

# PEYOTE

## AND OTHER PSYCHOACTIVE CACTI



**ADAM GOTTLIEB**



TWENTIETH CENTURY ALCHEMIST SERIES

**PEYOTE AND OTHER PSYCHOACTIVE CACTI**

ADAM GOTTLIEB

*Peyote has been used ceremonially by the native peoples of the Americas as a spiritual medicine for close to 3,000 years.*

*PEYOTE AND OTHER PSYCHOACTIVE CACTI* is a concise and readable guide to the art of cultivating peyote, San Pedro, and the numerous other entheogenic cacti. In light of the possible extinction of wild peyote, this book is a timely resource for those who feel a responsibility to preserve this sacred medicine. This revised underground classic describes:

- *the various methods of using these cacti*
- *cultivating cacti from seed or cutting*
- *increasing the yield of mescaline and other alkaloids*
- *extracting and increasing the yield of mescaline and other mixed alkaloids*
- *the current legal status of these entheogenic cacti*

**PEYOTE AND OTHER  
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# **Peyote and other Psychoactive Cacti**

**by Adam Gottlieb  
Published 1977**

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How to use them – How to extract them  
What they contain – Where to obtain them  
How to cultivate them and increase their potency  
35 different species discussed

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## 1. INTRODUCTION

For many years most of us have been aware of the psychoactive effects of Peyote. More recently in drug-oriented literature there have been numerous references to other cacti believed to have hallucinogenic properties. Among these are Doñana from northern Mexico, San Pedro from the Andes, three related mescaline-bearing species from South America, and at least 15 species used by the Indians of Central Mexico as Peyote substitutes. Botanists and Chemists are now studying the constituents of these cacti and are making some remarkable discoveries. In this guide we will consider each of these cacti and bring the reader up to date on what scientists have learned about them. The various methods of using these cacti are also discussed. Directions are given for cultivating cacti and increasing the yield of mescaline and other alkaloids. There are instructions for extracting mescaline from Peyote and San Pedro, and mixed alkaloids from Doñana and other cacti. We also include a brief discussion of the legal aspects of these hallucinogenic cacti and give the names and addresses of legitimate suppliers from whom these plants can be obtained at reasonable prices.

## **2. Mescaline, Peyote and the Law**

Both mescaline and Peyote are illegal under the statutes of the [U.S.] Federal Government and most States. Members of the Native American Church are permitted the ritual use of peyote because they established it as a religious sacrament long before these laws came into existence. Members are not permitted to use mescaline, however. Several other cacti such as San Pedro also contain mescaline. Technically it would be illegal to possess these, but because they are common ornamental plants it is permissible to use these cacti for normal horticultural purposes. If a person should attempt to use any of these plants for a psychedelic experience, prosecution is possible. If he were to extract the mescaline from these, the alkaloid would definitely be contraband material. It is important that this point be made clear because the mescaline extraction process is given in this guide. To extract the alkaloids from Doñana and other non-mescaline bearing cacti is not illegal. The information in this guide is presented for the sake of furthering knowledge. The Author can assume no responsibility for how anyone may apply it.

### 3. PEYOTE

This spineless, tufted, blue-green, button-like cactus, known botanically as *LOPHOPHORA WILLIAMSII*, is the most famous of the hallucinogenic cacti. It grows wild from Central Mexico to Northern Texas. Its known history dates back to pre-Columbian times; possibly as early as 300 B.C. During the past two centuries the religious use of Peyote has spread northward into the United States and Canada among many of the Plains Indian Tribes such as the Navajo, Comanche, Sioux, and Kiowa. This cactus eventually came to replace the hallucinogenic but dangerous red mescal bean (*SOPHORA SECUNDIFLORA*) as a ceremonial sacrament. During the 1800's the North American Peyote ritual was standardized. By 1920 the ceremonial practices of most tribes were identical with only minor variations.

(Note: In Mexico there is a popular liquor called mescal. Many people believe that it is made from the Peyote cactus. Actually it is fermented from the Maguey plant, a large succulent of the *Amaryllis* family with sword-like leaves. This plant does not contain mescaline or related alkaloids.)

It was in 1896 that Arthur Heffter extracted mescaline from Peyote and tested it upon himself. This was the first hallucinogenic compound isolated by man. About 350 mg of mescaline is required for a psychotropic experience, although definite effects can be felt from as little as 100 mg. Mescaline may comprise as much as six percent of the weight of the dried button, but is more often closer to one percent. An average dried button the diameter of a quarter weighs about 2 grams. It usually takes 6–10 of these buttons to gain the desired effect.

It has been noted that the peyote experience is quantitatively somewhat different than that of pure mescaline, the former being more physical than the latter. This is due to several of the other alkaloids present in the cactus. These include: *HORDENINE*, *N-METHYLMESCALINE*, *N-ACETYLMESCALINE*, *PELLOTINE*, *ANHALININE*, *ANHALONINE*, *ANHALIDNINE*, *ANHALONIDINE*, *ANHALAMINE*, *O-METHYLANHALONIDINE*, *TYRAMINE*, and *LOPHOPHORINE*. Not all of these substances have psychopharmacological activity when administered singly. Some of them in combination apparently potentiate the effects of the mescaline and definitely alter some of the characteristics of the experience.

