Salt Lake—Westerners, but with little experience in the Sonoran Desert. Two other men had come to southern Arizona for the first time, directly from Washington—business suits on a May day in the desert gave them away. A game warden and a theoretical ecologist had been invited from Mexico, but neither could attend. No Mexican scientists, no students, and no enlightened amateurs who had lived in organpipe stands were in attendance.

The talk went on, but it was hard to tell what it was about. There were phrases thrown out like “maximizing visitor use days in targeted environments while protecting the periphery” and “developing integrated methodologies to monitor rodent and cactus thief impacts on the demography of roadside populations.”

Suddenly a grizzly bear rose up in the audience and started to roar.

Well, not exactly a grizzly bear. Instead, a grizzled old desert biologist. But the effects were the same. The bureaucrats looked frightened, queasy, and concerned. Some beast had barged in and spoiled the picnic. And he was still roaring:

“Cactus! Rocks! Birds! Nests! Bats! Bugs! Snakes! That’s what we should be talking about, that’s what we should be learning about! If you guys want to set aside land for ‘visitor use days’ and ‘roadsides,’ count me out.”

The gray-haired, hulking figure in wrinkled khakis and dusty workboots pawed at his neck to open the collar of his shirt more, as if something was suffocating him. He sat down, looked around the room, and sneered:

“And by the way, how many of you have ever seen an organpipe cactus? I don’t mean through the viewfinder on your Kodak...I mean out in the boonies where you can’t just snap a photo then trot back to your air-conditioned car! How many of you have ever taken the time to look at them away from scenic-loop drives or nature trails? Do you guys go to Mexico, other than to visit the beach or to hear mariachis play in the border towns? How in the heck do you think you’re gonna figure out what to tell the public about organpipes if you just sit around in rooms like this?”

He glanced around the room again. Distraught bureaucrats were frantically writing notes to themselves, in case they were called upon to cover their peripheries. Then the bear lumbered out of his seat and over to the door. He turned around and looked at them one last time.



"I shouldn't have been so impolite. Some of you are here in the Sonoran Desert for the first time, so I shouldn't expect you to know anything about organpipe. And I myself know a lot less than I should. So let's get a fresh start. I'm going out to my Carry-All there in the parking lot, I'm gonna straighten it up, and make a little more room. I'll be leaving for Sonora in a couple hours, and you are welcome to go with me to see some great organpipe stands about a half day to the south. I'll loan you all the camping equipment you'll need. In fact, I'll be happy to pay the way of anyone who wants to go down and learn a little about organpipe. As for the rest of you, I wish you a pleasant visitor use day...."

He held his paw up to them for a moment, gesturing farewell, then stormed out the door.

Go south. Drive south of the border as far as you can in one day. Find a dirt road and drop off the pavement. Follow it down to where there is no more road sound of mufflers on semi-trucks, no more plastic diapers and beer cans. Park your vehicle. Grab a flashlight, a groundcloth, and a light sleeping bag. Walk, by moonlight, to a dry sandy wash at the base of a rocky knoll loaded with organpipes. Sleep. Sleep.

When you awake, you realize that you are not far from Topolobampo, Sinaloa. You are not far from where the Spanish first saw *Stenocereus thurberi*, and first learned of its usefulness from the Indians. Its southernmost limits are not too far to the south, in denser drought-deciduous forests, but here they begin to dominate certain landscapes. You are still far from understanding just what this plant really is, what it can mean to humankind.

