

APPENDICES

APPENDIX A
PROCEDURES FOR THE CHEMICAL ANALYSES OF
THE MAUÉ SEEDS AND THE PIAROA SNUFFS

by
Laurent Rivier
[Institute of Legal Medicine, Lausanne, Switzerland]

I. MAUÉ SEEDS (vide 1.3)

Isolation of alkaloids

Ground dry seed material (200 mg) was extracted with ethanol and a small amount of sodium hydrogen carbonate overnight at room temperature. After filtration and evaporation to dryness under nitrogen, the residue was dissolved in a suitable amount of ethanol and submitted to gas chromatographical/mass spectrometric procedures comparable to those described by Schultes et al. (1977).

Gas chromatography/mass spectrometry (GC-MS)

Analyses were carried out on a combined GC-MS instrument (Model 5985A, Hewlett-Packard, Palo Alto). Typical GC conditions used throughout were: SE-54 WCOT fused silica capillary column (25 m x 0.3 mm i.d.), temperature of the oven isothermal at 100°C for 1 min and programmed at 10°C/min to 260°C. Split mode injections of 1.5 µl were used at a helium carrier gas-flow of 1,2-1,5 ml/min through the column and a split ratio of 50:1. The capillary column was connected directly to the MS source which was kept at 250°C. The ion source parameters were set by the Autotune program providing a 70 eV ionization energy and a 300 µA emission current. Repetitive scanning from m/z 40 to m/z 340 was performed at one scan per sec. The tryptamines that may occur in Anadenanthera seeds were used as reference compounds. Mass spectrometric data for these substances are given by Schultes et al. (1977). Both retention time and mass spectrum of authentic reference compounds served as criteria for the identification of the unknown compounds.

Quantitative analyses were performed by using the same analytical conditions. Solutions of known concentrations of reference compounds were injected after each extract sample. Calculation was made by external standardization of the detector response for each detected compound.

In order to check the occurrence of minor alkaloids, a more sensitive setting of the GC-MS was used. By using the selective ion monitoring mode (SIM) the detection could be increased 20 to

50 fold. Appropriate MS peaks of each compound to be detected were chosen and extracts injected. If the selected peaks emerged at the expected retention time for the reference compound, it was concluded that the substance was present in the extract.

II. PIAROA SNUFFS (vide 2.3)

Isolation of alkaloids

Ground dry snuff material (100–200 mg) was extracted with ethanol overnight at room temperature. After filtration and evaporation to dryness under nitrogen, the residue was dissolved in a suitable amount of ethanol and submitted to gas chromatographical/mass spectrometric procedures comparable to those described by Schultes et al. (1977).

Gas chromatography/mass spectrometry (GC-MS)

Analyses were carried out on a combined GC-MS instrument (Model 5985A, Hewlett-Packard, Palo Alto). Typical GC conditions used throughout were: SE-54 WCOT fused silica capillary column (25 m x 0.3 mm i.d.), temperature of the oven isothermal at 100°C for 1 min and programmed at 10°C/min to 240°C. Split mode injections of 1.5 µl were used at a helium pressure of 0.5 kg/cm² giving a carrier gas-flow of 1 ml/min through the column and a split ratio of 50:1. The capillary column was connected directly to the MS source which was kept at 200°C. The ion source parameters were set by the Autotune program providing a 70 eV ionization energy and a 300 µA emission current. Repetitive scanning from m/z 40 to m/z 340 was performed at one scan per sec. The tryptamines and beta-carbolines that may occur in South American snuff materials and their source-plants were used as reference compounds. Mass spectrometric data for these substances are given by Holmstedt and Lindgren (1967), by Agurell et al. (1969), and by Rivier and Lindgren (1972). Both retention time and mass spectrum of authentic reference compounds served as criteria for the identification of the unknown compounds.

Quantitative analyses were performed by using the same analytical conditions. Solutions of known concentrations of reference compounds were injected after each extract sample. Calculation was made by external standardization of the detector response for each detected compound.

