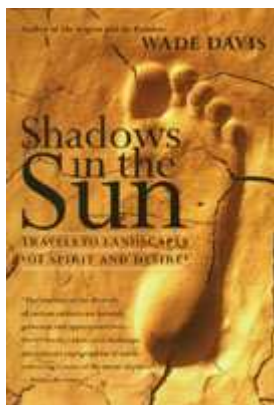


Shadows in the Sun

- by Wade Davis



Many years ago, while living among the Barasana Indians on the banks of the Rio Piraparana in the Northwest Amazon of Colombia, I was invited one night to drink ayahuasca, "the vine of the soul," the most revered and celebrated of Amazonian shamanic preparations. The tribal leader, a man named Rufino, described it as the jaguar's nectar, a magical intoxicant that could free the soul, allowing one to wander in mystical encounters with ancestors and animal spirits. He cautioned that the potion, like any sacred medicine, could be many things, but pleasant was not one of them.

We were sitting on four small wooden stools placed around the men's circle in the maloca, the community longhouse. Rufino, like his father, Pedro, was wearing a loincloth, as was a third man whose name was Pacho. All three had carefully decorated their bodies, tracing lines of red and black dye on their faces, and painting their legs with small wooden rollers that left geometric patterns on the skin. Each wore a seed anklet and a simple headdress that had a corona of green and yellow parrot feathers, tufts of eagle down, and a long tail feather taken from a scarlet macaw. In the center of the circle was a large red ceramic vessel, with swirling designs around the rim. Inside was a frothy liquid. Near the base of the pot were rattles, panpipes, and other musical instruments made from turtle shells and deer skulls. Already the men had danced, shoulder to shoulder in a line, singing as they circled the pillars of the longhouse. Now they waited quietly. The women and children had long since retired, and the only light came from a resin torch, burning at the base of one of the house posts.

Pedro stood up and began a solemn chant. When it was over, he dipped a black calabash into the ayahuasca and passed it to his son. Rufino grimaced as he drank the potion, as did we all. The taste was bitter and nauseating. There followed more singing and dancing, high tremulous voices and the sound of rattles and anklets. Then always a hush of expectation as Pedro prepared the next allotment of the brew.

I sat quietly among them, unable to participate yet conscious of the power and authority of their ritual. The plant took them first. In soft murmurs, Rufino spoke of a red sun, a red sky, a red rain falling over the forest. Nausea came quickly, and he vomited. Immediately Pedro offered another draught of ayahuasca; Rufino took it, spitting and gasping. Until then I had felt nothing, but the sound of his retching caused me to turn aside and throw up in the dirt. Pacho laughed and then did the same. We all took more ayahuasca, several more cycles. An hour or more passed. I looked up and saw the edges of the world soften, and felt a resonance coming from beyond the sky, like the intimation of a hovering wind, pulsating with energy.

At first it was pleasant, a wondrous sense of life and warmth enveloping all things. But then the sensations intensified, became charged with a strange current, and the air itself took on a metallic density. Soon the world as I knew it no longer existed. Reality was not distorted; it was dissolved, as the terror of another dimension swept over the senses. The beauty of colors, the endless patterns of orblike brilliance, were as rain falling away from my skin. I caught myself and looked up, saw Rufino and Pacho gently swaying and moaning. There were rainbows trapped inside their feathered headdresses. In their hair were weeping flowers and trees attempting to soar into the clouds. Leaves fell from the branches, with great howling sounds. The sky opened. There was a livid sear across the heavens, stars throbbing, a great wind scattering everything in its path. Then the ground opened. Snakes encircled the posts of the maloca and slipped away into the earth. The rivers unfolded like the mouths of blossoms. Movement became

penetration. Then the terror grew stronger, as did my sense of hopeless fragility. Death hovered all around. Ravenous children, and animals of every shape and form, lay sick and dying of thirst. Their nostrils plunged into the dry earth. Their flanks lay bare and exposed. And all around rose a canopy of immense sorrows.

I tried to shake away the forms from the luminous sensations. Instead my thoughts themselves turned into visions, not of things or places but of an entire dimension that in the moment seemed not only real, but absolute. This was the actual world, and what I had known until then was a crude and opaque facsimile. I looked up and saw my companions. Rufino and Pacho sat quietly, heads down, hunched around a fire that had not been there before. Pedro stood apart, arms outspread as he sang. His face was upturned, and his feathered corona shone like the sun. His eyes were brilliant, radiant, feverish, as if focused into the very nature of things.

