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PACIFIC INFORMATION SERVICE ON STREET-DRUGS
Volume 5 Nos. 3-6 May, 1977 Issue No. 21

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This is a very special blend of high quality Korean Ginseng leaves, Danakina, high grade Lobelia Herb, African yohimbe bark and hops. Guaranteed as best medium quality commercial weed. $2.50/oz., $7.00/4oz.

Organic Speed
Kola nut tea and Chia seeds for many hours of high-energy fun. $2.00/2oz. combination.

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"The Kind"
This is truly one of the finest organic stimulants available. $3.00/oz.

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Boté Two or Kava Root
Each has effects similar to mellow weed. Each $1.00/oz., $3.00/4oz.

Gotu Kola
The Cosmic Think Drink
$1.00/oz., $3.00/4oz.

Special Sample Deal
Send $1.00 and get one of each of the above (7ozs.) and save $2.50 for fast service and cash prepaid money order and 1 for shipping and handling.

Dept. H.T.

High Times, No.12, 1976.

"LEGAL HIGHS"—CONSTITUENTS,
ACTIVITY,
TOXICOLOGY,
and
HERBAL FOLKLORE

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A blend of pure Korean green leaves, Dianthus
leaves and high-grade Lobelia herb. Guaranteed as good as
medium-quality commercial weed. $2.50/oz., $7/4 oz.

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Kola nut tea and Chia seeds for many hours of high-energy fun. $2/1-ounce combination

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Each has effects similar to mellow acid. Each $1/oz., $3/4 oz.

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TRICHOCEREUS PACHEANOI

THE COSMIC COMBINATION  one
taste of each of the above — a $7 value
for only $5

HERBAL "OPPYUM"
The strongest, dreamlike preparation legally available. A natural
lethal product containing the substance leseroxanthin, the effects
of which resemble those but without the irrational side effects.
$0.00, $0.02/oz., $10.00/1/2 lb.
$40,000,000 units (2 ozs.)
$15,000,000 units (3 ozs.)

Note: The presence of advertisements for "legal highs" is not to be considered as either endorsement of their use or an offer to
sell them. They are included for illustrative purposes only.

The Editors.
**HALLUCINOGENIC**

**Hawaiian Baby Wood Rose Seeds** (Argyreia nervosa)
Legally sold for planting purposes only. Not intended for human or animal consumption. The seeds are shipped to you cleaned and free of poisons and pesticides. We water test all seeds to remove floaters. Thus giving you the highest quality seeds possible. Historical information included with each order. Immediate service. Prices include air mail postage.

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<td>1 lb (approx. 4000)</td>
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**SAN PEDRO CACTUS**

*Psychose's legal brother, having the same main active ingredient. Legally sold for planting purposes only. Not intended for human or animal consumption. Historical information included with each order. Immediate service. Prices include air mail postage.

*Limited quantities available.*

<table>
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**Super African Red**

Change your favorite green smoking herb to Super African Red by adding concentrated African Yohimbe Bark powder to each joint you roll. Free: 2 grams with any order of $15 or more.

**Legal Stash**

A superb legal blend created by Nature's Experience. This blend consists of Lemon Extract Flakes, Wild Lettuce Leaves, Hops and Damiana. We have tried all the blends available and we feel this blend is the best. *Not for use by children.*

**Organic Speed**

A fine blend of Kid's Natural powder, Damiana powder and raw Korean Red Ginseng Root powder.

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**Lettuce Extract**

For a relief from stress and anxiety, this blend is the best. *Includes Damiana*

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**Kava Kava Root**

A spiritual tonic. Great for relaxation.

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**Wild Mint**

A natural alternative to tobacco. IMPROVE YOUR VAPING EXPERIENCE.

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<td>8 oz</td>
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**Stash**

A fine blend of Lettuce Extract Flakes, Wild Lettuce Leaves, Hops and Damiana. We have tried all the blends available and we feel this blend is the best. *Not for use by children.*

**LEGAL GRASS**

Wild Lettuce, Korean Ginseng, yerba mate, Damiana, hops and other leafface extracts. For growing! It's legal. Unsold orders will be delivered full value.

**FREE WITH ANY PURCHASE**

Send Cash, Check or Money Order to:

**INTRODUCTION**

The decade of the 1970's can be characterized as a decade of polarization. The co-existence of extremes is not unusual in history and is not altogether surprising at the present time. However, what is unusual about the decade of the 1970's is the full spectrum of operating alternatives allowed to survive between the opposing extremes. In no instance is polarization more acute, and the alternatives more numerous, than in the drug scene.

One pole can be considered to be the professional pharmacist dispensing uniform-quality, fully labelled drugs which can be life-saving at costs ranging from $5 to $25 per prescription. If errors occur, the pharmacist, the physician, and the drug manufacturer can be sued for negligence in a court of law. All prescription drugs crossing a state are "endorsed" by the federal government as to quality, efficacy, and relative lack of toxicity at recommended dosages.

The other pole can be illustrated by the street-drug peddler "dispensing" variable-quality, unlabelled drugs which can be life-threatening at costs ranging from 15 to 10,000 times that paid to the pharmacist of equivalent amounts of active ingredient. If "medication" errors result, the street peddler and his suppliers are inaccessible for legal suit. Lastly the Food and Drug Administration does not provide "endorsement" of drug quality.

In the first instance, individuals take drugs because they are ill and they may resent the fact; in the second instance, drugs are taken recreationally by generally healthy individuals who then increase their chances for illness. An interesting polarization.

Between these poles, a new industry has evolved over the past 10 years. The selling of so-called "legal highs" in retail stores or by mail. Nationally distributed magazines now exist to champion and promote the merchandising of these agents. The Food and Drug Administration appears reluctant to monitor the apparently profitable "legal high" industry. Do "legal highs" deliver full value? Or do they represent just another commercially profitable rip-off? This presentation will debate briefly the efficacy and hazards of some of the more widely advertised "legal highs" now available.
I. Fam. EPHEDRACEAE (ONAGRAEACEAE)

Ephedra Species (1-16)

Common Names: Mormon Tea; Brigham Tea; Brigham Young Weed; Squaw Tea; Mexican Tea; Ephedra; Ma-Huang; Whore-House Tea.

INTRODUCTION

Ephedra species have a long history of use in Asia as medicinal agents in the treatment of asthma, rheumatism, syphilis, cardiac insufficiency, malarial fever, influenza, post-partum difficulties (unspecified), typhoid fever, joint pain, and to induce sweating (12). The early settlers of the western United States used a tea (whore-house tea) prepared from Ephedra nevadensis to treat venereal infections.