In order to check the occurrence of minor alkaloids, a more sensitive setting of the GC-MS was used. By using the selective ion monitoring mode (SIM) the detection could be increased 20 to 50 fold. Appropriate MS peaks of each compound to be detected were chosen and extracts injected. If the selected peaks emerged

at the expected retention time for the reference compound, it was concluded that the substance was present in the extract.

APPENDIX B

PRINCIPAL DIAGNOSTIC ACCESSORIES OF MAYA ENEMA SCENES

by

Nicholas M. Hellmuth

[Foundation for Latin American Anthropological Research,
St. Louis, Missouri, United States]

1978, revised November 1984

[Figure numbers refer to plate numbers in Appendix C of the thesis]

1. ENEMA JUG: Furst and Coe were the first to recognize a certain shaped pottery jug as a central feature in the enema ritual (1977). The direct association between jug type and specific ritual comes from the Coe scene and from a second Tepeu 1 jug in a private collection (Hellmuth Photo Archive A-313). None of the three Tzakol 3 cylindrical tripods which show enema administration include a jug (or any other ceremonial paraphernalia in the simple scenes (Figs. 1a-b; 2). The two paintings showing the actual enema administration are both on vases of the "enema jug" shape. Five additional vases show jugs of the same shape with enema clysters on top or nearby (e.g. Fig. 18b). These paintings of the definite enema clyster in direct association with a pottery container of a specific shape suggest this type of pot was characteristic of the enema ceremony. More than 100 Classic period pictures of such jugs are now known for Petén and Campeche-Yucatan style paintings. Some throne scenes have two to five jugs, often of varying size.

The shape, not the size, is the distinguishing characteristic. Enema jugs have a neck much narrower than the rim. The neck may either be tall or squat. The top rim is wide and sometimes quite thick. The ratio between the rim, neck, and body dimensions varies widely. The jugs can vary in height from .25 m to over one meter, holding an estimated 4 to 20 liters (1 to 5 gallons) of liquid if filled. Some enema jugs have handles on the body. Two jugs - possibly of the enema sort - on a Chipoc style painting (R. Smith 1952: Fig. 15h, C.I.W. Contrib. 56) have handles on the neck. Occasional enema jugs are bound with ropes. One Petén vase and a Petén plate each show a Dance after Decapitation Sacrifice dancer carrying an enema jug with a tumpline (native carrying strap around the forehead holding the jug on the back). One of these scenes includes a clyster. In a complex jug presentation scene (Hellmuth 1976; not a sacrifice related portrait) two

monkeys and a deer-like animal each carry enema jugs on netted tumplines. Enema jugs may be plain, painted with a variety of designs or with a single hieroglyph. Since some enema jugs have round bottoms and thus would have tended to tip over, certain jugs are pictured resting securely in pot stands. One painting pictures an enema jug with a lid (Middle American Research Institute, Tulane University, labeled as being from Honduras).

Once the basic shape of an enema jug is recognized, two can readily be identified from Tikal polychrome vases, one from Temple I's Burial 116; another which I excavated in Burial 196 from Structure 5D-73, the burial of a ruler closely related to Ruler A in Burial 116. Many of the sherds of large jugs found in excavations on the palace floors of Tikal and of Uaxactun, labeled traditionally in technical pottery monographs as "water jugs" or "storage jugs" could in fact have been used in enema rituals. Chemical analysis needs to be done on the residue on the bottoms of excavated jugs.

Several enema scenes picture celebrants drinking next to the same jugs from which the clysters are evidently filled. This fact has led me to recognize that the overall ritual was dedicated to deliberate consumption of large amounts of a certain liquid. Taking an enema was only part of a much longer ceremony. The enema manner of ingestion was used after the celebrant could take no more orally. Thus the jugs which conservative colleagues prefer to term "water jugs" does not rule out their simultaneous utilization in the enema ritual. And, in all those cases where any special use can be determined for these jars, that use is associable with enema clysters. Enema clysters are easy to identify on vases, even when they are not inserted into anuses (see Trait 3).

Although jugs often seen in the Dresden Codex have the same general shape as 8th century enema jugs, no enema symbolism is yet identified in any codex. In the Classic period, smaller, portable jugs, have handles on them and are carried by dancers in the Dance after Decapitation. Such jugs sometimes are decorated with Akbal hieroglyphs. Whether these are portable versions - containing the same essentially alcoholic beverage - as the large enema jugs is not yet ascertained. I do not believe they are "copal bags."