Slowly, as the night moved forward, the colors faded and the terror receded. I felt my hands running over the dirt floor of the maloca, saw dust tinged with green light, heard the voices of women laughing. Dawn was coming. I could hear it in the forest. My companions remained by the hearth, but the fire had died and the air was cold. I stood and stretched my muscles. Tired but no longer afraid, I slipped into my hammock. For the longest time I lay awake, wrapped in a cotton blanket, like a drained child waiting to sweat out the end of a fever. The last thing I saw before drifting off to sleep was a placid cloud of violet light softly descending on the maloca.

Some hours later I was awakened by the roar of an airplane passing just over the roof of the longhouse. I looked up and saw narrow shafts of light cutting through the thatch. My head ached and I was thirsty, but other than that I was fine. I felt clean, as if my body had been washed inside and out. Sitting up, I found myself surrounded by young boys, who followed me outside into the sunlight and down the path that led to the river. The water was cool and refreshing, delicious to drink. There was a shout, and one of the boys pointed to the river bank. It was the missionary pilot who had dropped me off at the village a fortnight earlier. Beside him stood Rufino and his father. They had packed away their regalia, but their legs still bore decorative motifs, and black genipa dye was smeared across their faces. The pilot had his hands on his hips.

"Gone native, have we?" he called out. "I wouldn't touch that water if I was you."

"You're early," I said.

"Actually, I'm two days late."

"Oh."

"Well come on then. I don't have all day. I've got to be in Miraflores by noon."

It made for an awkward departure. I gathered my gear and specimens, left what remained of the trade goods with Rufino, and within twenty minutes was airborne, soaring above the maloca and over the forest toward the small town of Nimi. The sudden shift in perspective was startling. The streams fell behind, grew into rivers, and the rivers spread like serpents through a silent and unchanging forest. Rufino had likened ayahuasca to a river, a journey that takes one above the land and below the water to the most remote reaches of the Earth, where the animal masters live and lightning is waiting to be born. To drink ayahuasca, anthropologist Gerardo Reichel-Dohmatoff once wrote, is to return to the cosmic uterus and be reborn. It is to tear through the placenta of ordinary perception and enter realms where death can be known and life traced through sensation to the primordial source of all existence. When shamans speak of facing down the jaguar, it is because they really do.

On Earth, there are Some 800,000 species of plants feeding on the light of the sun. Of

these, only a few thousand yield food and medicines, and only a mere hundred or so contain the compounds that transport the mind to distant realms of ethereal wonder. Strictly speaking, a hallucinogen is any chemical substance that distorts the senses and produces hallucinations -- perceptions or experiences that depart dramatically from ordinary reality. Academics call these drugs psychotomimetics (psychosis mimickers), psychotaxics (mind disturbers), and psychedelics (mind manifesters). These dry terms quite inadequately describe the remarkable effects the compounds have on the human mind. Indeed, the sensations are so unearthly, the visions so startling, that most hallucinogenic plants acquired a sacred place in indigenous cultures. In rare cases, they were worshipped as gods incarnate.

The pharmacological activity of the hallucinogens arises from a relatively small number of chemical compounds. While modern chemistry has been able, in most cases, successfully to duplicate these substances or even to manipulate their chemical structures to produce novel synthetic forms, nearly all such drugs have their origins in plants. In the plant kingdom, they occur only among the advanced flowering plants and the more primitive spore-bearing fungi. Most are alkaloids, a family of about 5,000 complex organic molecules that also account for the biological activity of most toxic and many medicinal plants. These active compounds may be found in various concentrations in different parts of the plant--root, leaves, seeds, bark, and flowers -- and they may be absorbed by human body in a number of ways, as is evident in the wide variety of folk preparations. Hallucinogens have been smoked or snuffed, swallowed fresh or dried, drunk in decoctions and infusions, absorbed directly through the skin, placed in wounds, or administered as enemas.

In the worldwide distribution of the hallucinogens, there is a remarkable anomaly that illustrates the role these plants play in traditional societies. Of the 120 or more hallucinogenic plants found to date, over 100 are native to the Americas; the rest of the world has contributed fewer than 20. In part, this uneven distribution is a reflection of the emphasis of academic research. A good many of these plants were first documented by my former professor, Richard Evans Schultes, and his students at the Harvard Botanical Museum and elsewhere. His interest has been predominantly in the New World. Still, were these plants a dominant feature of traditional cultures in Eurasia, Africa, Australia, and the South Pacific, surely they would have shown up in the extensive ethnographic literature and in the journals of traders and missionaries. With few notable exceptions, they do not. Nor is this discrepancy due to floristic peculiarities. The rain forests of West Africa and Southeast Asia, in particular, are exceedingly rich and diverse. Moreover, the peoples of these regions have most successfully explored them for pharmacologically active compounds for use both as medicines and poisons. In fact, as much as any other material trait, the manipulation of toxic plants is a consistent theme throughout sub-Saharan African societies.