Ephedra and its main active constituent, ephedrine, was rediscovered in the western world in 1924 and promoted for the treatment of nasal congestion and asthma, the elevation of low blood pressure due to cardiac insufficiency and as a central nervous system stimulant for the treatment of narcolepsy (13). Attempts to synthesize ephedrine and related compounds led to the discovery of the amphetamines (10). These new drugs were found to be wonderful in combating fatigue, curbing the appetite and in reversing mild depression when taken orally or by injection (10). Amphetamine-containing inhalers were very popular for "curing" nasal congestion associated with the common cold and other conditions -- also the depression associated with influenza. Now the amphetamines are rigidly controlled.

Ephedrine hydrochloride, maximum of 25 mg. per dose (larger amounts per single dose require a physician's prescription) can be purchased without any restrictions. Pseudoephedrine, another Ephedra alkaloid is also available without restriction, provided the single dose unit does not contain more than 30 mg. Pseudoephedrine tablets (SudafedR) are presently promoted for the self-treatment of nasal congestion.

TOXICITY AND TOXIC EFFECTS

Clinical doses. The usual clinical dose of ephedrine hydrochloride is 25-50 mg. every four hours and the total daily dose should not exceed 150 mg. (13). The recommended dose of pseudoephedrine hydrochloride is 30-60 mg. every four hours (older children and adults) which amounts to a 180-360 mg. total dose for 24 hours (15). Ephedrine in particular will cause a rather long-lasting increase in blood pressure and dilatation of the pupils of the eyes. In addition, these drugs may cause in some persons nervousness, insomnia, tremor, vertigo (dizziness), headache, tachycardia (very rapidly beating heart), palpitation (pulsation of heart perceptible to person), sweating and a sensation of body warmth, nausea, vomiting, loss of appetite and occasionally cardiac arrhythmias (9). Chronic anxiety states have been seen in some regular users of these drugs (9).

Overdose. Clarke (16) reports that the estimated minimum lethal dose of ephedrine hydrochloride in children up to two years of age is 290 mg. and 2 gm. for adults.

The following symptoms are usually seen after the ingestion of excessive doses of ephedrine (single dose by an adult in excess of 500-1,000 mg.) (9,16): nausea, vomiting, chills, cyanosis (dark bluish or purplish color of the skin due to deficient oxygenation of the blood); excessive irritability; fever, tachycardia; dilated pupils and blurred vision; opisthotonos (tetanic spasm where body is arched and restine on the heels and head), convulsions; respiratory embarrassment which may be followed by coma and respiratory failure (9).

Ephedrine and pseudoephedrine are readily absorbed from the gastrointestinal tract and the nasal mucosa. These drugs are excreted, largely unchanged, by the kidneys and up to 75 percent of the dose is excreted within 12 hours. Generally, no drug can be detected in the urine 24 hours after the last dose (9).

Srivastava (14) of the National Botanic Gardens, Lucknow, India argues rather unsuccessfully that the Soma plant of Rig Veda is an Ephedra species.

II. Fam. ARACEAE

Acorus calamus L. (8,17-30)

(A. spurius Schott.)

Common Names: Calamus Root; Sweet Root; Sweet Flag; Sweet Cinnamon; Sweet Cane; Sweet Myrtle; Rat Root; Calamus.

INTRODUCTION

The calamus plant is native to eastern North America, temperate Asia and northern Europe (19). There is long history of medical use of the rhizomes and overground portions of this plant. In India, preparations made from the rhizomes are used as an aphrodisiac (29); in the treatment of asthma, cough; flatulences, dyspepsia, dysentery, convulsions, epilepsy, apoplexy, hysteria, insanity, and intestinal worms (28). In Pakistan, preparations made from the rhizomes are used as a nerve tonic and as an emetic; for the treatment of dyspepsia and colic, and as a remedy in the treatment of asthma, hysteria and neuralgia (8).

Some of the older (over age 40) Cree Indians in northern Alberta, Canada use calamus (rat root) for oral hygiene, as an antifatigue medicine; as an analgesic for relieving toothache (eugenol, a minor constituent of the oil is a topical anesthetic) and headache; and to relieve asthmatic attacks and the symptoms of excessive alcohol ingestion (30).

The rhizomes have a volatile oil content of 1.5 to 4.5 percent (17, 39). The essential oil is a mixture of compounds: asarone and G-an- aromo 70 to 80 percent (26). Some of the minor constituents are eugenol, pinene, camphene, and Caryophyllene (23).

Pharmacological testing of calamus rhizomes and the essential oil in animals has shown that the volatile oil contains the active
III. Fam. PIPERACEAE

Piper methysticum Forst (2,21-23,31-41)

(Macropiper methysticum Miq., Piper spurium Forst. in Neobiana Sol., P. decumanum Uplz.)

Common Names: Kava-Kava; Kava; Awa; Methysticum.

INTRODUCTION

The plant Piper methysticum and its role in the social and religious life of the people in the South Seas was first brought to the attention of the western world by Captain James Cook in 1768 (33). The slim volume by Steinmetz (40) gives an excellent review of the botany, history, use, chemistry, and effects of this plant. Shulgin (34) and Buckley (35) have written excellent articles on the chemistry and pharmacology of this plant.

During the early part of this century, kava preparations were used in the United States in the treatment of gonorrhea, gout, rheumatism, dropsy, vaginitis, chronic cystitis, and retention of urine (39). Gonean, a 20 percent solution of kava resin in saffron oil was used in the treatment of gonorrhea, urinary tract irritations, and also for nocturnal incontinence (41).

The roots and rhizomes of P. methysticum were and are used to prepare a refreshing and mildly intoxicating beverage in many areas of the South Seas (33,40). Shulgin (34) classifies it as an excitant -- serving a role similar to coffee at social gatherings and alcohol at the cocktail party. Kava has been shown to possess some sedative and muscle relaxant properties (34). Apparently this activity is associated with a series of arylationene-d-arylethylene derivatives such as methysticin, dihydromethysticin, kawain, dihydrokawain, and demethoxy-yangonin (34).

Kava roots and rhizomes contain two yellow pigments, flavokawain A (2'-hydroxy-4',5'-dimethoxychalcone) and flavokawain B (2'-hydroxy-4',5'-dimethoxychalcone) which probably account for the skin discolorations (34) and the skin lesions (40) observed with chronic use of kava as a beverage.