2. "ROW IN JUG TOP" of unidentified objects sticks out of the top of some enema jugs (Fig. 17). These objects are usually in a parallel row, standing out 2 to 6 inches. They are each about the size of a large, wide, bird plume. These objects are not always rigid; otherwise their constitution is unknown. They may be of cloth or perhaps even actual plumes. In one instance a pair of

stylized "smoke" curls issue from the jug through the row of bars. I postulate that these may be essence bars - leaves or segments of a plant steeping in the watery concoction to add flavor or other chemical essence deemed a necessary ingredient for this apparently potent liquid. There is though, no proof whatsoever for this hypothesis. Further study of additional examples from private collections is needed.

Several Yucatecan/Campeche region polychrome paintings on low bowls have fat, rounder, nipple-ended objects sticking out from enema jugs. These are either a regional variation or a different substance. It is also possible that these are food solids meant to soak into themselves essence already in the enema jug liquid, so the bar can later be sucked, eaten, or smoked. We need to find a painting where these bars are being handled outside of the jug to see their full size, and perhaps thereby learn something of their content and function.

3. ENEMA CLYSTER. The clyster is most likely formed of a bone tube (which is insterted into the anus) and a squeezable bulb (of native rubber or animal intestine). The whole apparatus is the same size and shape of modern "ear syringes" used for blowing water into the ear to cleanse them. A beautiful specimen is pictured in color on the polychrome graffiti at Tikal in the palace buried intact by the Maya under Structure 5E-55 (Orrego and Larios 1983: front cover and Lam. 11,A). More than 25 other examples are clearly rendered in Petén paintings (Figs. 3; 7a; 8; 10; 11; 12a; 14b; 16a; 17; 24; 32b; 33; 42). The long bone tube is clearly pictured in a polychrome painting in the Museo Popol Vuh (Fig. 42). Another naturalistic rendering is in Fig. 16a. The specimens of Fig. 18b were repainted in Miami and are not accurate in minute detail (the Miami painter misunderstood the bone tube), though the overall scene is correct in a general sense. Sometimes a little "gasket" can be seen holding the bone tube in place on the bulb. The bulbous end of the clyster often has a nipple-like end. A frequent, diagnostic trait of the clyster is the oval or semi-circular black design on the top middle of the bulb. Feline personage 22 on the Grolier Vase of the 31 Gods holds an excellent example (M.Coe 1973: Grolier 37). The seashells held by personages 1 and 24 on the same vase includes the same symbol.

In use, the enema clyster was dipped into the water jug to suck the liquid into the bulb. Then the enema was either self-administered (especially during the Early Classic; Hellmuth 1985) or insterted or assisted by a young female attendant (Late Classic). Several scenes picture an enema clyster and a drinking cup or U-thing resting directly on top of the enema jug.

To get a rigid bone tube into the anus could have been painful without a preliminary lubricant, and indeed on one bowl a celebrant has his hand near his anus seemingly applying something (Fig. 13e), while a spider-monkey-man behind him holds the syringe ready to inject.

I suspect that many of the deer bone tubes found in excavations of Maya temples, palaces, middens, and burials are actually the tubes of enema clysters. Willey comments on the frequency of such bone tubes: "The bone tube, usually a short polished section of an animal long bone, is a very typical Maya Lowland artifact" (1978:168), which to him (before the Furst and Coe article) were of then unknown function.

Musical rattles may at first be confused with enema syringes, since they both consist of a bulb on a stick. But, enema clysters never have pendants or attached decorations as do musical rattles. No enema celebrant ever has two clysters, one in each hand (or one rattle and one drum (tucked under the arm)) - the standard arrangements for rattle musicians. The clyster has its characteristic side decoration, and the person holding a rattle will not usually wear the clothing of an enema participant or attendant. Associations and costumes - in addition to differences in the object itself - permit ready differentiation for the iconographic specialist.