Two of these alkaloids – *Hordenine* and *Tyramine* – have been found to possess antibacterial activity, presumably because of their phenolic function. For ages the Huichol Indians have rubbed the juices of fresh peyote into wounds to prevent infection and to promote healing. The Tarahumara Indians consume small amounts of peyote to combat hunger, thirst and exhaustion especially while hunting. They have been known to run for days after a Deer with no food, water or rest. Peyote has many uses in folkloric medicine including the treatment of arthritis, consumption, influenza, intestinal disorders, diabetes, snake and scorpion bites and datura poisoning. The Huichol and other tribes recognize two forms of peyote. One is larger, more potent and more bitter than the other. They call it *TZINOURITEHUA-HIKURI* (peyote of the Gods). The smaller, more palatable, but milder buttons are called *RHAITOU MUANITARI-HIKURI* (peyote of the goddesses). The difference between the two forms may be due solely to how old the plants are. Alkaloids tend to accumulate in these cacti with age. It is possible, however, that the goddess peyote is a different species. Until recently botanists believed that the genus *LOPHOPHORA* consisted of a single but highly variable species. But in 1967 H.H. Bravo found near Queretaro in south-central Mexico another species which he named *LOPHOPHORA DIFFUSA*. This plant is yellow-green, soft, ribless and contains a somewhat different alkaloid mixture with far less mescaline than *L. williamsii*.

## 4. THE EXPERIENCE

About half an hour after ingesting the buttons the first effects are felt. There is a feeling of strange intoxication and shifting consciousness with minor perceptual changes. There may also be strong physical effects, including respiratory pressure, muscle tension (especially face and neck muscles), and queasiness or possible nausea. Any unpleasant sensations should disappear within an hour. After this the state of altered consciousness begins to manifest itself. The experience may vary with the individual, but among the possible occurrences are feelings of inner tranquillity, oneness with life, heightened awareness, and rapid thought flow. During the next several hours these effects will deepen and become more visual. Colors may become more intense. Halos and auras may appear about things. Objects may seem larger, smaller, closer or more distant than they actually are. Often persons will notice little or no changes in visual perception while beholding the world about them, but upon closing their eyes they will see on their mind–screen wildly colorful and constant changing patterns. After several more hours the intensity of the experience gradually relaxes. Thought becomes less rapid and diffuse and more ordered. In the Navajo peyote ritual this change of thought flow is used wisely. During the first part of the ceremony the participants submit to the feeling and let the peyote teach them. During the latter part of the ritual the mind turns to thoughtful contemplation and understanding with the conscious intellect what the peyote has taught the subconscious mind.

The entire experience may last from 6 to 12 hours depending upon the individual and the amount of the plant consumed. After all the peyote effects have passed there is no comedown. One is likely to feel pleasantly relaxed and much at peace with the world. Although there is usually no desire for food during the experience one would probably have a wholesome appetite afterwards.

## 5. METHODS OF USE

The most common method of use is simply to chew up and swallow the fresh or dried buttons after removing the tufts and sand. This is the way it is almost always done at Indian ceremonies. Most people find the taste of this cactus unbearably bitter. The Indians, however, feel if one's heart is pure, the bitterness will not be tasted. Many have found that by not cringing from the taste, but rather letting one's senses plunge directly to the center of the bitterness, a sort of separation from the offensive flavor is experienced. One is aware of the bitterness, but it no longer disturbs him. This is similar to the practice of bringing one's consciousness to the center of pain so that detachment may occur. It is not a difficult trick, but it takes some mental discipline. People who cannot endure the bitterness of peyote often go to various extremes to get it into the system without having to taste it. One fairly effective method is to drink unsweetened grapefruit juice while chewing it. The acids in the juice somewhat neutralize some of the bitter bases. Another method is to grind the dried buttons in a pepper grinder and pack the pulverised material into OOO capsules which are washed down with warm water. This is an effective method but it can take 20 capsules or more to get a 350mg dose of mescaline. Often people will boil the buttons in water for several hours to make a concentrated tea. A cup of this decoction can be swallowed in a few hasty gulps. Another preparation that is occasionally used is a jello-type dessert made with the fresh or dried plant. If spoonfuls are swallowed whole the gelatine serves as a sort of shield protecting the tastebuds from contact with the bitter material. It also slows down the absorption of the drug in the digestive tract. This can be of value. It is generally recommended that anyone consuming peyote or mescaline ingest it gradually during a period of an hour or take two half doses 45 minutes apart. This is done to reduce the shock of the alkaloid to the system. Nausea or queasiness is sometimes experienced half an hour or so after taking peyote or mescaline. This usually passes in less than an hour. A sip of grapefruit juice will sometimes dispel the sick feeling. During the peyote ceremony Indians encourage vomiting rather than restraint if the urge presents itself. Throwing up, they believe, is a purging of both physical and spiritual ills. Most tribes fast for at least a day before taking peyote. This can also help to minimize gastric distress. One should not have eaten for at least 6 hours before taking either mescaline or peyote.