The Amerindians, for their part, were certainly no strangers to plant toxins. They commonly exploited them as fish, arrow, and dart poisons. Yet whereas the peoples of Africa consistently used these toxic preparations on each other, the Amerindians almost never did. And while the Amerindians successfully explored their forests for hallucinogens, the Africans did not. The use of any pharmacologically active plant is firmly rooted in culture. If the African peoples did not exploit their environment for psychoactive drugs, it is because they had no cultural need or desire to do so. In many Amerindian societies, by contrast, the use of plant hallucinogens lies at the very heart of traditional life.

In searching for hallucinogenic plants, indigenous peoples have shown extraordinary ingenuity. In experimenting with them, they have demonstrated signs of pharmacological genius. They have also, quite evidently, taken great personal risks. Peyote (*Lophophora williamsii*), for example, has as many as thirty active constituents, mostly alkaloids, and is exceedingly bitter, not unlike most poisonous plants. Yet the Huichol, Tarahumara, and numerous other peoples of Mexico and the American Southwest discovered that, sun-dried and eaten whole, the cactus produces considerable psychoactive effects.

With similar tenacity, the Mazatec of Oaxaca discovered, in a mushroom flora that contained numerous deadly species, two dozen that were hallucinogenic. These, they believed, had ridden to the Earth upon thunderbolts and were reverently gathered at the time of the new moon. Elsewhere in Oaxaca, the seeds of a morning glory (*Turbina corymbosa*) were crushed and prepared as a decoction that we now know contained alkaloids closely related to LSD. This was *ololiuqui*, the "vine of the serpent," a sacred preparation of the Aztec.

The group of plants that shamans approach with the greatest trepidation are in the potato family, species of *Datura* and *Brugmansia* -- the "holy flowers of the North Star" and the trees of the evil eagle." These plants contain tropane alkaloids that, though useful in the treatment of asthma, can in higher dosage induce a frightening state of psychotic delirium marked by burning thirst, visions of hellfire, and, ultimately, stupor and death. Sorcerers among the Yaqui of northern Mexico anoint their genitals, legs, and feet with a salve based on crushed *datura* leaves and experience the sensation of flight. Many believe that the Yaqui acquired this practice from the Spaniards, for throughout medieval Europe, witches commonly rubbed their bodies with hallucinogenic ointments made from *belladonna*, *mandrake*, *henbane*, and *datura*. In fact much of the behavior associated with witches is as readily attributable to these drugs as to any spiritual communion with demons. A particularly efficient means of self-administering the drug is through the moist tissue of the vagina; the witch's broomstick or staff was considered a most effective applicator. The common image of a haggard woman on a broomstick comes from the belief that the witches rode their staffs each midnight to the sabbat, the orgiastic assembly of demons and sorcerers. It now appears that their journey was not through space but across the hallucinatory landscape of their own minds.

Lowland South America has provided several important and chemically fascinating hallucinogenic preparations, notably the intoxicating *yopo* and *epena* snuffs of the upper Orinoco in Venezuela and adjacent Brazil and *ayahuasca*, found commonly among the rain forest peoples of the Northwest Amazon. *Yopo* is prepared from a tall forest tree, *Anadenanthera peregrina*, in the bean family. The seeds are roasted and ground into a fine powder, which is then mixed with some alkaline substance, often the ashes of certain leaves.

The sacred powder known as *spend*, the "semen of the sun," is a tryptamine-based hallucinogen that induces not merely the suspension of reality, but the complete dissolution of the material world as we know it. The source of this most remarkable hallucinogen is the blood-red resin found in several tree species in the genus *Virola* of the nutmeg family. Preparations vary. The nomadic *Maku* ingest the resin directly; other tribes, notably the *Huitoto* and *Bora*, swallow pellets made from a paste of the resin. The drug is taken as a snuff by the *Barasana*, *Makuna*, *Tukano*, *Kabuyare*, *Kuripako*, and *Puinave* of eastern Colombia and various groups of the *Yanomami* in the upper Orinoco. To prepare the snuff, the bark is removed from the trees in early morning, and the soft inner layers are scraped off. The shavings are kneaded in cold water, which is subsequently filtered and boiled down to a thick syrup that, when dried, is pulverized and mixed with the ashes of the bark of wild cacao. As with many shamanic preparations, several admixture plants may be added to enhance the snuff.