4. BIB of overlapping segments of material is the single most diagnostic trait after the enema jug and clyster (Figs. 7a-b; 13a-c; 17). The direct association of these bibs to scenes with enema jugs or syringes is so fixed that I originally termed these "enema bibs," but of course they are worn on the wrong end for that. The identification as vomit bib came from a Tepeu 1 bowl in the Museo Popol Vuh (Fig. 25). Regurgitation was a natural result of the excessive drinking which was a prelude to the enema (Figs. 24; 25; 27). Bleeding after mouth torture or tooth pulling is a possibility for Fig. 24 but is not yet suspected in the other scenes. Artistic portrayal of bleeding after tongue sacrifice is not documented even in scenes of known relationship to tongue piercing, such as at Yaxchilan. Anthropologists have recorded that when the Lacandon Maya consume fermented balche beer that the natives normally regurgitate the first sips they take due to the unpleasant and harsh taste of this intoxicating beverage. Late Classic paintings demonstrate that most of the "enema" ceremony involved ritualized preliminary drinking and toasting.

After I had identified the bibs, during a presentation of the enema ritual diagnostics at a lecture, Dept. of History of Art, Yale University, ca. 1978-79, Michael Coe accepted the bib identification and pointed out to me that the bib was the same

size, shape, and of the same material as the turbans worn in the same enema scenes. From this observation I suggest the term bib-turban (when worn on the head) or turban-bib (when worn as a bib). The Whipple Vase and a vessel in a West Berlin museum each show the turban-bib held by a female attendant near the man who will be dressed.

These special items of dress are made of hundreds of overlapping segments of unidentified material. On some paintings the segments look like feather ends, in other paintings like flower petals. They could also be bits of painted cloth. The suspicion that perhaps the little oval units of the bib construction might possibly be flower petals (or painted copies on cloth) comes from the overlapping pattern of suspected flowers on stems in bouquets being sniffed in certain throne room enema scenes. One of the pots I excavated from Tikal Burial 196 shows a suspected bouquet of flowers or leaves in a wicker basket next to a small enema jug. In the only scene yet found where the contents of the enema jug itself are pictured (when the jug is turned upside down and emptied) comparable little overlapping units are coming out of the jug (Fig. 4).

When the accessory is worn as a bib, then an enema ceremony is thereby identified. When worn as a turban (especially in Chama style paintings) an enema ceremony is not necessarily being enacted.

5. U-THING: a Red Band style, Tepeu 1 bowl in the Museo Popol Vuh shows three enema enactments, each with two net-headdressed God N devotees on either side of a large 5 gal. enema jug (Fig. 7a-b). Two of the jugs have clearly identifiable enema syringes on top. All three jugs include an enigmatic U-shaped thing on top also. Since other enema jugs picture drinking cups on top (with or without an adjacent enema clyster) perhaps the U-things are just a special shape of drinking cup. Three of the celebrants hold identical U-shaped things as though they were going to eat them - or drink out of them. A woman on the Whipple Vase holds a U-thing while she applies make-up (?) to an enema participant. Whatever its use, it appears restricted to enema scenes.

6. OFFERING BALLS: On the right of the throne in the Princeton 7 scene is a ceramic container with five little balls which Coe correctly identifies as "offerings." With the advantage of a photographic archive of other Maya paintings from private collections and museums it is now possible to relate this bowl to others, and then to use this identification to recognize the same balls on vases of the traditional corpus, such as on a Tikal Burial 116 vase under a lord's throne. In the adjacent panel is another throne with an enema jug underneath it. This ceramic

container in the palace scene has tripod supports and contains the same little oval offerings as on a lively presentation of enema celebrants, a syringe, enema jug with stick bundle (Fig. 17) (see item 7, next). I suspect the offering balls were edible. They may have a little semi-circle painted at their tops, sometimes just like the design on the enema clyster.

A bowl possibly from Campeche shows a man seated in front of a large enema jug holding a large bowl (different than the plates with the offering balls) full of what seems to be comparable offering balls, except here they seem almost to be some kind of fruit. Four of the identical round objects are sticking out of the top of an enema jug in the same position that essence bars are normally found. Still another Campeche or Yucatan bowl has two more clearly defined balls right on top of the jug with the diagnostic little split or semi-circle (really a thin "U"). These little balls may well be to steep in the enema liquid to impart essence, or to soak up essence already in the jug's liquid.