A method which avoids both the bitterness and the nausea is the rectal infusion. 8–16 grams of dried peyote is ground into a fine powder and boiled in a pint of water for 30 minutes. It is then strained and further boiled to reduce its volume to one half pint. After cooling, this is taken as an enema using a small bulb syringe and retained for at least two hours. If there is any fecal matter in the lower bowel, a small cleansing enema should be taken and thoroughly expelled before having the peyote infusion. Otherwise much of the drug will be taken up by the feces and later voided.

## 6. FINDING AND PICKING PEYOTE

The peyote cactus may be found in many areas throughout the Chihuahuan Desert from central Mexico to southern Texas. When a site is found where peyote grows it usually does so in abundance. Sometimes it grows in open sunlit places, but more often it is found in clusters under fairly large shrubs, among mesquite or creosote bushes or in the shade of large succulents.

The best time to harvest any cactus is after a long dry spell. The worst time is during or after a rainy period. The plants build up alkaloids during dry seasons and draw upon them for growth when the rains come. If the plants are harvested during or after a wet spell, the alkaloid content may have dropped below 50 percent. If you have a soil test kit, you can get a good indication of the potency of cacti growing wild. If the soil is rich in nitrogen, the plants are likely to be rich in alkaloids.

When harvesting peyote, many people uproot the entire plant. This is unnecessary and wasteful. The roots contain no mescaline. Some of these plants have taken a long time to reach their size. A cactus three inches in diameter may be more than 20 years old. To collect peyote properly the button should be cleanly decapitated slightly above ground level. When the roots are left intact new buds will form where the old was removed. These will eventually develop into full-size buttons which may be harvested as before. Faulty harvesting methods have seriously depleted populations of this cactus. Because of the presence of several phenolic alkaloids peyote cacti do not spoil easily and may be kept in their fresh form for several weeks after harvesting. If they are to be kept longer than this they must be refrigerated, frozen, or dried. The enzymes which cause the harvested plant to eventually decompose also destroy the mescaline and other alkaloids. To dry peyote buttons lay them out in the hot sun or in an oven at 250 degrees F until completely devoid of moisture.

## 7. OTHER PEYOTE-TYPE CACTI OF CENTRAL MEXICO

There are several cacti which are used by the Tarahumares and other tribes of central Mexico as substitutes for peyote. Many of these cacti are now under investigation for their alkaloidal content and psychopharmacological activity. Progress is somewhat retarded in the studies of the effects of these plants because almost all experimentation has been conducted on laboratory animals rather than humans. Some of these cacti have been found to contain mescaline and other related alkaloids with known sympathomimetic properties. Much further research is needed on these plants and their activity. However, we will attempt to bring the reader up to date on what is known about them at this time.

### PEYOTILLO:

This small cactus is botanically called *PELECYPHORA ASELLIFORMIS*. It is also known sometimes as the hatchet cactus because of its oddly flattened tubercles. It is often found growing in the state of San Luis Potosi in central Mexico. The plant contains traces of mescaline too minute to have any effect. It also contains small amounts of anhalidine, anhaladine, hordenine, N-methylmescaline, pellotine, 3-demethyltrichocereine, B-phenethylamine, N-methyl-B-phenethylamine, 3,4-dimethoxy-B-phenethylamine, N-methyl-3,4-dimethoxy-B-phenethylamine, and 4-methoxy-B-phenethylamine. Most of these are found in peyote but in much larger quantities.

### TSUWIRI:

The botanical name of this cactus is *ARIOCARPUS RETUSUS*. The Huichol name tsuwiri means False Peyote. These people make long pilgrimages to the sacred places where peyote grows in search of that sacrament. They believe that if a person is has not been properly purified the spirits will lead him to the False Peyote and if he partakes of it, he will suffer madness or at least a bad trip. The plant is known among some tribes as Chautle or Chaute. These names are also used for other *Ariocarpus* species. This cactus contains hordenine, N-methyltryamine in fairly small amounts (about 0.02 percent) and traces of N-methyl-3,4-dimethoxy-B-phenethylamine, and N-methyl-4-B-phenethylamine. Aside from these alkaloids it also contains a flavone called retusin (3,3',4',7-tetramethoxy-5-hydroxyflavone). Although alkaloid content may vary some at different seasons or stages of growth, from the scientific point of view the amounts present in this plant appear insufficient to produce any psychopharmacological response.

**SUNAMI:** This plant, *ARIOCARPUS FISSURATUS*, has been used in folkloric medicine of Mexico and southwestern USA. It is believed to be more potent than peyote and is used in the same manner as that cactus or made into an intoxicating drink. Among some tribes it is known as Chaute (a generic term for *Ariocarpus* species), living rock, or dry whiskey. The latter name, however, is often used for peyote and other psychoactive cacti. There are two varieties of *A. fissuratus*: var. *lloydii* and var. *fissuratus*. Both have about the same phytochemical makeup. The plant contains mostly hordenine, less N-methyl-tyramine and some N-methyl-3,4-dimethoxy-B-phenethylamine. Two other species, *A. kotschoubeyanus* also known as Pata De Venado or Pezuna De Venado, and *A. trigonus* also contain these alkaloids.