Walking, walking, you zigzag under the dense canopy of this tiered Short Tree Forest. In a sense, the forest is not all that short except in comparison to the pine forests in the Sierra Madres up the barrancas to the east. The upper boughs of the tallest trees seem to float more than four meters above the continuous canopy. These giants include the *pochote*, with its fruit full of feather-like kapok; the huge-trunked *palo barril*; the *palo joso*, with its hundreds of tiny leaflets; and the *torote* or elephant tree. The more continuous middle canopy is made up of brasilwood, tree morning glories, the wide-crowned *guasima*, and the spiny-fruited *papache*. Occasionally, the mass of the arborescent *cardon echo* cactus breaks through this canopy, or makes an opening for itself. Below, wild jicama, sennas, *chocolas*, and birds-of-paradise seek light through small openings. Particularly near the bases of hills, this forest is too competitive, too wet for organpipes to thrive. To find them, you often

have to move upslope, to the cliff faces of barrancas or steep sides of volcanic hills with too little moisture-holding capacity for more tropical plants. Sometimes, however, you find them on rocky, soil-poor bajadas, stretching for miles, such as the ones Andrés Pérez de Ribas visited north of the Río Sinoloa some time after 1604. He was the first to describe thoroughly the pitahaya fruit and plant, and their use by Indians, in memoirs written around 1644:

The fruit which they enjoy for the longest period is of the pitahaya, a tree unknown in Europe. Its branches are several centimeters in diameter and of the nature of thorny green striated wax tapers extending as much as ten meters in height.

The fruit grows from these thorny ribbed branches and is, of itself, covered with thorns. It is similar in appearance to a chestnut or prickly pear. Its interior consistency is much like that of a fig, although softer and more delicate. Its color is at times white, at others red, or yellow. It is very savory, particularly when harvested before the rains come in the summer. The abundance of these pitahayas is such that one may travel among them for a distance of fifteen to thirty kilometers.

At least as far south as the Sinaloan organpipe which Pérez de Ribas relished are those described by Spanish padres in Baja California Sur a century later. There, organpipe enters the subtropical Cape Region, where it is found with several other columnar cacti, including the endemic known scientifically as *Stenocereus littoralis*. It remains more abundant in true desert areas north of La Paz, where its fruits are still sold in markets for the equivalent of a dollar per kilogram. Other columnar cacti fruit, by comparison, are seldom eaten near La Paz, due to the superiority in taste of pitahaya dulce. There, the vegetation receives between 150 and 200 millimeters of rain and supports more arid species, such as an ocotillo locally known as *palo adan*, the peninsular palo verde, the *chilito* cactus, *palo jito*, the *datilillo* yucca, and organpipe's tart counterpart, *pitahaya agria*.

Miguel del Barco, who knew the natural history of the Loreto and San Xavier areas better than any other priest in Baja California, was particularly curious about the organpipe:

The fruit is born stuck to the branches, near their tips. There, it is produced from beautiful white blossoms tinged with red. When these dry and the fruit begins to swell, it is so covered with thorns that you can't see the fruit itself. As the fruits increase in size and are about to mature, the thorns become more widely spaced, and you can see through to the skin of the fruits, be they green, yellow or red as

when completely ripe. Those that have red skins are always red inside as well. Others are yellow, white or buff.

All of them are excellent fruit, worthy of being on the table of the greatest of kings. Their flesh is juicy, mild, delicate and very delicious. They have no pit to cause problems in eating, and the seeds which are no bigger than those of mustard are imbedded into the pulp of the fruit, each separate from the others. For this reason the seeds go down easily, as part of the pulp, without you even knowing that they are swallowed.

...Some years there are so few organpipe fruit that it is fair to say there wasn't any. In the winter of 1739-1740, it rained so many times that even though these rains were gentle, the arroyos were swollen and ran swiftly. This event I witnessed only that winter in the thirty years that I was there in Baja California. All the country was cured of the drought, and the following months brought a dressing of herbs and wildflowers. In contrast, the organpipe of that year did not bear fruit, complaining perhaps of too much moisture.

While Miguel del Barco recorded patterns of pitahaya variation that scientists have yet to study, his colleagues in lower California looked at the columnar cacti in only one way. They served as the medium of the most lowly tradition that the Baja California peoples practiced—a food-recycling technique known euphemistically as “the second harvest.” In 1740, Father Consag provided a brief description of this tradition, later highlighted by geographer Homer Aschmann:

When the pitahaya dulce was ripe, food was so abundant that the Indians could remain in one spot for some weeks. They made a practice of defecating in a selected spot. When the feces were dry, they were collected in flat baskets, ground up by hand, and the undigested pitahaya seeds winnowed out. These seeds were toasted, ground on metates and eaten.