7. STICK BUNDLES are pictured just below the bowl of offering balls on the scene with a Holmul Dancer backrack. These sticks are in two bundles projecting out of a medium sized enema jug. A man holds a clyster nearby and several other attendants wear vomit bibs. On a vase in a West Berlin museum a woman (wearing clothing with a painted, tabbed "turtle carapace" symbol associated with enema attendants, see diagnostic trait 12) offers a bundle of sticks to a man. On a Dance after Decapitation vase (Fig. 33) the sticks are again projecting out of an enema jug, here carried by a feline actor with turban-bib and with a syringe strapped onto his belt front. He looks like a drug peddler coming into town with his wares. Any such sticks as these would traditionally be identified as perforators, especially for bloodletting by penis perforation. But so far no personal bloodletting is associated with the enema ceremony. The only blood is from occasional decapitation. Since in two cases the stick bundles are inside the enema jug, possibly again they are steeping or soaking up some flavor or stimulant. They seem too thin to be cigars, but tobacco should not be ruled out. Their identity and function is unclear. Are the little bundles held in Grolier 43 (non-enema scene) and contained in a serving dish in Grolier 48 (a definite enema jug scene) the same? We can only hope to find in a private collection a painting where these sticks are being handled in some manner where their full size and shape is clearer. So far they are partially obscured by the container in which they are held.

8. DRINKING CUPS in a variety of sizes and shapes are held by enema attendants and celebrants in many scenes. The normal

pattern is two men on either side of an enema jug drinking and toasting one another for some time before actually receiving an enema. Often attractive young ladies serve the cups. Obviously drinking cups are so common in other non-enema contexts that the mere presence of a drinking cup is not enough to identify a scene as related to an enema unless the celebrants are wearing a bib. Paintings often show a drinking cup resting on top of the enema jug. It is possible that U-things (Trait 5) are a special form of drinking cup.

The Cholula murals of the drunkards is certainly similar to many of the drinking scenes around enema jugs on Maya polychromes (Artes de Mexico, Ano XVIII, No. 144, 1971).

9. PELLETS: is a general name for small unidentified objects. In two or three scenes with enema jugs the celebrants are popping little pellets or cookie sized edibles into their mouth. The way they hold these items so reverently as they eat them, the general posture of the celebrant in his setting, suggests that these little snacks are either mighty tasty or else pack quite a stimulating effect upon ingestion into the body system. My original notes nicknamed these "ecstasy cookies" but that term of course could not be objectively substantiated. The pellets are so small that it was hard for the Maya artist to add any symbols to aid in the identification of their content or meaning.

10. CIGARS are smoked in several enema rituals (figs. 12c; 13b-c), but are so widely used elsewhere that they are not diagnostic of the enema ceremony. Robicsek's book describes the effects of smoking a Mesoamerican cigar.

11. PETAL BOUQUETS on long sticks are held by lords and attendants in several throne scenes where enema jugs are nearby. That they are in fact pleasantly scented flowers is suggested by a little bird hovering over a bouquet on Grolier 28 (not an enema scene) and also by one vase where the lord seems to be sniffing at the bouquet. Did the Maya also take stimulating snuff? If so, they consumed drugs through every opening of their body except their ears. Their ears received stimulants from pulsating drum and rattles. The traditional tendency in Maya academia to render conservative interpretations is inappropriate in a situation such as the highly evolved Maya rituals which involved a total chemical assault on every sense organ from a wide variety of stimulants administered in sequence. We must also remember that certain of these drinking and injecting rituals took place before the bloody sacrifice of babies (Hellmuth 1978: 212 and two other vases, unpublished, Hellmuth Photo Archive) as well as of adults followed by a gory dance of crazed priests and ritual attendants.

12. BUMP OUTLINED DECORATIONS ON WOMEN'S HUIPILS are

noticeable on enema related scenes (Hellmuth Photo Archive A-358a; 456981-66 (West Berlin); and 48667-2). Some stylized water lilies (in other, unrelated scenes) have the water lily pad with the same pattern of bumps around the edge.