**DOÑANA:** This small cactus, *CORYPHANTHA MACROMERIS*, from northern Mexico has been found to contain macromerine, a phenethylamine drug reputed to have about 1/5 the potency of mescaline. It also contains normacromerine, N-formylnor-macromerin, tyramine, N-methyltyramine, hordenine, N-methyl-3,4-dimethoxy-B-phenethylamine, metanephrine, and synephrine (a macromerine precursor). Other *coryphantha* species which contain macromerine with most of these other alkaloids include: *C. pectinada*, *C. elephantideus*, *C. runyonii* and *C. cornifera* var. *echinus*. Most of these alkaloids with the exception of macromerine have also been found in other varieties of *C. conifera* and in *C. durangensis*, *C. ottonis*, *C. poselgeriana* and *C. ramillosa*. Considering that there is usually no more than 0.1 percent macromerine in Doñana and that a gram or more of this alkaloid may be needed to produce a psychotropic effect, one would have to consume more than a

kilo of the dried cactus or 20 pounds of the fresh plant. Clearly this is not possible for most humans. If one wishes to experiment with the hallucinogenic properties of Doñana, it is necessary first to make an extraction of the mixed alkaloids. Methods for this are given latter in this guide.

**DOLICHOTHELE:** Several tribes occasionally use any one of several species of Dolichothele as a peyote-like sacrament. These include *D. baumii*, *D. longimamma*, *D. melalenca*, *D. sphaerica*, *D. surculosa*, and *D. uberiforma*. Recent investigations have revealed in these the presence of small amounts of the alkaloids N-methylphenethylamine, B-O-methylsynephrine, N-methyltryamine, synephrine, hordenine, and dolichotheline (N-isovalerylhistamine).

**MISCELLANEOUS:** Several other cacti have been used by the Tarahumares as peyote substitutes. Among these are *Obregonia denegrii*, *Aztekium ritterii*, *Astrophytum asterias*, *A. capricorne*, *A. myriostigma* (Bishops cap), and *Solisia pectinata*. The Tarahumares also consume a cactus which they call Mulato (*Mammillaria micromeris*) and claim that it prolongs life, gives speed to runners, and clarifies vision for mystical insights. Another cactus similarly employed is known as Rosapara (*Epithelantha micromeris*) is believed by many botanists to be the same species as Mulato, but at a later vegetative stage. The large cactus *Pachycereus pecten-aboriginum*, known locally as Cawe, has occasionally been used as a narcotic.

What little studies have been carried out on these cacti have revealed the presence of alkaloids most of the other species we have discussed, but no mescaline or macromerine. Many of these alkaloids have some psychopharmacological properties, but nothing to compare with those two drugs. Furthermore, the amounts of these alkaloids are usually so small as to be insignificant. For example, the species *Obregonia denegrii* contains tyramine 0.003 percent, hordenine 0.002 percent, and N-methyltyramine 0.0002 percent. These are all known sympathomimetics, but the percentages are far too minute to have any value. Several publications in recent years have mentioned the sacramental use of these cacti. As a result thousands of people have obtained these plants from cactus dealers and ingested them, usually with disappointing (and sometimes nauseating) results. Sadly many of these cacti are quite rare. If too many people destroy them experimentally, they may become a seriously endangered species. The most suitable cacti for a true psychedelic experience are peyote, which is for the most part illegal, and several species of *Trichocereus* (such as San Pedro), which are still legal.

**SAN PEDRO:** This cactus has gained considerable fame in the past five years after numerous reports that it is hallucinogenic, contains mescaline, and is readily available from cactus nurseries. This plant known botanically as *Trichocereus pachanoi*, is native to the Andes of Peru and Ecuador. Unlike the small peyote cactus, San Pedro is large and multi-branched. In its natural environment, it often grows to heights of 10 or 15 feet. Its mescaline content is less than that of peyote (0.3 – 1.2 percent), but because of its great size and rapid growth, it may provide a more economical source of mescaline than peyote. One plant may easily yield several pounds of pure mescaline upon extraction. San Pedro also contains tyramine, hordenine, 3-methoxytyramine, anhalanine, anhalonidine, 3,4-dimethoxyphenethylamine, 3,4-dimethoxy-4-hydroxy-B-phenethylamine, and 3,5-dimethoxy-4-hydroxy-B-phenethylamine. Some of these are known sympathomimetics. Others have no apparent effects when ingested by themselves. It is possible, however, that in combination with the mescaline and other active compounds they may have a synergistic influence upon one another and subtly alter the qualitative aspects of the experience. It is also possible that any compounds in the plant which act as mild MAO inhibitors will render a person vulnerable to some of the above mentioned amines which would ordinarily be metabolized before they could take effect.

The effects of San Pedro are in many ways more pleasant than those of peyote. To begin with, its taste is only slightly bitter and the initial nausea is not as likely to occur. When the full psychotropic experience takes hold it is less overwhelming, more tranquil and not nearly as physical as that from peyote.