TOXICITY

Apparently this plant has a very low degree of toxicity. There are no reports of acute intoxications but regular use may lead to skin pigmentation and lesions (34,40).

CONCLUSIONS

The powdered roots and rhizomes of P. methysticum are currently being sold in health food stores. The product is labelled as "Hawaiian Kava Kava, Piper methysticum, Awa root finely ground."

Directions are supplied for preparing an aqueous extract. The use of kava as a mild excitant instead of alcohol seems to have some advantages, since the mild sedation apparently does not enhance aggressive tendencies. Probably it's use would reduce motor skills and automobile driving while under the influence should be avoided.

IV. Fam. MYRISTICACEAE

Myristica fragrans Houtt. (2,9-11,16,20-23,25,29-30,36,42-52)

Common Name: Nutmeg; Mace.

INTRODUCTION

Nutmeg and mace are products of the same tree Myristica fragrans. This tree has a fruit similar to an apricot or peach in appearance. When ripe, the husk splits open to expose a single glossy brown nut (nutmeg) enclosed by a scarlet aril which when dried is known as mace (48).

Nutmeg in particular and mace to a lesser extent have been used for the treatment of a wide variety of medical and health problems such as digestive disorders, rheumatism, cholera, madness, flatulence used to promote menstrual flow in delayed menstruation) and as an abortifacient (52). Towards the end of the 19th century, nutmeg became known in North America and England as an emmenagogue and abortifacient and apparently was used frequently for such purposes — usually with negative results (47). Nutmeg and mace are considered to be aphrodisiacs and are used as such in Yemen (10) and in India (29).
CONSTITUENTS AND ACTIVITY

Apparently the essential oil of nutmeg is responsible for the effects seen after the ingestion of nutmeg (42-48). The aromatic fraction of oil of nutmeg, obtained from 20 gm. of nutmegs, was reported to consist of: myristicin 210 mg.; elemicin 70 mg.; isoelemicin 3 mg.; eugenol 5 mg.; isoeugenol 6 mg.; methyleugenol 18 mg.; methyisoeugenol 11 mg.; methoxyeugenol 8 mg. (25). Nutmegs, depending upon geographical origin and length of storage, usually contain from 5 to 15 percent volatile oil (47).

Myristicin was originally thought to be the only active compound in nutmeg but pure myristicin does not reproduce the results obtained when the whole nutmeg is used, both in man and animals (20,45,47). It has been suggested (20,45,51) that myristicin may be aminated in the body to form the amphetamine-type psychotomimetic compound MMMA (3-methoxy-4,5-methylenedioxyamphetamine) and elemicin in a similar manner to form TMA (3,4,5-trimethoxyamphetamine). If so, these metabolites would be responsible for some of the effects of nutmeg intoxication.

TOXICITY

Many descriptions of nutmeg intoxication can be found in the literature (30,43-44,51-52). The ingestion of 5 to 15 gm. of nutmeg will usually result in a toxic state characterized by a variety of symptoms. Symptoms usually appear within 3 to 6 hours after ingestion. There is a more or less severe physical collapse characterized by a weak pulse, hypotension, clamminess of the extremities, giddiness, vertigo, nausea, and a feeling of congestion and pressure either in the region of the chest or lower abdomen. Some 5 to 12 hours later an extended period of alternating delirium and stupor persists, usually resolved by a heavy sleep. Frequently the person becomes terrified and afraid of impending death or doom. In general, recovery occurs within 24 hours but with excessive dosage the duration of the intoxication may extend to several days, frequently marred by severe headaches and spells of dizziness (20,47,52).

The intoxicating effects produced by the ingestion of nutmeg are variable. These variations in response are due to the loss of the volatile oil from the finely ground nutmegs that are sold as a spice. Whole nutmegs do not lose the volatile oil nearly as rapidly as the powdered material.

It should be mentioned that the perceptive but anonymous author of Legal Highs (11) wrote the following about nutmeg:

"Beneficial as a spice or in small amounts; not recommended as hallucinogen."

V. Fam. PAPAVERACEAE

Eschscholtzia californica Cham. var. alba (2,6-7,11,55)

Common Name: California Poppy.

INTRODUCTION

The California poppy is a member of the same plant family (Papaveraceae) as the opium poppy (Papaver somniferum L.), but it does not contain any of the narcotic alkaloids such as morphine and codeine (6-7).

The two alkaloids (coptisine and sanguinarine) which are found in the California poppy, are also found in most if not all of the members of the poppy family. These alkaloids and others that are found in the California poppy have no identifiable physiological activity (6-7,55).

This plant can be considered non-toxic and without any misuse (abuse) potential. The alleged activities after smoking (2,11) are probably without foundation or may be attributed to added chemicals or plant material.

VI. Fam. LEGUMINOSAE

Cytisus scoparius (L.) Link (2,5,9-11,25,49,54-57)

(Sarothamnus scoparius)

Common Names: Broom; Broom Tops; Scotch Broom; Sarothamn Herb.

INTRODUCTION

Broom or Scotch broom is a plant that has been introduced into the United States (5). It was originally grown as an ornamental plant but has escaped and is found growing wild in many areas of the country.

At one time the fresh or dried tops of this plant were used as an emetic and purgative in large doses (56) and smaller amounts as a laxative and as a diuretic in dropy (56).

Bentley and Trimen (56) state that the reports of alleged narcotic properties of broom come from the observation that shepherds:

"...are well acquainted with the narcotic properties of broom, from noticing that sheep after eating it become excited and stupified."
**Constituents and Activity**

The overground portions of *Cyfisus scoparius* and the seeds, contain the alkaloids sparteine, lupinine, sarothamnine and genisteine (55). Apparently the very toxic alkaloid, cytisine is not present in this species (5,55-56).

Sparteine, the main alkaloid in this plant (approximately 1.5 percent) as the sulfate is used as an oxytocic for the induction of labor at term. Initially 75 mg. is given by intramuscular injection; then 75 to 150 mg. per hour, if necessary, to a maximum dose of 600 mg. (5).

**Toxicity**

Apparently very high doses, much more than would be available by smoking the dried plant, are required for a toxic response (5,16). There is no evidence that broom (*C. scoparius*) has been used as an intoxicant or hallucinogen. The reported sedative effects after smoking (2,11) have not been verified. Apparently this plant is not very toxic and the use of it as a "legal high" probably would not precipitate a severe toxic episode. Prolonged and regular use of broom as a smoking substance may have deleterious effects upon the user, although there is no evidence for this statement.