During months of drought, the columnar cactus seeds provided a needed source of protein, oil, and calories that the people of Baja California, coastal Sonora, and Tiburón Island could not afford to waste. The large-seeded *cardon*, or *Pachycereus pringlei*, may have been used more frequently in this way than even the organpipe. Whichever species was utilized, the seeds were meticulously cleaned and washed, ground, and then thoroughly cooked before being eaten. Regardless of how much preparation went into making this food acceptable to the desert peoples, it was hardly palatable to Europeans.

It was with unclerical delight that Consag spread a story of what had happened to the finicky father, Francisco Mario Piccolo. Visiting a ranchería of Pericu

Indians near Mulegé for the first time in a long while, Piccolo had been treated to a specially prepared feast. After the meal, Piccolo asked out of curiosity what it was that they had eaten. To his discomfort, they began to explain that it was from a flour made of ground pitahaya seeds.

Not just any pitahaya seeds, they continued. Ones that they had painstakingly gathered from feces found on a favorite rock nearby.... They didn't need to go into any more detail for Piccolo, who all of a sudden was feeling ill.

Go east as far from Baja California as you can reach, without letting organpipe drop out of sight for good. Rise up from sea level as high as you can without freezing them out. You might take a train, the Ferrocarril Pacifico, with tracks that traverse the edge of the Barranca del Cobre. If you are roadworthy enough, you might endure a truck or jeep bouncing up and down the switchbacks, from Sierra Madrean summits of 3000 meters to canyon bottoms of 500 meters, dodging landslides and potholes. This will put you into other *barrancas*, the word Mexicans use when "canyon" just doesn't encompass enough.

At 1400 meters, not far below Chihuahuan oaks, organpipes edge themselves out on slopes of volcanic tuff. Here, the dominants at Los Mochis persist, more widely spaced, at the limits of their distribution too. But the barranca microclimate serves to mix a wider range of plants together: the *amole* agave, which I nickname the "turn-of-the-century plant," growing upside down on cliffs; *guamuchil*; coral bean; *sotol* or desert spoon; boat-spined acacia; sycamore or *aliso*; mesquite; and *chichiquelite*, an edible nightshade. In addition, the wild relatives of many cultivated plants cluster below organpipe and echo cactus, particularly in more open areas: figs, chiles, teparies, manioc, and a tequila-like agave. With such a diversity of flora, the predominantly pine-zone dwelling Tarahumara Indians often descend into the barrancas to gather plants not found closer to home.

It was with the Tarahumara that Carl Lumholtz first encountered the pitahaya, which he claimed produces "the finest fruit in Mexico's Northwest." He observed that this harvest allows the Tarahumara a chance to feast during the otherwise food-poor dry season. It may be for this reason that organpipe came to play a role in Raramuri mythology and calendrical cycle:

With the Indians, the pitahaya enters, of course, into religion, and the beautiful macaw [guacamaya] which revels in the fruit is associated with it in their beliefs. The bird arrives from its migration to southern latitudes when the pitahaya is in



bloom, and the Indians think that it comes to see whether there will be much fruit; then it flies off again to the coast, to return in June when the fruit is ripe.

The following gives the trend of one of the guacamaya songs: "The pitahaya is ripe, let us go and get it. Cut off the reeds! The guacamaya comes from the Tierra Caliente to eat the first fruits. From far away, from the hot country, I come when the men are cutting the reeds, and I eat the first fruits. Why do you wish to take the first fruits from me? I eat the fruit, I throw away the skin. I get filled with the fruit and I go home singing. Remain behind, little tree, waving as I alight from you! I am going to fly in the wind, and some day I will return to eat your pitahayas, little tree!"