San Pedro may be eaten fresh or dried and taken in any of the manners described for peyote. Cuttings of San Pedro sold in the USA are usually about three feet long by four inches diameter. A piece 4–8 inches long will usually bring about the desired effect. The skin and spines must be removed. The skin should not be thrown away, however. The green tissue close to the skin contains a high concentration of mescaline. Some people chew the skin until all the juices are extracted. If you don't what to do this, the skins can be boiled in water for several hours to make a potent tea. The woody core of the cactus cannot be eaten. One can eat around it like a corn cob. The core does not have much alkaloid content, but can be mashed and boiled as a tea for what little is there.

To dry San Pedro slice the cactus into disks (actually stars) 1/2 inch thick and dry thoroughly in the sun or in an oven at 250 degrees F. The spines must be removed either before drying or before chewing. Also one must be careful of the splinters from the woody core.

If a tea is made from fresh San Pedro, the cactus must be either sliced, chopped or crushed before boiling.

San Pedro is a hardy cactus and endures cold climates quite well. It grows at altiudes from sea level to 9000 feet high in the Andes where it is most frequently found on western slopes. The soil in this region is very rich in humus and various minerals. This helps in the production of mescaline and other alkaloids.

There are several cacti which look much like San Pedro and have even been mistaken for it by trained botanists. In 1960 when Turner and Heyman discovered that San Pedro contained mescaline they erroneously identified the plant as *Opunita cylindtica*. A few other South American species of *Trichocereus* also contain mescaline with related alkaloids. These include: *T. BRIDGESII*, *T. MACROGONUS*, *T. TERSCHECKII*, and *T. WERDERMANNIANUS*.

There is evidence that the ritualistic use of San Pedro dates back to 1000 BC. Even today it is used by Curanderos (medicine men) of northern Peru. They prepare a drink called CIMORA from it and take this in a ceremonial setting to diagnose the spiritual or subconscious basis of a patient's illness.

## 8. CULTIVATION OF PSYCHOACTIVE CACTI

Any cactus can be grown from either seed or cutting. Seed grown plants can take many years to develop to a usable size, but should ultimately provide strong, healthy stock from which cuttings may be taken. Plants have to grow through the lengthy seedling stage. A San Pedro plant started from seed may be no more than 1/2 inch high after it's first year and perhaps an inch high after it's second; It's diameter being 1/8–1/4 during this time. A cutting of San Pedro may be 2 feet high by 4 inches diameter when planted. After 6 months it might easily gain 4–6 inches in height, send forth one or two branches 6–8 inches long by 2 inches diameter, and have sprouted several branch buds which will do the same within the next six months. When these offshoots are 6 inches or more long they may be broken off and planted following the instructions below. Or they may be allowed another 6 months growth until they deepen from pale to dark–green to give them time to accumulate alkaloids and then consumed.

Live plants of any of the species mentioned in this guide – with the exception perhaps of peyote – can be purchased from suppliers named at the end of this chapter. Freshly harvested peyote cuttings are frequently available on the underground market for 50 cents to one dollar per button. When selecting peyote cuttings for planting choose ones which are firm and unbruised with at least 1/2 inch of taproot below the top. If the bottom of the taproot is still delicate where it has been cut, the button should be placed bottoms up in partial shade for a day or two until the severed area has a dry corky texture. If this is not done, the plant will be prone to rot.

The best soil mix can be prepared from 3 parts coarse sand, 1 part loam and 1 part leaf mold. Bake this mixture in an oven at 400 degrees F for an hour to kill fungus, bacteria, weed seeds and insect eggs. After the soil mix has cooled it is ready to use. The taproot of the plant may be dipped in a rooting mixture, such as ROOTONE, before planting. This enhances root development and hinders decay. Place the bottom just deep enough so that the soil does not quite touch the green part of the plant. The soil should be kept slightly moist and evenly so. If you are planting a tall cactus like San Pedro, the cutting should be placed deeply enough in the soil that it will have sufficient support to stand. San Pedro type cacti can also be laid upon the ground and will send down roots from their sides while the buds grow upwards. San Pedro can grow well in almost any soil as long as there is decent drainage.

Cacti tend to grow mostly during spring and autumn, to send down roots in the summer, and to rest through winter. Although cactus cuttings may be planted anytime of the year they stand the best chance if planted in the late spring. They should be watered thoroughly once or twice a week depending upon how rapidly moisture is lost. The soil an inch below the surface should always contain some moisture. Watering can be cut back to less than half during the winter.

## 9. INCREASING THE POTENCY OF PSYCHOACTIVE CACTI

There are several factors which influence production of mescaline and related alkaloids in cacti. Presence of a wide variety of trace minerals is important. Occasional watering with Hoagland A–Z trace mineral concentrate provides these minerals. Combine 1 part concentrate with 9 parts water and water cacti with this once every two months.