13. CONGLOMERATE MONSTER GOD HUT is a special construction seen three times in front of enema rituals, on the Whipple Vase (Fig. 18a), on the other side of Fig. 22 (Hellmuth Photo Archive A-358a); and on the other side of Fig. 21 (Hellmuth Photo Archive 486667-2). This hut is composed of a stack of monster faces. Whereas the Whipple Vase is totally overlined and partially re-created in Miami, discovery of the other two untouched Maya paintings in original condition certifies reality of the overall layout of the Whipple Collection scene.

PARTICIPANTS

Standardized enema ceremony participants include:

(a) Water Lily Jaguar is as frequent in enema jug scenes as he is in Dance after Decapitation paintings though his costume may be different in each situation. For the Dance after Decapitation he wears a red or orange scarf. For the enema ritual he wears a turban-bib. Several Tepeu 1 multiple resist style paintings show one of each feline together (private collection, Zurich), demonstrating that the two costumes are both separate yet can be worn in a combined ritual - an enema associated with sacrifice. That it is a human actor wearing a costume is clear from another vase where the celebrant's head sticks out from his feline costume (Hellmuth 1978:210, upper left).

(b) Spider Monkey is as common in enema jug scenes as he is in Dances after Decapitation. In death ceremonies, though, the monkey conflates with a deer, and may wear a red or orange scarf, or carry a fruit-like object. In enema scenes the monkey more likely has an enema turban-bib and may wear a loincloth (Figs. 13a-e). The deer is not as prominent in enema scenes as is the monkey, except where God D is present.

(c) Drug bird is distinguished by a beak with fat, out-turned end. This beak is unlike any real bird yet this avian character is present in at least four enema scenes. Hellmuth 1978:210 illustrates one. On a matched set of two nearly identical Late Classic Petén plates an anthropomorphic dancer in net weave body stocking (yet not in this case a God N) has one of these special bird beaks attached to his face. Of the many different birds in enema rituals, this is the easiest character to recognize.

(d) Enema birds in general are more common in highland Guatemalan paintings (Fig. 9), but birds do occur on Petén plates together with enema jug drinking scenes. One Late Classic plate in the

Denver Art Museum has highland type bird celebrants next to enema jugs. Some of the birds shake musical rattles, just as on the series of highland vases (one of which is in the American Museum of Natural History, New York). Altogether at least five different species of birds are represented in this group of highland vase paintings and other species are sure to be recognized as additional vases become available for study. Whereas birds in Dance after Decapitation scenes tend to be raptorial, have slit stomachs, or carry snakes, enema birds tend to be simpler and more anthropomorphic. Birds also occur in lowland paintings, as on a Red Band style bowl (Fig. 12b).

(e) Big lipped frogs are dominant personages on one Tepeu 1 enema scene (Fig. 13a). One holds a giant water lily in his lap. The frogs on this one bowl have large, round eyes and thick, almost bird-beak like lips. Other frogs, but differing in anatomical and mythical detail, appear on the Vase of the 31 gods (Grolier 37). In some of these 7th-8th century paintings it is hard to distinguish between toads and frogs, or even iguanas.

(f) Other animals appear in enema scenes. One may be an armadillo (Fig. 12b). The Vase of the 31 Gods (Grolier 37) pictures other beasts. Since every rendering is a little bit different it is difficult to ascertain whether the differences are stylistic or anatomical.

(g) Rain Beast is the name given by Coe to the officiating deity on the Whipple Vase. He is generally considered to be GI (though Coe keeps them separate).

(h) God N or devotee is the principal celebrant. A full-fledged God N is elderly and wears a conch shell (or turtle shell or snail shell). A devotee may be of any age, and shows his devotion to the God N cult by wearing net weave napkin headdress (Figs. 7a-b; 9b). God N, and devotees, appear in many other ceremonies besides those related to enemas.