In the case of *ayahuasca*, it is the sophistication of the preparation that is most impressive. The drug is derived from two species of forest lianas, *Banisteriopsis inebrians* and, more commonly, *Banisteriopsis caapi*. The potion is made in various ways, but generally the fresh bark is scraped from the stem and boiled for several hours until a thick, bitter liquid is produced. The active compounds are the beta-carbolines *harmine* and *harmaline*, whose subjective effects are suggested by the fact that, when first isolated, they were known as *telepathine*. Taken alone, an infusion of the plant induces subtle visions, blues and purples, slow undulating waves of color.

Long ago, however, the shamans of the Northwest Amazon discovered that the effects could be dramatically enhanced by the addition of a number of subsidiary plants. This

practice is an important feature of many folk preparations and it stems, in part from the fact that different chemical compounds in relatively small concentrations may effectively potentiate one another. In the case of ayahuasca, some twenty-one admixtures have been identified to date. These include roots and leaves, the bark of lianas, and flowers and seeds derived from a host of species in a wide range of botanical families. Two of the admixtures are of particular interest. *Psychotria viridis* is a shrub in the coffee family. *Diplopterys cabrerana* is a forest liana closely related to a ayahuasca, *Banisteriopsis caapi*. Unlike ayahuasca, both these plants contain tryptamines, powerful psychoactive compounds that when smoked or snuffed induce a very rapid, intense intoxication of short duration, marked by astonishing visual imagery. Taken orally, however, these potent compounds have no effect because they are denatured by an enzyme, monoamine oxidase (MAO) found in the human gut. Tryptamines can be taken orally only if combined with a MAO inhibitor. Amazingly, the beta-carbolines found in ayahuasca are inhibitors of precisely this sort. Thus, when ayahuasca is combined with either one of these plants, the result is a powerful synergistic effect, a biochemical version of the whole that is greater than the sum of the parts. The visions, as the Indians say, become brighter, and the blue and purple hues are augmented by the full spectrum of the rainbow.

When I first witnessed and experienced this remarkable example of shamanic alchemy, what astonished me was less the raw effects of the drug -- stunning as they were -- than the intellectual process underlying the creation of these complex preparations. The Amazonian flora encompass literally tens of thousands of species. How did the Indians learn to identify and combine in such a sophisticated manner these morphologically dissimilar plants, with such unique and complementary chemical properties? The standard scientific explanation, trial and error, may well account for certain innovations; but at another level, it is but a euphemism disguising the fact that ethnobotanists have very little idea how Indians originally made their discoveries.

The problem with trial and error is that the elaboration of the preparations often involves procedures that are exceedingly complex or that yield products of little or no obvious and immediate value. *Banisteriopsis caapi* is an inedible, nondescript liana that seldom flowers. True, its bark is bitter, but scarcely more so than a hundred other forest vines. An infusion of the bark causes vomiting and severe diarrhea, hardly conditions that would encourage further experimentation. Yet not only did the Indians persist; they became so deft at manipulating the various ingredients that individual shamans developed dozens of recipes, each yielding potions of various strengths and nuances for specific ceremonial and ritual purposes.

The Indians have their own explanations, rich cosmological accounts that from their perspective are inherently logical: sacred plants that had journeyed up the Milk River in the belly of anaconda, potions created by primordial jaguar, the drifting souls of shaman dead from the beginning of time. As a scientist I had been taught not to take these myths literally. But they do suggest a certain delicate balance, the thoughts of a people who do not distinguish the supernatural from the mundane. The Indians believe in the power of plants, accept the existence of magic, acknowledge the potency of the spirit. Magical and mystical ideas enter the very texture of their thinking. Their botanical knowledge cannot be separated from their metaphysics. Even the way they order and label their world is fundamentally different.