Once harvested with a pronged rod, the fruit is split and dried in the sun. On ripened fruit, the thorns so easily fall off that there is no trouble handling them during processing. The Tarahumara then scrape the hardened pulp out of the brittle rind and store it as small cakes. Sometimes the fruit is boiled down and the seeds are skimmed off the top. The thickened fruit juice and pulp are poured into a mold, where they congeal into a *queso* or sweet of cheeselike consistency. The skimmed-off seeds are ground and added to pinole.

As masters in the making of fermented beverages, the Tarahumara also make a mild cactus beer or *tesguino*. The juice from mashed pitahaya pulp is collected, mixed with water and boiled in a huge clay pot for several hours on top of coals. They throw in a piece of bark, most often from the shrubby papache, to serve as a catalyst as the juice begins to ferment. The Tarahumara *tesguino* pots are used over and over again, building up within their pores a special culture of beer yeast. The *tesguino* reinforces the culture of the Tarahumara themselves. Adults spend around a hundred days a year participating in ritualized *tesguinadas* where the beer serves as a social lubricant, whether it be made of sprouted maize, mescal, manzanitas, or pitahayas. Like the flying guacamaya, the Tarahumara partake of the fruit, and go home singing.

Some 250 kilometers northwest of the Tarahumara, pitahaya is too important as food to be made into wine. In 1737, Padre Felipe Segesser commented that the pitahaya, with its exceptional flavor, was used intensively by the Pima at Tecoripa whenever they had a summer shortfall of grain. Two hundred and fifty years later, old Pedro Estrella, one of the last Pima speakers at Onavas, affirmed that the fruit "was purely to eat, not for wine."

As Don Pedro said this, he sat beneath his ramada made of organpipe bones cut lengthwise to form what looked like a corrugated roof. Much of the parapher-

nalia near his ramada was made of this bone-like xylem tissue which remains after organpipes die and their watery flesh rots away. Pima gatelatches, corrals, and fences, plus chicken coops, bird traps, and boxes are regularly made of cactus bones.

On the banks of the Río Yaqui, Onavas lies just outside the true Sonoran Desert, in subtropical thornscrub. Here, organpipe may outnumber the echo, the other common columnar cacti. Both serve as roosts for vultures, so that their branches are often streaked by the whitewash of these scavengers. The vegetation is rich in legumes such as feathertree, boat-spine acacia, ironwood, mesquite, Sonoran palo verde and kidneywood. Birds are thick within the patches of fruiting wolfberry, hackberry, and graythorn. At least one bird stays so close to the organpipe during fruiting time that in Onavas, it has become the organpipe dove: *paloma pitayera*. You can hear the white-winged doves calling "o'koko'i" early in the morning from the tops of the pitahaya, the Pima say.

When fruit is scarce, the Seri Indians suggest that you listen for the call of these white-winged doves. Follow the sound. Where the doves are, there are ripened pitahaya.

I followed them along the Sea of Cortez coast one week eight years ago, in the heat of early July. I was with the late great chaotic desert rat Paul Schneider, working for ethnobotanist Richard Felger, trying to estimate the yields of desert foods used by the Seri. We would awake with the first calling of the doves and dive into a desert heat that not even the night diminishes. By the time the sun came up, we would already be sweating, running down the desert coast, counting the fruit of organpipe.

It was like working for the Census Bureau, except the citizenry we had to interview were all columnar cacti.

"Good morning, Mr. Organpipe. Your address? The Desemboque dump? Yes, I guess there's only one prominent dump in this area. Age? You don't know? What do you mean you don't know? You're older than that little one over there, aren't you? Well, yes, that's right, taller and more arms. Maybe that will do, yes? Paul, could you count the arms, while I estimate height? Mmmmm, let's see there—3.5 meters. Paul? You're having trouble? Yessir, keep them up in the air for just another moment until Paul is done counting....How many? Twenty-seven arms. Not bad. There's another one over here that's your height that has only six. Okay, Paul, I'll count the fruit and flowers on this side, and meet you at that dead branch....Your

subtotals? Fifteen and twelve? Let's see, with my counts, that makes a total of thirty-one fruit and twenty-three flowers. Thank you for your patience, sir. Yes, you can let your arms down now. Yes, thanks again. Next?"