(i) God D (Fig. 14c), especially when seated on a planetary band throne often has enema jugs associated with him (Fig. 15). This elderly slouching god may have a rabbit or young woman (the Moon Goddess most likely) on the throne behind him. God D appears in many scenes other than those related to enemas. He appears himself, rather than in the guise of devotees.

(j) Women wearing huipils decorated with bump-outlined forms are diagnostic of enema attendants.

DISTINCTIVE RITUAL TYPES WHICH EMPLOYED ENEMAS AS PART OF LONGER ENACTMENTS.

There is not really just one "enema ritual." Actually, enemas were taken in:

- A) plain palace settings with minimal special costumes and pagentry (Figs. 16; 35).
 - B) multi-actor settings but still with minimal costumes (Fig. 36).
 - C) With God N devotees, often with the Cauac Monster God Hut, and female attendants (Figs. 7; 11; 18; 19; 20; 21; 22; 23).
 - D) As complex enema rituals, generally with animals (Figs. 5; 12; 13; 17; 24 [Type E also]; 34).
 - E) As part of the Dance after Decapitation Sacrifice (Figs. 24 [aspects of Type D]; 27; 28; 31; 32; 33; 40; 42).
 - F) By God D (Figs. 14; 15; 38 [God D is on other side]).
- As cataloging of photographs continues additional categories of enema ritual can be classified.

Based on more than 50 Late Classic scenes, I propose the following hypothetical reconstruction of the ceremony, Type C, which shares many features with Type D.

Two specially dressed men seat themselves on either side of a giant enema jug, often with an attractive young female attendant. A clyster and drinking cup are ready on top of the container of special drink. With small cups the celebrants dip into the jugs, fill their containers, and drink. They keep drinking to a state of intoxication. 16th-17th century Spanish chroniclers document that such alcohol consumption was a standard part of Maya rituals. One purpose was to induce visions, a form of communication with their gods. Celebrants or attendants costumed as deer, felines, and spider monkeys dance in bearing additional jugs in tumblines. Other bizarrely costumed characters also appear.

All of this interaction takes place in front of a Monster Face Conglomerate "God Hut," a ceremonial structure of perishable material. Inside the hut reigns the supervising or honored deity, in two cases GI (Whipple Vase and the vase of Fig. 22 [on the other side]); in one case a God K-like supernatural, (Fig. 21, other side, Hellmuth Photo Archive 486667-2). In the background a musical group plays, with gourd rattles, turtle carapace rasped with deer antler, and small drums. Women attend to the pre-enema preparation, fanning, undressing, massaging, costuming, and applying make-up to the men who will receive the clyster. Two paintings picture the women holding the bib-turban ready to dress the man nearby. All the while the men continue drinking from cups dipped into the enema jugs. The participants also make use of

special little "cookies" and "U-things" (either another edible or make-up material). Flower-like bouquets are offered and sniffed and potent cigars are smoked continuously. At a certain point the God N devotees parade near their enema jugs, with the female attendants behind them, getting ready to take off their loincloth apron. The devotees render obsequence to the god in the conglomerant hut. As a final event, the men recline and bend over to receive the enema, administered themselves, or by the women.

The Vase of the 31 Gods (Grolier 37) depicts a variant, and even more complicated enema ritual, featuring God D (though not a sky band God D type enactment). The multiple-resist Tepeu 1 vases (Figs. 31; 32) and the same ceremony on vases of other styles (Figs. 24; 25; 27; 28; 42), present the combined enema ritual together with the Dance after Decapitation Sacrifice. Figs. 16 and 35 show the simpler, Type A enema administration.

I feel it is a fair conclusion from the frequency of drinking scenes on Maya pottery, combined with Landa's and Margil de Jesus' comments on native Maya alcoholic consumption in religious rituals to recognize that drinking in the Maya palace reached high levels comparable to that of ancient Greece and Rome, if not more. The Cholti-Lacandon of Sac Balam, Chiapas (Nuestra Senora de los Dolores de Lacandon, 1694-ca.1710) had attendants whose job it was to keep the caciques drinking and intoxicated four days in a row for a single ceremony (Margil de Jesus 1984). And the Maya were religious all year long. Considering that at the same time the Maya were smoking native cigars of considerable potency in nicotine alone, not to mention other stimulants not found in a Havana puro or in a Marlboro, eating pellets and balls of potential stimulating action, and then injecting chemical substances directly into their body through an enema clyster, would certainly affect them. We cannot discount the effect of music and dance. Ecstatic states can be obtained through suggestive music and dance alone, and bare breasted young females may not have gone entirely unnoticed either. Imagine what condition they were in on the morning after a four day ceremony. Aztec excesses are simply better documented. Maya polychrome paintings at last make available for the Maya what Spanish chronicles and Aztec codices long ago provided for central Mexico.