There are tribes in the Northwest Amazon that do not distinguish green from blue, for the canopy of the forest is the very sky that shelters them. This strange concept lingered in my imagination when I first worked in the tropical lowlands. It surfaced whenever I confronted yet another botanical enigma, the manner in which the Indians classify their plants. The Ingano of the upper Putumayo in Colombia, for example, recognize seven kinds of ayahuasca. The Siona have eighteen varieties, which they distinguish on the basis of the strength and color of the visions, the trading history of the plant, the authority and lineage of the shaman, even the tone and key of the incantations that the plants sing when taken on the night of a full moon. None of these criteria makes sense botanically,

and, as far as modern science can distinguish, and the plants are referable to one species, *Banisteriopsis caapi*. Yet the Indians can readily differentiate their varieties on sight even from a considerable distance in the forest. What's more individuals from different tribes, separated by large expanse of forest, identify these same varieties with amazing consistency. It is a similar story with other stimulants, such as the caffeine-rich liana *Paullinia yoco*. In addition to yoco blanco and colorado, the Ingano recognize black yoco, jaguar yoco, yage-yoco, yoco of the witches. Fourteen categories in all, not one of which can be determined based on the rules of our own science.

Like most ritual hallucinogens, ayahuasca is a sacred medicine and a vital component of the shaman's repertoire, enabling him to communicate across great distances in the forest to diagnose illness, ward off evil, prophesy the future. But for the peoples of the Northwest Amazon, it is far more. Ayahuasca is the visionary medium through which human beings orient themselves in the cosmos. Under the cloak of the visions, the user of ayahuasca encounters the gods, the primordial beings, and the first humans, even as he or she embraces, for good and for bad, the wild creatures of the forest and the powers of the night. Lifted out of his body, the shaman enters a distant realm, soaring like a bird to beyond the Milky Way or descending the sacred rivers in supernatural canoes manned by demons to reach distant lands where lost or stolen souls can be found and mystical deeds of spiritual rescue may be accomplished. To begin to understand the role that all these powerful plants play in these societies, it is essential to place the drugs themselves in proper context. For one, the pharmacologically active components do not produce uniform effects. On the contrary, any psychoactive drug has within it a completely ambivalent potential for good or evil, order or chaos.

Pharmacologically, it induces a certain condition, but that condition is mere raw material to be worked by particular cultural or psychological forces. Andrew Weil, a physician who has written a great deal about the cross-cultural use of drugs, illustrates this point with an example from our own society. In the rain forests of Oregon, there are a number of native species of hallucinogenic mushrooms. Those who go out into the forest deliberately intending to ingest these mushrooms generally experience a pleasant intoxication. Those who inadvertently consume them while foraging for edible mushrooms invariably end up in the poison unit of the nearest hospital. The chemical effects of the mushrooms have not changed. What does vary is the interpretation of the intoxication and the individual's expectations of what the drug will do.

Similarly, the hallucinogenic plants consumed by the Amerindians induce a powerful but neutral stimulation of the imagination. They create a template upon which cultural beliefs may be amplified a thousand times. What individuals see in the visions is dependent not on the drug but on other factors: the physical and mental states of the users; their expectations, based on a rich repository of tribal lore; and, above all, the authority, knowledge, and experience of the leader of the ceremony. The role of this figure, be it man or woman, shaman, curandero, payí, maestro, or brujo, is pivotal. It is the shaman who tackles the bombardment of visual and auditory stimuli and gives it order. It is the shaman who must interpret a complex body of belief, reading the power in leaves and the meaning in stones, skillfully balancing the forces of the universe and guiding the play of the winds. The ceremonial use of hallucinogenic plants is a collective journey into the unconscious. It is not necessarily, and in fact is rarely, a pleasant or an easy journey. It is wondrous and it may be terrifying. But above all, it is culturally purposeful.

Amerindians enter the realm of hallucinogenic visions not out of boredom or to relieve restless anxiety but rather to fulfill some need of the group. In the Amazon, for example, hallucinogens are taken to divine the future, track the paths of enemies, unveil the medical properties of healing plants. The Amahuaca of Peru drink ayahuasca in order that the nature of the forest animals may be revealed to their apprentices. The Huichol of Mexico eat their peyote at the completion of long, arduous pilgrimages through a landscape of the spirits, that they may experience in life the journey of the soul of the dead to the underworld. In eastern North America, during puberty rites, the Algonquin confined adolescents to a longhouse for two weeks and fed them a beverage based, in part, on datura. During the extended intoxication --and the subsequent amnesia, a

pharmacological feature of this drug -- the young boy forgot what it was to be a child so that he might learn what it meant to be a man.

Whatever the ostensible purpose of the hallucinogenic journey, Amerindians generally take the sacred plants in a highly structured manner that places a ritualistic framework of order around their use. Moreover, the experience is explicitly sought for positive ends. It is not a means of escaping from an uncertain existence. Rather, it is perceived as a means of contributing to the welfare of all of one's people