We would get several dozen cacti interviewed by ten-thirty or so in the morning. By then, the temperature had climbed over a hundred and ten degrees, and Paul had climbed into his old, battered pickup. I pushed so that Paul could jump-start it, and we would then joyride through the gorgeous forests of cardon, wood, desert lavender, brittlebush, and foothill palo verde. Swerving down the sandy road into Desemboque, we'd bounce with every bump. His truck was free of air-conditioning, so whenever we stopped, we had to peel ourselves from the wet seatbacks—I never knew that pickup cabs could sweat that much. We would then kick the doors open and swagger around the humble town of Desemboque looking to see if an ice-cold Coke could be had.

The same schedule followed in Punta Chueca and Bahía Kino as in Desemboque—do our cactus counts, collect a few fruit for nutritional analysis, jump-start the truck, dig the truck out of sand pits, then head into the nearest Seri village. Within the previous five years, the southerly Seri had moved from the low brush and wood huts to fancy fiberboard frame houses. They still used old truck bodies for walls of storage sheds, and they eyed Paul's soon-to-die pickup with envy. We would drink our sodas, Paul would juggle, I would finger-wrestle with the kids, then we would show them the cactus fruit we had collected earlier.

"*Imam imam*," a youngster would say of the ripe fruit.

"*Ool*," said another, acknowledging that it was from organpipe.

A man with shoulder-length hair under his cowboy hat would then lift his sunglasses to take a good look. He said in Spanish that it was a good harvest for so early in the season.

Our last night in Bahía Kino, we carefully packed all the fruit to be taken back for nutritional analysis. We wrapped each in paper and placed it on a cardboard liner inside a wooden fruit box. We covered the entire box with paper and wrapped string around it. Several boxes were fit snugly together in the back of the pickup.

We went to sleep in our hammocks at eight in the evening, hoping to get an early start to escape the heat. The truck sat not ten meters away from us, waiting with its load. We got the jump on dawn, and were back at the border by midday.

That's when we discovered that all the boxes of cactus fruit were gone.

In the long run, perhaps the loss of our additional data didn't matter that much. We had our census statistics, just no seed per fruit and nutritional composition information for another year. Besides, Richard Felger and his collaborator Mary Beck Moser had already accumulated what may be the most extensive set of data on Indian use of columnar cacti that will ever be assembled. Following up on W. J. McGee's suggestion that cactus fruit was the most important wild fruit harvest of the Seri, Moser and Felger spent over two decades documenting the nuances of the relationship between columnar cacti and the last hunter-gatherer culture in arid America.

Their treatise not only covers the Seri use of organpipe as food and drink, but also the plant's use as medicine, shelter, toys, in games, as paraphernalia in hunting and in smoking out bees, and as an image in folklore.

The Seri still gather pitahaya fruit every year, despite the fact that in the last few decades, their economy has shifted more towards the sales of wood carvings, baskets, and sea-turtle meat. The ripe fruit, *imam imam*—which Padre Gilg wrote as *himamas* in 1692—remains a special treat. Traditionally, the first ripe fruit brought into camp was opened, and bits of its pulp dabbed on the cheeks and nose to bring good luck.

According to Moser and Felger, the Seri were aware of geographic variation in organpipe traits at a level of detail beyond that which botanists have ever investigated. The Seri know a place near Pozo Coyote where certain plants flower and fruit twice a year. At Pozo Peña, the fruit produce a particularly strong but pleasant odor. At other sites, they found fruit that came on fairly late, in the autumn. The care for detail by persons who noticed such things was prominent in Seri culture. Would such fine observations count as much in a symposium of so-called cactus experts?