Experiments conducted by Rosenberg, Mclaughlin and Paul at the University of Michigan, Ann Arbor in 1966 demonstrated that dopamine is a precursor of mescaline in the peyote cactus. Tyramine and dopa were also found to be mescaline precursors, but not as immediate and efficient as dopamine. It appears that in the plant tyrosine breaks down to become tyramine and dopa. These then recombine to form dopamine which is converted to nor–mescaline and finally to mescaline. One can take advantage to this sequence by injecting each peyote plant with dopamine 4 weeks prior to harvesting. Much of the dopamine will convert to mescaline during this time, giving a considerable increase in the alkaloid of the plant. Prepare a saturated solution of free base dopamine in a .05 N solution of hydrochloric acid and inject 1–2 cc into the root of each plant and the same amount into the green portion above the root. Let the needle penetrate to the center of the plant, inject slowly and allow the needle to remain in place a few seconds after injection. It is best to deprive the plant of water for 1–2 weeks before injection. This makes the plant tissues take up the injection fluids more readily. If dopamine is not available, a mixture of tyramine and dopa can be used instead 6 weeks before harvesting for comparable results. San Pedro and other mescaline–bearing cacti can be similarly treated for increased mescaline production. Inject at the base of the plant and again every 3–4 inches following a spiral pattern up the length of the plant. A series of booster injections can be given to any of these cacti every 6–8 weeks and once again 4 weeks before harvesting for greater mescaline accumulation.

It is also possible to increase the macromerine and nor–macromerine content of Doñana cacti using tyramine or DL–norepinephrine as precursors. Injections should be given 20–25 days before harvesting. Series of injections can be given 45 days apart for higher alkaloid accumulation.

## 10. EXTRACTING PURE MESCALINE FROM PEYOTE OR SAN PEDRO CACTUS

The isolation of mescaline from cacti containing this alkaloid is not difficult to perform and is perhaps one of the most rewarding alchemical processes that one can attempt. The chemicals required for this process are readily available and their purchase arouses no suspicion or interest on the part of Government agencies. The equipment employed is not expensive or particularly complicated or can be constructed very easily from ordinary household items. The entire process can be carried out in any kitchen in the matter of hours by following the instructions below and in the final stages one can verify the success of the procedure by actually watching the crystals of mescaline precipitate in the solution. One kilo (2.2 lbs) of dried peyote buttons may yield between 10 and 60 grams of pure white needle crystals of mescaline depending on the potency of the plants used. On average the yield is about 20 grams. The usual underground price of a kilo of dried peyote ranges between \$125 and \$250 (25 to 50 cents per button). From indians in the southwestern USA the price is closer to \$50 (10 cents per button). The street price for a gram of pure mescaline is \$20 to \$30 – if one is lucky enough to find it. One can obtain from a kilo of dried peyote \$200 to \$1200 worth of mescaline. If San Pedro is employed one may anticipate a yield of 3 to 12 grams of mescaline per kilo of dried cactus. One can legally purchase a kilo of dried San Pedro for \$5 to \$10 and from it extract \$60 to \$250 worth of pure mescaline.

Grind a kilo of the dried cactus, place this in a large pressure cooker, cover with distilled water, and boil for 30 minutes. Strain the liquids and save them. Return the pulp to the pot, add more water and boil again for 30 minutes. Strain the liquids and combine them with the first strainings. Repeat this process about five times or until the pulp no longer has a bitter taste. Discard the pulp and reduce the volume of the combined strainings by boiling in an open pot. *Do not use aluminum ware.* When the liquids have been concentrated to the thickness of cream (about one quart), stop the boiling and stir in 400 grams of sodium hydroxide (lye). This makes the mescaline more soluble in benzene and less in water. If a large separatory funnel is available pour the liquids into it and add 1600 ml of benzene. Shake the funnel well for five minutes and let it stand for two hours. If a separatory funnel is not available the process can be carried out in a one gallon jug with a siphon attached.

After standing for 2 hours the water layer will settle to the bottom and the benzene layer will float to the top. Between the two layers will be a thin emulsion layer of mixed water and benzene. Drain off the water and emulsion layers if you are using a separatory funnel or siphon off the benzene layer if you are using the makeshift jug-siphon apparatus. Be certain that neither the water or emulsion layers get into the benzene layer when separating. If any of these layers do get into the benzene during separation pour everything back into the separator, let it stand and repeat the separation more carefully. It is better to leave some benzene layer in the water and emulsion than to get emulsion and water into the benzene. Nothing will be wasted. All of the benzene which contains the mescaline will eventually be salvaged. Sometimes the layers will fail to separate properly. If this is the case immerse the funnel or jug in a deep pot of hot water for two hours. This will break up the emulsion and bring about the separation.