*Cytisus laburnum*, commonly known as laburnum or golden chain is very toxic and must be avoided. All parts of this plant contain the extremely toxic alkaloid cytisine (16).

**Sophora secundiflora** (Ort.) Lagasse ex De Candolle (2,9-11,16,25,49, 54-55)

**Common Names:** Mescal Beans; Red Beans; Coral Beans; Colorines.

**Introduction**

The use of the seeds of *Sophora secundiflora* by the indigenous populations of parts of Mexico and the United States as a psychotropic agent is rather well documented (25,49,54). Mescal beans have been found in deposits from old living sites which date back to 7,000 BC and certain evidence would suggest that these seeds were used as psychotropic agents (54).

**Constituents and Activity**

The main active constituent of the seeds of *S. secundiflora* is the very toxic alkaloid cytisine (55); also known in the older literature as baptitoxine, sophorine, ulexine (55), laburnine, or cytiton (16). Cytisine was once used as a respiratory stimulant in doses up to a maximum of 3 mg. daily (16).

**Toxicity**

The ingestion of a toxic amount of mescal beans or the pure alkaloid cytisine will produce the following symptoms (9):

"Ingestion is followed by a variable symptomless period, then excessive salivation, burning of mouth and oesophagus, thirst and nausea. Violent and persistent vomiting, sometimes haemorrhagic. Severe abdominal pain, meteorism and diarrhoea. Skin cold and clammy, pulse at first rapid, then slow and irregular, respiration dyspnocic and sometimes Cheyne-Stokes in type. Headache, staggering gait, vertigo, scomolence. Muscular twichings and cramps. Aphasia, visual disturbances, delerium and hallucinations. Unconsciousness. Death occurs by respiratory paralysis, or later from ureaemia following oliguria and anuria."

A lethal dose of the seeds for a horse is 0.5 gm./kg. and for a dog, 6.0 gm./kg. While the lethal dose for the alkaloid is 3-5 mg./kg. for dogs and cats, the corresponding human dose apparently is not known (16).

Fortunately, the use of these seeds as a "legal high" is not recommended by the anonymous author of Legal Highs (11). Ingestion of the seeds of *S. secundiflora* for experimentation or intoxication could be a very dangerous and potentially lethal adventure (9,16).

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**VII. Fam. Aquifoliaceae**

*Ilex paraguarensis* St.Hill. (2,5-7,9,11,13,16,22,58)

Common Names: Mate; Paraguay Tea.

**Introduction**

Mate consists of the dried leaves of the plant *Ilex paraguarensis* which are used to prepare a tea, drunk for its stimulating properties (5). Medicinally, mate in large doses is used as a laxative or purgative and sometimes for its diuretic properties (5).

**Constituents and Activity**

The leaves of *I. paraguarensis* contain up to 2 percent caffeine (51) and also some of the alkaloid theobromine (7). Caffeine is a mild central nervous system stimulant and diuretic, while theobromine has very little stimulant action but rather pronounced diuretic activity. Theobromine is still prescribed for its diuretic properties (13).

**Toxicity**

The toxicity of this plant is very low. Caffeine, the main ingredient, has not been the direct cause of any known deaths of adults (16). The regular ingestion of caffeine or caffeine-containing beverages (coffee, tea and cola drinks) may cause in some people: nervousness, insomnia, anxiety, headache, gastric upset, and nausea (9).
It has been estimated that a single dose of 10 gm. of caffeine could be a potentially lethal dose for an adult not accustomed to caffeine-containing beverages, but recovery after the ingestion of 30 gm. has occurred (9). Dimillo and Garriott (58) have reported a fatal case of caffeine poisoning following the ingestion of an over the counter (OTC) preparation by a 5 year old girl. They also state that a review of the literature revealed 5 other cases of caffeine poisoning.

VIII. Fam. STERCULIACEAE

Cola nitida (Ventenat) Schott et Endlicher (2,5-6,9,11,16,58)

Common Names: Kola; Cola; Kola Nuts; Gotu; Gotu Cola; Gooroo Nuts; Bichy Nuts; Goro; Gola; Gura Nuts.

INTRODUCTION

Kola is the dried cotyledon of Cola nitida and contains up to 3.5 percent caffeine (5) and less than 1 percent theobromine. The main use of cola nuts is to prepare a caffeine-containing extract used in several carbonated beverages of the cola type (5).

The central nervous system stimulation seen after the ingestion of cola nuts and the extracts is due almost entirely upon the caffeine content. The caffeine content is also the cause of any adverse reactions that may be seen with prolonged and chronic use of beverages containing cola extract (5,16).

IX. Fam. PASSIFLORACEAE

Passiflora incarnata L. (2,6-7,10-11,13,16,23,55,59)

Common Names: Passion Flower; Wild Passion Flower; May-Pop; Grenadille; Apricot Vine.

INTRODUCTION

The leaves and stems of Passiflora incarnata have been used as the source of preparations sold as nerve sedatives. Preparations made from passion flower were prescribed (13) for general restlessness, insomnia and certain spasmodic disorders. They have also been used in the treatment of some types of convulsions (unspecified). Passion flower has also been attributed with anodyne properties and used in the treatment of various neuralgias (13). Currently, it is suggested that smoking this herb will give a marihuana-like high and that the tea acts as a tranquillizer and sedative (11).

CONSTITUENTS AND ACTIVITY

The leaves and stems of this plant contain the alkaloids harmanine (banisterine, yageine, telepathine, leucoharmine) harmaline, harmine (passiflorine, arthine, joturine), and harmol (7,16). Harmanine and harmaline are both hallucinogenic and toxic (16). The injection of 150-200 mg. of harmine, into man, will produce vivid hallucinations (16), and an oral dose of 300-400 mg. will produce definite psychotic symptoms (16). Harmalone is approximately twice as toxic as harmine (55). Moderate oral doses will cause tremors and clonic convulsions (55).

TOXICITY

Toxic doses, probably in excess of 200 mg. orally, of harmaline will produce convulsions, soon followed by motor paralysis, marked central nervous system depression, decrease in body temperature, reduction in blood pressure due to pronounced weakening of cardiac muscle and respiratory paralysis (55).

X. Fam. TURNERACEAE

Turnera aphrodisiaca Ward (2,11,23,57,60-61)

Common Names: Mexican Damiana; Damiana; Old Woman's Broom.