For me, the most remarkable Seri use of organpipe was for keeping boats afloat—a strange duty for a land-loving plant accustomed to less than 100 millimeters of rain per year. The caulk called *hoco ine*, 'wood's mucus,' by the Seri was first described by Edward Davis in 1924:

I witnessed the operation of making a certain kind of pitch or tar which the Seri use to make the seams in their canoes or boats tight. The women pound up the dried pulp next to the outside skin of the dead *pitahalla* cactus (organ cactus). This is very dry and brown in color and the pieces are pounded up to a dry powder with a wash or shore rock in a dried deer hide. This is placed in a *batello*,



or flat basket, and manipulated so that the coarse pieces come to the top and are scraped off and thrown away. The fine powder is then put in a five gallon can and some porpoise [sic] or sea-lion oil or horse oil is poured on it and stirred into a thick gummy mass. When thoroughly mixed it is put over the fire, in an olla, to boil continuously for an hour or two until it is the consistency and has the appearance of coal tar. While being worked it is kept heated and applied to seams inside and outside the boat. It hardens just like tar and answers the same purpose.

Well, almost. Early in this century, the plank boats coated with this caulking leaked so badly that they needed constant bailing. A Seri boy with a bucketlike pot had to be sent along with the men to keep them from going under. No matter how detailed a culture's botanical knowledge is, no remedy, no technology is foolproof. Let us praise such failures as the Seri in a sinking ship, for that is what sends us back to the drawing board.

Keeping afloat in a tide of water. Throughout most of Sonora, countrymen will say that the fruiting of organpipe begins around San Juan's Day in late June, with the initiation of the summer rains. It is as if they ready their fruit to ride the coming floods.

To ensure greatest establishment and survival of seedlings, columnar cacti such as organpipe gear their seed-ripening period to coincide with the summer rains. Those seeds which have not already been passed to the ground by birds or bats are then knocked loose by the thunderstorms. There, they wash downslope and are often left in sight or scent of a number of predators ranging from coyotes to harvester ants. The few which become established are often those which have been washed or defecated down beneath spiny desert shrubs. With this protection, they are allowed to emerge and grow until they eclipse the size of the nurse plant below. To pass on a favor, it seems, they themselves often serve as a protective platform for *Mamillaria* cactus, and as a support structure for vining herbs. To extend the favor, the nexus of their branches regularly provides a base for nests of cactus wrens and other birds. Organpipe fruit are of course eaten by these birds, as well as by dozens of other kinds of animals.

Rain delivers organpipe seeds to new homes, but do organpipes themselves bring the rain? It is as if the blooming organpipe, branches reaching skyward,

Spring  
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serves as the Sonoran equivalent of the lightning rod. When the fruit on the  
columnar cacti are ripe, the Papago say, we make wine from them, drink, and sing  
to throw up the clouds. The clouds build and bulge, dark and heavy  
over the desert hills. Suddenly, one weighty cloud sags,  
touching the top of the thorny cactus  
below. With the touch of just one  
thorn, it bursts into a  
thunderstorm.