Prepare a solution of 2 parts sulfuric acid and one part water. (never add water to the acid or it will splatter; add the acid a little at a time to the water by pouring it down the inside of the graduate or measuring cup containing the water.) Add 25 drops of the acid solution one drop at a time to the benzene extracts. Stopper the jug and shake well for one minute. Then let stand for five minutes. White streaks of mescaline sulfates should begin to appear in the benzene. If these do not appear, shake the jug more vigorously for two to three minutes and let it settle for five more minutes. I have found that when extracting mescaline from San Pedro it is sometimes necessary to shake the mixture more thoroughly and for a longer time to get the mescaline streaks to form. This is probably because of the lower mescaline content in the plant. This would also apply to any peyote that does not have a high mescaline content. After the streaks appear add 25 more drops of the acid solution in the same manner, shake as before and let settle for ten minutes. More streaks will appear. Add 15 drops of acid, shake and wait 15 minutes for streaks to form. Add 10 drops, shake and wait about 30 minutes. Test the solution with wide range pH paper. It should show that the solution is between pH 7.5 and 8. Allow

the mescaline sulfate crystals to completely precipitate. Siphon off as much of the benzene as possible without disturbing the crystals on the bottom of the jug.

The next steps are to salvage any mescaline still in the water and emulsion layer. Combine the benzene siphonings with the water/emulsion layer, shake these well together for 5 minutes and let settle for two hours as before. Carefully remove the benzene layer, treat it again with acid, precipitate the crystals and siphon off the benzene as in the previous steps. Recombine the siphoned benzene with the watery layer and repeat this again and again until no more crystals precipitate. Siphon off as much benzene as possible without drawing crystals through the siphon.

The next step involves removing the remaining benzene from the crystals. There are two methods to choose from. The first is the quickest, but requires ether, which is dangerous and often difficult to procure. Shake up the crystals with the remaining benzene and pour it into a funnel with filter paper. After the benzene has passed through the filter rinse the empty jug with 100 ml of ether to salvage any crystals in the jug and pour the ether over the crystals in the filter. After the ether has passed through the filter repeat the rinsing with another 100 ml of ether. Then let the crystals dry. If ether is not available or you do not wish to use such a highly combustible substance, the precipitate and residual benzene can be poured into a beaker. The jug should be rinsed several more times with a little benzene and added to the beaker so no crystals are left behind. The beaker is then placed in a heat bath until all of the benzene has been evaporated.

The next step is to purify the mescaline sulfate crystals. Dissolve the dry crystals in 200 ml of near-boiling distilled water. Add a pinch of activated charcoal (Norite) and filter while still hot through number 2 filter paper. The hot water which contains the mescaline will pass through the filter. The Norite absorbs impurities from the mescaline. After the liquids have passed through the filter pour a little more hot water over the filter to rinse through any remaining mescaline which may have impregnated the filter paper. Add 10 percent ammonia solution a few drops at a time to the hot filtrates until the solution registers between pH 6.5 and 7. Place a boiling stone in the solution and reduce its volume to 75 ml by boiling. Remove the boiling stone and allow the solution to cool to room temperature. Place the solution in a freezer or in a refrigerator set to the coldest possible temperature and allow the solution to cool to almost freezing. Tiny white needle-like crystals form around the bottom and sides of the beaker. Break up the crystals with a glass stirring rod while the solution is still ice cold and pour through a filter. Mescaline sulfate is insoluble in near freezing water and will not pass through the filter. Rinse the beaker with fresh ice water and pour this over the filter. The crystals will now be pure white and can be dried under a heat lamp or in an oven at 250 degrees F. More mescaline can be salvaged from the water that has passed through the filter by boiling these liquids down to about 20 ml, adding Norite while hot, filtering through number 2 paper as before, chilling the filtrate to near freezing as once before, filtering while cold, rinsing with ice water and drying the crystals. This repetition should obtain at least two more grams of mescaline sulfate. If large volume mescaline extraction is being conducted it would be worthwhile to repeat this salvaging procedure several more times.

## 11. MIXED ALKALOID EXTRACTIONS

There are numerous methods for extracting a mixture of the alkaloids from cacti. Different methods may result in varying degrees of purity. For example, the dried, pulverized material can be defatted with petroleum ether or lighter fluid prior to extraction to remove lipid content; solvent combinations such as methanol/chloroform/ammonium hydroxide can be used for extracting; The extractions can be made acidic (pH 9.5) with 1-N hydrochloric acid, filtered and washed in a separatory funnel or improvised siphon-jug apparatus with diethyl ether, neutralized with ammonium hydroxide and evaporated to dryness. However, most of these solvents are difficult for the non-professional to obtain. Perhaps it is just as well since many of these solvents are either toxic or explosive if handled improperly. Also, we do not always know precisely what we are trying to extract. Some of the active principles may be non-alkaloidal. Too much purification might remove some of the active substances. The approach given here employs materials which may be purchased inexpensively at any supermarket and are safe to work with. This procedure extracts all of the alcohol and water-soluble alkaloids and non-alkaloidal materials and permits only the fibrous pulp to be discarded.

Pulverize the dried cactus (tufts and spines need not be removed). Prepare a mixture of two parts isopropyl rubbing alcohol and one part clear, non-sudsing, unscented and untinted ammonia. Make the pulverized material soggy with this mixture and allow it to stand covered overnight. Do not use aluminum or iron wares during any of these steps. After soaking, cover the mash with isopropyl alcohol and boil in a heat bath for six hours. Strain the liquids through muslin and press as much liquid as possible from the pulp. With fresh alcohol repeat the boiling and straining three more times. Combine the strained liquids. Evaporate this in a heat bath until only a tar remains. (When evaporating a solvent use an electric range or hot plate rather than a gas stove. Have adequate ventilation and avoid breathing the fumes.) The tar can be further dried by spreading it thinly on a baking tray and placing it in an oven set at the lowest possible heat. Remove the tray once every fifteen minutes to examine the material. When it appears to be almost dry place it back in the oven, shut the heat off, and let it stay there until the oven cools.