INTRODUCTION

In the Bahamas, damiana leaves are boiled in water and the vapours inhaled to relieve headache (57). Bedwetters are given the tea to drink for 3 or 4 mornings "to strengthen their backs." (57)

Damiana leaves are reported to have aphrodisiac properties but there is no evidence to support this claim (61). In the past, damiana preparations have been used to treat impotency, but these preparations were not effective. Preparations made from damiana leaves have been used as: a general stimulant, aphrodisiac, tonic, diuretic, astringent, laxative, and also for the treatment of kidney, menstrual and pregnancy diseases (60).

CONSTITUENTS AND ACTIVITY

The leaves contain 0.2 to 0.9 percent of a volatile oil of undetermined composition, 6 percent of a hard brown resin, approximately 8 percent of a soft resin, about 3.5 percent tannin, and 6 percent starch (61). There is no evidence that this plant has any predictable physiological activity (57,60-61).
TOXICITY

Apparently this plant, *T. aphrodisiaca*, is relatively innocuous; a rather extensive literature search has failed to reveal any reports on toxicological problems.

XI. Fam. CACTACEAE (63-67)

Ariocarpus retusus Scheidweiller (10,25,27,62,69-70)

Common Name: False Peyote.

INTRODUCTION

False peyote is a globular cactus, 10-12 cm. in diameter, grey-green to purplish in color, with pink flowers (25). This cactus is found only in central and northern Mexico (25) where it grows in open, stony places.

A. retusus is apparently used as a hallucinogen in Mexico (27). A number of compounds have been isolated and identified from this cactus: N-methyl-3,4-dimethoxy-β-phenylethylamine, hordenine, N-methyl tyramine, and β-methyl-4-methoxy-β-phenylethylamine. Mescaline has not been found in this cactus (70). These compounds probably have very little or no sympathomimetic or hallucinogenic activity (69). Apparently the folk name, false peyote, has a chemical basis in fact.

Trichocereus pachanoi Britton & Rose (9-10,16,25,71-73)

(Common Name: San Pedro Cactus.

INTRODUCTION

The San Pedro cactus occurs in the Andean parts of Ecuador and Peru and probably in Bolivia, at altitudes between 6,000 and 9,000 feet (25).

Live cuttings of the San Pedro cactus are offered for sale in advertisements in magazines such as *High Times* (No. 10, June, 1976) at prices of $10/6" or $100/120". This cactus does have a history of folk use (71) in the diagnosis and treatment of illness. Both the folk healer and the patient drink a potion prepared from San Pedro cactus and after 8 to 12 hours the healer receives knowledge on the cause of the illness and prescribes the appropriate herbs for the patient (71).

CONSTITUENTS

Crosby and McLaughlin (72) have reported the isolation and identification of mescaline (0.33 percent of the freeze-dried material).

TOXICITY

An oral dose of 5 mg./kg. of pure mescaline will usually produce psychic effects and visual hallucinations in man (73). These effects appear within one to two hours and may persist for 12 hours (73). Other less desirable reactions from an effective dose of mescaline include anxiety, hyperflexia of limbs, and static tremors (73). The drug is usually taken orally and high doses invariably trigger a persistent vomiting; consequently a lethal dose of mescaline for man is not known (9,16). The ingestion of mescaline or mescaline-containing cacti may cause serious panic reactions in the naive user, or in an unaware individual receiving the drug as a "prank."

XII. Fam. CONVOLVULACEAE

Argyreia nervosa Boj. (10-11,21-22,25,36,68,70,74-77)

Common Names: Wood Rose; Baby Wood Rose; Hawaiian Wood Rose; Hawaiian Baby Wood Rose.

INTRODUCTION

The seeds of some members of the morning glory family (Convulvulaceae), particularly Ipomoea and Argyreia species, contain various amounts of ergot alkaloids (lysergic acid derivatives) (25,68,74-76). The seeds of these plants have a long history of use as intoxicants in religious ceremonies and in folk medicine (25,68). The reports of the use of these seeds as hallucinogens and the identification and isolation of hallucinogenic alkaloids (78) stimulated some of our population to ingest preparations of these seeds. Now, they are the subject of commercial exploitation in some of the "new generation" magazines such as *High Times*, *Head and Rush*.

Hawaiian wood rose seeds (Argyreia nervosa) are an example. An advertisement in *High Times*, No. 10, June 1976 made the following offer:

"...sold for planting purposes only. Not intended for human or animal consumption."

Yet the advertisement was headed "HALLUCINOGEN." The price quoted was: 20 seeds for $3.00, 100 seeds for $13.00 and one pound (approximately 4,000 seeds) for $300.00. In addition, they offered "historical information" with each order. One would suspect that the purchasers of these seeds are not all horticulturists.
CONSTITUENTS AND ACTIVITY

The seeds of *A. nervosa* contain large amounts of ergoline alkaloids including ergine (lysergic acid amide, LAA), isoergine (isolysergic acid amide, isoLAA), chanoclavine, ergonovine (ergometrine) and others (76). Some *Ipomea* species show a similar alkaloid content; for example *I. violacea* (badoh negro) have a total alkaloid content of approximately 0.06 percent (25) and ergine tends to predominate. Marderosian (76) wrote that an investigation of the alkaloid content of *A. nervosa* seeds yielded 0.55 mg. of isoergine and penniclavine, plus 0.76 mg. of ergine for each one gram of fresh seeds. Lewis and Lewis (10) state that *A. nervosa* seeds contain approximately 3 mg. of total alkaloid per gram of seeds.

*A. nervosa* seeds weigh approximately 1.3 gm. each (our laboratory) and *I. violacea* seeds weigh approximately 0.04 gm. each (our laboratory). Thus, each *A. nervosa* seed would contain approximately 4 mg. of total alkaloids, of which approximately 1.04 mg. would be ergine (considered to be the main active alkaloid). *I. violacea* seeds contain approximately 60 mg. of total alkaloids per 100 gm. of seeds (approximately 2,500 seeds) and the ergine content is about 65 percent of the total alkaloids (40 mg./100 gm. of seeds).

The ingestion of 1 mg. of ergine (lysergic acid amide) will produce hallucinations; therefore, one *A. nervosa* seed or 75-100 *I. violacea* seeds (2.5 gm.) should produce the effect of the alkaloids, in particular ergine (77).

Schultes (25) reports that lysergic acid amide (ergine) when taken,

"...induces indifference, a decrease in psychomotor activity, the feeling of sinking into nothingness and a desire to sleep...until finally an increased clouding of consciousness does produce sleep."