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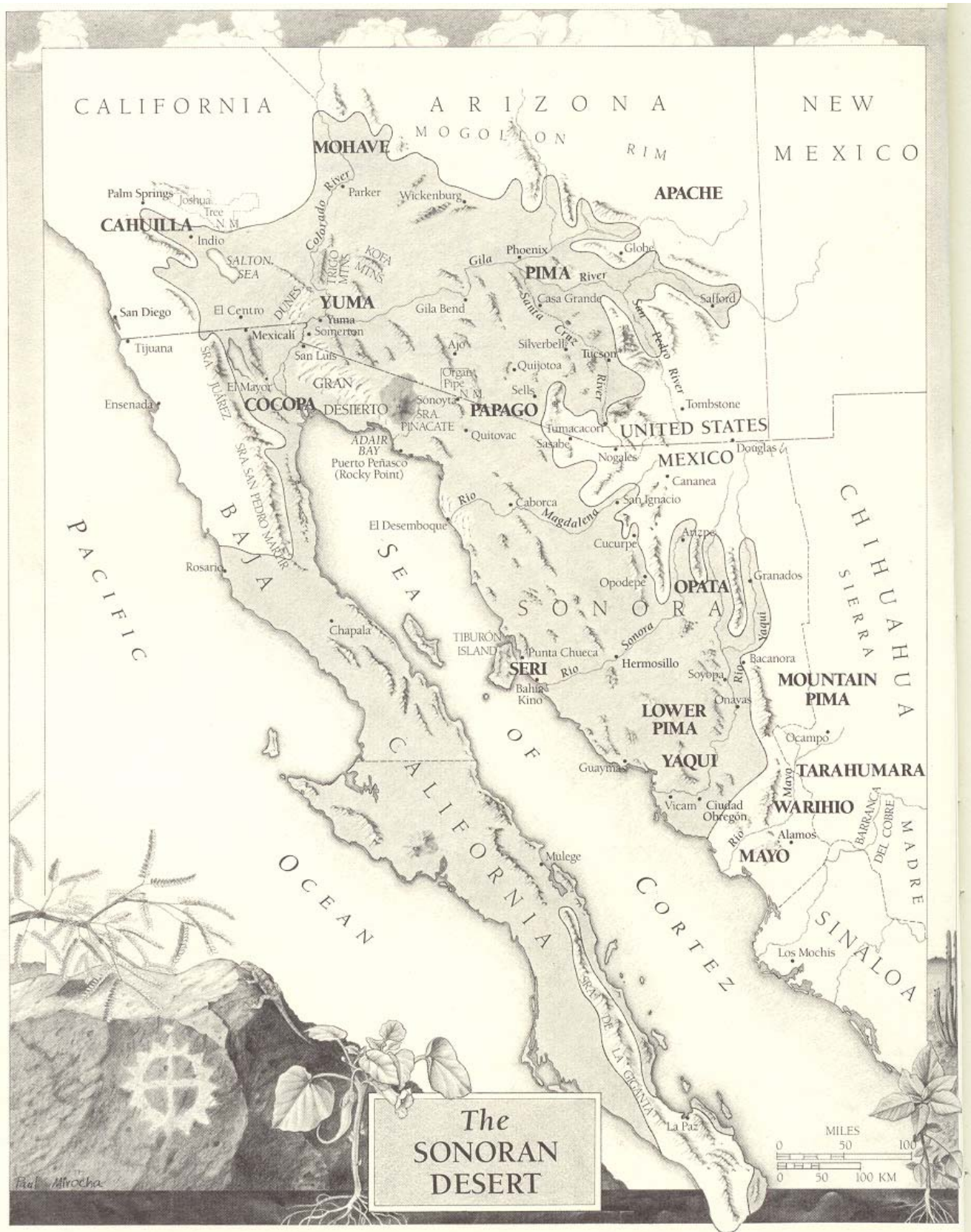
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CALIFORNIA

ARIZONA

NEW  
MEXICO

MOHAVE

MOGOLLON

RIM

APACHE

Palm Springs  
Joshua Tree  
Indio

CAHUILLA

San Diego

Tijuana

Ensenada

PACIFIC  
OCEAN

Baja  
California

GULF  
OF  
CALIFORNIA

OCEAN

Cochise  
River

TRICO  
Mtns

YUMA

Yuma  
Somerton

GRAN  
DESERTO

ADAIR  
BAY

Puerto Penasco  
(Rocky Point)

Chapala

El Desemboque

Rio

Caborca

Magdalena

Opodepe

Granados

Yaqui

Bacanora

Ocampo

Alamos

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La Paz

La Paz

Parker

Wickenburg

Gila

Phoenix

Globe

Safford

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#### *About the Author*

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## *Gathering the Desert*

GARY PAUL NABHAN

*Illustrations by*  
PAUL MIROCHA

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