## 12. DICTIONARY OF CACTUS ALKALOIDS

- Anhalidine: Tetrahydroisoquinoline alkaloid (2-methyl-6,7-dimethoxy-8-hydroxy-1,2,3,4-tetrahydroisoquinoline) Found in Lophophora and Pelecyphora.
- B-O-methylsynephrine: Phenolic B-phenethylamine found in citrus trees and some cacti. No data on pharmacology, but similar compound B-O-methylepin-ephrine produces considerable CNS stimulation.
- 3-dimethyltrichocereine: B-phenethylamine alkaloid (N,N-dimethyl-3-hydroxy-4,5-dimethoxy-B-phenethylamine). Found in Pelecyphora and some Trichocereus species.
- Dolichothele: Imidazole alkaloid properly known as N-isovalerylhistamine or 4(5)-[2-N-isovalerylaminoethyl]imidazole. Found only in Dolichothele and Gymnocactus species. Pharmacological action still unknown.
- Homoveratrilamine: a dimethoxy form of the mescaline molecule (3,4-dimethoxy-B-phenethylamine). It has no activity by itself, but may alter the mescaline experience slightly when taken in combination. It is found in San Pedro cactus and in the urine of certain types of schizophrenics.
- Hordenine: Phenolic B-phenethylamine found in barley roots and several cacti. Also known as anhaline (N,N-dimethyltyramine). Has mild sympatho-mimetic activity and antiseptic action.
- Macromerine: Nonphenolic B-phenethylamine (N,N-dimethyl-3,4-dimethoxy-B-hydroxy-B-phenethylamine. Found only in Coryphantha species. Reputed to possess 1/5 the potency of mescaline.
- Mescaline: Nonphenolic B-phenethylamine (3,4,5-trimethoxy-B-phenethylamine). Main psychoactive component of Peyote, San Pedro, and several other Trichocereus species. Also found in traces in Pelecyphorea.
- Metanephrine: Weak sympathomimetic found in Coryphantha species.
- 3-methoxytyramine: Phenolic B-phenethylamine found in the plant kingdom for the first time in San Pedro cacti. Also found in the urine of persons with certain types of brain disorders and cancer of the nervous system.
- N-methyl-3,4-dimethoxy-B-phenethylamine: Found in Pelecyphora aselliformis, Coryphantha runyonii and Ariocarpus species, but not in peyote. Has slight activity in depletion of cardiac norepinephrine.
- N-methylphenethylamine: Nonphenolic B-phenethylamine alkaloid recently found in the Dolichothele species. Also found in Acacia species and other plants. Goats and sheeps in Texas sometimes eat Acacia berlandia and suffer a condition known as limberleg or Guajillo wobbles. Pressor action of this alkaloid has been shown experimentally to occur with low toxicity. Phenalanine and methionine are it's biosynthetic precursors.
- N-methyltyramine: Phenolic B-phenethylamine found in some cacti, mutated barley roots and a few other plants. Probably an intermediate phytochemical step in the methylation of tyramine to form candicine. Has mild sympathomimetic action and probable antibacterial properties.
- Normacromerine: Nonphenolic B-phenethylamine (N-dimethyl-3,4-dimethoxy-B-hydroxy-B-phenethylamine) found in Coryphantha species. Shows less effect on rats than macromerine.
- Pellotine: Tetrahydroisoquinoline alkaloid (1,2-dimethyl-6,7-dimethoxy-8-hydroxy-1,2,3,4-tetrahydroisoquinoline) found in Lophophora and pelecyphora.
- Synephrine: Phenolic B-phenethylamine (N-methyl-4-hydroxy-B-phenethylamine) found in citrus plants, some cacti, and human urine. Well known sympathomimetic agent. Probably an intermediary in phytosynthesis of macromerine.
- Tyramine: Phenolic B-phenethylamine found in several cacti. Mild sympathomimetic with some possible antiseptic activity.

## 13. SUPPLIERS

The following companies are established cactus dealers. They carry San Pedro and other cacti mentioned in this guide at reasonable prices. When ordering from them do not inquire about the psychoactive potency or in any way hint that you are using the plants for such purposes. Before ordering from them request their catalog. Enclose \$1.00 to cover the cost of the catalog and mailing. If you wish to inquire about the availability of a species not listed, ask for it by its Latin botanical name. Do not inquire about the availability of *Lophophora williamsii* or you will arouse suspicion.

- Cactus Gem Nursery, 10092 Mann Drive, Cupertino, California 95014
- The Desert Plant, 2519 Durant Avenue, Berkeley, California 94704
- Desert Plant Company, PO Box 880, Marfa, Texas 79843