Embolden (22) has the following to say about *Argyreia nervosa* seeds and their use as an intoxicant.

"...The black seeds within the capsule have been used by poorer Hawaiians for a 'high.' Unfortunately, the complex alkaloids of these seeds of *Argyreia* species provide not only a high, but a miserable hangover characterised by nausea, constipation, vertigo, blurred vision and physical inertia."

The author of *Legal Highs* (11) states that nausea may be experienced during the first hour or two and that the total experience lasts about 6 hours. A dose of 4-8 seeds is suggested. Also a contraindication is listed; pregnant women or persons with a history of liver disease should refrain from using these seeds. This is a very good precaution since the alkaloid ergometrine (ergonovine) has definite oxytocic properties (70,77).

TOXICITY

Apparently the ingestion of these seeds and their contained alkaloids have not been responsible for any deaths to date. None of the references consulted mention any cases or even the possibility. Of course, the intoxicated state could be the cause of some form of fatal misadventure. It should go without saying, that seeds treated with commercial preservatives and fungicides should not be ingested.

XIII. Fam. SOLANACEAE (2,5-11,16,20-21,27-28,36,55-56,68,70,78-92)

*Atropa belladonna* L.

Common Names: Belladonna; Deadly Nightshade, Dwayne.

*Datura stramonium* L.

Common Names: Thorn Apple; Apple of Peru; Stramonium; Jimson Weed; Jamestown Weed.

*Hyoscyamus niger* L.

Common Names: Hyoscyamus; Henbane; Black Henbane; Poison Tobacco.

*Mandragora officinarum* L.

Common Names: Mandragora; Mandrake; European Mandrake.

INTRODUCTION

The roots, leaves, stems and seeds of species of *Atropa*, *Datura*, *Duboisia*, *Hyoscyamus*, and *Mandragora* have been chewed, smoked or drunk by persons in all parts of the world for at least 5,000 years because they are potent intoxicants (87). The history of the use of these plants, both in the New and Old Worlds is well documented (10, 27,68,87,91).

Tyler (87) has written an interesting commentary about the use of some of these intoxicating plants in the preparation of "witches' ointments" used during the middle ages.

"...Perhaps the most intriguing stories of these psychotropic plants concern the use of henbane, belladonna, *Atropa belladonna*, and stramonium as the active ingredients of the witches' ointments used particularly during the Middle Ages (15th to 18th centuries). A witch wishing to fly to the sabbat for the purpose of intercourse with the devil had merely to strip herself naked and rub the green ointment over her entire body, including her anus and genitals. Then striding a broom stick, she was ready for the magic trip.
and the use of them as intoxicants has caused a number of medical emergencies (2,79-85).

The tropane alkaloids are responsible for the intoxicating activities of these plants. The composition and concentration of these alkaloids vary among the different genera and species. Also, the concentration of the alkaloids varies in the different plant parts (leaves, roots, stems, fruits, and seeds).

Atropa belladonna. This plant contains 1-hyoscymine as the main alkaloid; traces of atropine, apoatropine, belladonine, cuscohygrine, and scopolamine. The roots have an average total alkaloid content of 0.6 percent; stems, 0.95 percent; leaves, 0.4 percent; unripe berries, 0.19 percent and ripe berries, 0.2 percent; seeds, 0.33 percent. The alkaloid 1-hyoscymine represents about three-quarters of the total alkaloids (5) and scopolamine most of the remainder (5).

Hyoscynamus niger. This solanaceous plant is particularly rich in alkaloids. All parts of the plant contain them. Depending upon the manner of collection, the leaves may contain from 0.05 to 0.15 percent alkaloids, three-quarters of which is 1-hyoscymine and scopolamine the remainder (5).

Mandragora officinarum. All parts of this plant contain the alkaloids 1-hyoscymine and scopolamine as well as small amounts of an unidentified alkaloid, mandragorine (5).

In the 19th century, preparations prepared from A. belladonna were used to treat chorea, epilepsy, whooping-cough, asthma, tetanus, delirium tremens, dysmenorrhea, bedwetting, diabetes, pneumonia, acute nephritis, and painful uterine affections (56).

In India (8), various parts of Datura stramonium have different uses: the fruits as a sedative and intoxicant; juice of the flowers for emetics; juice of the fruits, applied to the scalp for curing dandruff and falling hair; fresh leaves, applied to boils, sores and fish bites. Also preparations made from the seeds and leaves are used for antispasmodic, anodyne and narcotic purposes, and the seeds are smoked like tobacco for curing gum troubles (8). Also in India, it is reported that seeds of D. stramonium are powdered, mixed with butter and taken internally for the treatment of male impotence (10). This mixture is also applied to the genitalia to obtain sexual vigor (10).

The Chinese (92) have a mixture of D. stramonium and Cannabis sativa that is used as a rather mild general anesthetic. The formula is as follows; equal quantities of D. stramonium and C. sativa gathered when the moon is in its proper phase, dried in the shade, pulverized and mixed with wine. The ingestion of this preparation will produce a narcotic-anesthetic effect that will enable small operations and cauterizations to be done without pain (92).

Hyoscymine, atropine and tincture of belladonna are used for their anticholinergic properties. They block the muscarinic activity of acetylcholine. They are used principally for their antispasmodic effect in treating spastic colitis, gastroenteritis and peptic ulcer; an antispasmodic effect used to reduce respiratory secretions in anesthesia, gastric secretions in peptic ulcer therapy and nasal and sinus secretions in common cold and allergy medications (5). The usual therapeutic doses are: hyoscyamine sulfate, 125 to 250 mg. (micrograms) three or four times a day; atropine sulfate, tablets: 300 to 600 mg. three or four times a day, injections: 400 to 600 mg. per injection, tincture of belladonna, 0.6 to 1.0 ml. three or four times a day (5).

Scopolamine has a depressant activity on the central nervous system and has been used to treat motion sickness and in combination with morphine ("twilight sleep") as a sedative and pre-anesthetic medication. The combination with morphine, once widely used, has been discontinued since respiration is seriously depressed. Currently scopolamine in combination with antihistamines is used in over-the-counter sleep aids (5).

TOXICITY

A toxic amount of atropine sulfate can be considered to be 3 mg. or more; hyoscymine sulfate 0.5 to 1 mg.; tincture of belladonna, 2 ml. or more; A. belladonna berries, 3 or more by a child (9). One hundred seeds of Datura stramonium weigh 0.791 gm. or 7.9 mg. per seed (our laboratory — seeds from plants grown in Stockton, California in 1974). The usual alkaloid content of D. stramonium seeds is said to be 0.4 percent (5). If 0.5 to 1 mg. of hyoscymine
sulfate will cause a toxic reaction, then approximately 50 to 100 seeds (alkaloidal content 1.5 to 3 mg.) could cause a severe intoxication if ingested.

The symptoms usually seen after the ingestion of a toxic dose of the solanaceous alkaloids or plants containing them are as follows: intense thirst, dilated pupils, vomiting, vertigo, dryness of mouth, a hot red skin, rapid and weak pulse, vision difficulties (loss of accommodation), delirium, incoherence, high temperature, cardiac irregularities; coma and convulsions precede death (16,70).

The following report of a fatal intoxication due to the ingestion of D. stramonium seeds will illustrate the usual sequence of events (84):

"The patient, a 19 year old male, presented at the Emergency Room at 2:17 P.M. in an agitated, confused state. The patient's past medical history was unremarkable and he had no known history of drug abuse. He was placed in restraints and observed. At 2:30 A.M. the patient was noted to be obtunded and a temperature was recorded as being 108°F. The house officer was called and he (the patient) was admitted to the intensive care unit at 2:30 A.M. He was noted there to be obtunded, hot, dry, with unequally dilated pupils which did not react to light, had diminished deep tendon reflexes, and showed no response to pain. His temperature was 108°F, pulse 160 and thready, respiration 40, and blood pressure 120/74. A diagnosis of poisoning with atropine (or like compounds) was tentatively established and supportive therapy begun. The patient was intubated, placed on hypothermia, and catheterized. He was then lavaged and produced approximately 200 ml. of brown, mucous material laden with small black seeds (later identified as Jimson weed).

By 4:00 A.M. the patient's temperature was down to 99°F and hypothermia was discontinued. A neurology consult was obtained and a lumbar puncture performed which yielded a CSF (cerebral-spinal fluid) within normal limits. Neostigmine 0.5 mg. was ordered, followed by physostigmine (2 mg.) over the next thirty minutes. It was the expressed opinion of the neurologist that the prolonged hyperthermic episode had probably done some neuronal damage. The patient remained comatose, hypotensive, hypothermic, and bleeding...

At 2:30 P.M. the patient arrested for the first of three times. After the third arrest, the patient failed to respond to cardio-pulmonary resuscitation (CPR) but reverted to normal sinus rhythm on his own after CPR was terminated. From that point he deteriorated until his demise at 5:25 P.M. Death was reported as due to DIC (disseminated intravascular coagulation) secondary to prolonged hyperthermia, secondary to poisoning by atropine-like agents. Attendant pathologies included hypoglycemia secondary to an adrenal infarct and an acute tubular necrosis." (parentheses added)

XIV. Fam. RUBIACEAE

Corynanthe yohimbe Schum. (2,6-7,10,13,21,36,77,93-96)

(Pausinystalia yohimbe (Schum.) Fierre)

Common Names: Yohimbe; Yohimbe Bark; Yohimbene; Yohimbine; Yohimbine Bark

INTRODUCTION

The bark of the tree, Corynanthe yohimbe has been used as an aphrodisiac in western Africa for centuries (10). After its isolation from the bark by Spiegel in 1896 (93), the alkaloid yohimbine (corynine, quebrachine) was introduced into western medicine for the treatment of male impotence, angina pectoris and arteriosclerosis (13). Other uses were as a mydriatic and local anesthetic. The compound was used for conjunctival and corneal anesthesia (95). The local anesthetic effect is about the potency of cocaine but longer lasting (93).

Currently yohimbine bark is advertised as a smoking preparation for the "effortless seduction" (Rush, November 1976).

CONSTITUENTS AND ACTIVITY

Yohimbine bark contains a number of alkaloids (6-7), but yohimbine (17α-hydroxy-yohimban-16α-carboxylic acid methyl ester) is still considered to be the principal active alkaloid. This alkaloid is found in the leaves, and the stem and root barks (7).

Sollmann (93) has an interesting description of the actions of yohimbine. The following quotation will give a description of some of the actions of the alkaloid yohimbine and may explain why this bark and its alkaloid are considered an aphrodisiac.

"...Local anesthetic, about the same strength but more lasting than cocaine. Less toxic, but much more irritant. Hydriazis, without loss of accommodation. Vessels dilated. Intestines, excited or in situ, and bladder stimulated by small, depressed by large, doses.

When it is given by mouth or hypodermically in
moderate doses, it produces a general vasodilation in the skin, mucous membranes, and particularly in the sexual organs. In consequence of the latter, and perhaps by a direct action on the spinal centers, it produces erection. It does not seem to stimulate the production of spermatosoa or sexual desire. It does not increase the rate of reproduction in mice.

The effect is not produced by therapeutic doses in man (5 mg. or 1/12 gr.), although it has been promoted as an aphrodisiac. The reports of clinical improvement after several weeks are probably explainable by suggestion. Yohimbine has also been proposed for lowering abnormally high blood pressure; but, Lawrence, 1912, found that it produces a further rise, with dangerous symptoms.

Larger doses produce psychic excitement, cerebral congestion, vertigo, gastric disturbance; and in rabbits, marked injury of the renal epithelium. Toxic doses produce general stimulation and subsequent paralysis of the nervous centers, particularly in the medulla; and complex effects on the cardiac muscle. Coronary vessels are not affected; or they are dilated. Death occurs by respiratory paralysis." (italics are those of the original author)

Yohimbine apparently does not have true hallucinogenic properties, but can induce an acute anxiety syndrome in a human given 0.5 mg. per kg. intravenously (79,96).

Dried Lobelia was used by eastern North American Indians as a speedy emetic and purgative; if not rapidly vomiting, the remedy itself could cause death (10). Also the herb was smoked by North American Indians either alone or mixed with tobacco (10). In Chile, the Lupa is smoked and the folk name is tobacco del diablo (Devil's tobacco); this species contains the same alkaloids as *L. inflata* (10).

Lobelia has been used in western medicine, both self and physician prescribed, for a considerable time (13,56,95,98). It has been used in the treatment of bronchitis, bronchial asthma, asphyxia, and used as an expectorant, nauseant and emetic (95). Lobelia has also been used in the treatment of such diverse diseases as epilepsy, tetanus, diphtheria, and tonsillitis (13).

**CONSTITUENTS AND ACTIVITY**

Lobelia herb contains at least 14 different piperidine alkaloids (5-7). The principal alkaloid is lobeline (approximately 0.3 percent) which has respiratory stimulating activity and high toxicity (9,13,56). Two other alkaloids, lobelanine and lobelanidine, have emetic activity. In 1884 Johnson wrote the following about Lobelia inflata (98).

"...In full doses, lobelia produces severe nausea, obstinate vomiting, and great prostration. In over-doses the prostration becomes extreme, there is a failure of voluntary motion, followed by stupor, coma, and not infrequently convulsions and death. Though formerly much used for emetic effect by empirics, dangerous effects were so often produced that it is now seldom employed in this manner. It is chiefly employed in spasmodic affections of the air-passages, as spasmodic laryngitis and spasmodic asthma. In the latter disease it often produces the happiest effects."

Lobeline sulfate (0.5-1.5 mg./dose) is incorporated into tablets or lozenges which are advocated as aids in breaking the tobacco habit. Lobeline is used because its effects generally resemble those of nicotine. It is said that lobeline suppresses (depresses) nicotine withdrawal symptoms -- a "methadone" equivalent for tobacco users (99).

Lobeline, the pure alkaloid, has been used as a respiratory stimulant in intoxications by alcohol, opiates and sedatives which tend to cause respiratory depression (97).

**TOXICITY**

Cooper (9) reports that the ingestion of 50 mg. of dried herb or 1 ml. of tincture of lobelia has produced alarming symptoms in some people. The effects noted include: dryness of the throat, nausea and vomiting, diarrhea and abdominal pains, sweating, headache, vertigo, tremors, paresthesia, somnolence, and muscular twichings. Pulse is rapid and respiration labored; pupils are constricted...
and non-reactive to light. Convulsions precede death by respiratory failure (9). It would seem that Lobelia inflata and the alkaloid lobeline are rather hazardous materials and careless use of either could possibly cause rather serious intoxications.

This "delightful" herb is one of the constituents of the "Legal Grass" advertised in some "dope" magazines (High Times, No.12, August, 1976, Marijuana Monthly, 2(3): 36 (1976)). "Legal Grass" is guaranteed by the seller to be "as good as medium-quality commercial weed." "Legal Grass" is "a very special blend of high quality Korean ginseng leaves, damiana, high grade Lobelia herb, African yohimbe bark and hops."

Probably this mixture would be an aid in dieting for weight loss -- one does not eat much when nauseous. Possibly "Legal Grass" could be considered a treatment for marihuana caused "munchies."

The following is excerpted from The Merck Index, 5th ed. (95).

"Lactuca virosa L.
Common Names: Wild Lettuce; Lettuce Opium; German Lactucaarium.

Lactuca sativa var. capitata L.
Common Names: Lettuce Opium; French Lactucaarium.

INTRODUCTION

The flowering herb, L. virosa, contains large amounts of white, milky juice with a bitter taste and a strong opiate-like odor (56). When the collected juice is exposed to the air, it hardens and assumes a brownish color. This product is termed Lactucaarium (56), and it long has had a reputation for narcotic properties. This reputation is not supported by real data (56). One German scientist stated that Lactucaarium looks and smells like opium but there was no real effects from its use. Wilcox (99) wrote in 1917 that lactucaarium was said to contain hyoscyamine. This statement, he reported, was not correct and further it was an unreliable hypnotic.

The Merck Index of 1907, 1930, 1940, 1952, 1960, and 1968 report the presence of hysoscyamine in lactucaarium (59, 95, 100) in spite of the lack of evidence and denial of its presence (6-7, 13, 58, 90) in the whole plant or its latex.

Lactuca sativa (common garden lettuce) contains several medicinal substances. The fibrous covering of the stem has many vessels filled with a white milky juice with a very bitter taste and a noxious odor also similar to that of opium. It is the basis of a medicinal syrup and a paste. Lettuce also yields an extract prepared with the juice from the stem covering which is known in medicine as thridace. The Chinese used Lactuca sativa for a wide variety of illnesses and medical conditions (92). The entire plant was used for toning up the sinews, dispersing flatus, aiding circulation, strengthening the intellect, and relieving thirst. The expressed juice of the stalk was instilled into the interior of a bubo after opened and pus removed. The seeds were used as a galactagogue (increasing secretion of milk in nursing mothers) and as an anodyne. A preparation made from L. sativa seeds was also used to treat swellings of the genitals and to make hair grow on scar tissue (92). The expressed juice was applied to boils, abscesses, carbuncles and used as a wart remover. It was claimed that the flowers and seeds were effective in reducing fever in the treatment of jaundice and as a quieting remedy (sedative) (92)."
Instead, it contains the natural active ingredient, lactucarium, which has such a wonderful effect on body and mind. According to Dorland’s Illustrated Medical Dictionary, 25th edition, the juice of lactuca (lactucarium) was formerly used as a sedative and hypnotic.

Many other reference books refer to lactucarium as an opium substitute, hence the name, Lettuce 'Opium'.

2. Is Lettuce 'Opium' really opium? No. Our product has no connection whatsoever with real poppy opium which is both harmful and illegal.

6. What are the effects and how much should you smoke? We believe that any substance is habit forming in direct proportion to the amount of pleasure associated with its use.

A sample of lettuce opium (Natural Enterprises Corp., Gaithersburg, Maryland 20760) was purchased from a local retail dealer on April 13, 1977 at a cost of $4.95 plus tax. The label on the package states that it "contains 2 grams lettuce extract (Lactuca sativa)." The plastic box contained two aluminum foil wrapped packages. The weight of material in package one was 1.1 gm. and package two contained 0.80 gm. for a total weight of 1.9 gm. Each package contained a brownish-green material; organoleptic evaluation of the material revealed that most of the material consisted of plant fibres. The odor was that of dried herbs, no opium-like odor was detected.

The material did not meet the definition of Lactucarium (lettuce opium) because the fibrous material comprised the bulk of the sample evaluated. Chemical examination (C. Helisten. Personal Communication, PharmChem Research Foundation, Palo Alto, California, May 6, 1977) of a sample of lettuce opium prepared by the same company, failed to reveal the presence of any of the solanaceous alkaloids, in particular hyoscyamine.

The price of $4.95 for two grams of material is a cost of approximately $1,200.00 per pound for dried lettuce. A very costly herb -- and the product did not even smell like opium.

CONCLUSION

In the case of "legal highs," as with many recreational pursuits, value received appears to be in proportion to what the purchaser expects, rather than what he actually purchases.

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