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APPENDIX C

A PICTORIAL APPROACH TO ENEMA SCENES ON ANCIENT MAYA POTTERY

[All plates originate from the archive of the Foundation for Latin American Anthropological Research (St. Louis, Missouri), except plate 3 (Peter Furst), plate 40 (Royal Museums of Art and History, Bruxelles) and plate 41 (John Justeson). Where possible, information on time period, (tentative) provenance, present location and condition is given on basis of personal communications by Nicholas Hellmuth in 1984. Previous publications are sometimes indicated, but no attempt has been made to be exhaustive.]

PLATE 1. Painted polychrome Maya cylindrical tripod.

Time period: Early classic.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Condition: feet are broken off.

Description: Both sides show a personage bending forward, who is giving himself an enema (1a, 1b).

PLATE 2. Painted polychrome Maya tripod bowl.

Time period: Early classic.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Previous publication: Robicsek 1978.

Description: A personage bending forward is giving himself an enema (cf. plate 1).

PLATE 3. Painted polychrome Maya pot.

Time period: Late classic, probably Tepeu 1.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Previous publication: Furst and Coe 1977.

Description: Plate 3a shows the actual shape of the vase. Plate 3b is a painting of the whole vase by Diane Peck. It shows seven pairs of a male and a female. One of the females is inserting a syringe into the anus of her companion (bottom middle), and a second male is himself performing this task (top right). Two other males have an enema syringe tucked into the belt (top left and bottom right). Between the couples, there are nine jugs with painted dots at their mouth. Several males have a bib around their neck, and some of them are wearing this garment as a head-dress. Most females are holding an U-shaped object in the hand,

and some of them offer a bib to their companion. Between the top and bottom, a glyph appears in a repetitive band. Coe (1978) suggests that this glyph may be the sign for the enema ritual, and adds the speculative notion that it represents an anal sphincter muscle.

PLATE 4. Carved Maya bowl.

Time period: Late classic.

(Tentative) provenance: Yucatan, Mexico.

Present location: private collection.

Description: A personage is pouring black-eyed circular forms out of a jug.

PLATE 5. Painted polychrome Maya bowl.

Time period: Late classic, Tepeu 1.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Description: A jug emitting scrolls is flanked by an indeterminate creature (left) and a Water Lily Jaguar (right).

PLATE 6. Painted polychrome Maya bowl.

Time period: Late classic, probably Tepeu 1.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Description: A seated figure is surrounded by two large jugs, which are emitting dotted lines.

PLATE 7. Painted polychrome Maya bowl (Red Band style).

Time period: Late classic, Tepeu 1.

(Tentative) provenance: Petén or Motagua, Guatemala.

Present location: Museo Popol Vuh, Guatemala City.

Previous publication: Robicsek 1978.

Description: The scene shows large jugs with an U-shaped object on top, which are flanked by two males wearing bibs (7a, 7b). On one side of the bowl, the right male is holding a second U-shaped object, and there is also an enema syringe on top of the jug (7a).

PLATE 8. Painted polychrome Maya bowl.

Time period: Late classic.

(Tentative) provenance: Campeche or Yucatan, Mexico.

Present location: private collection.

Description: The scene shows a large jug with a probable syringe on top (8a) and seated figures holding a bowl full of large black-eyed forms (8a, 8b).

PLATE 9. Painted polychrome Maya vase.

Time period: Late classic.

(Tentative) provenance: Highlands, Guatemala.

Present location: private collection.

Condition: possibly repainted.

Description: A bird-like creature holding a probable enema syringe (9a) is being offered a cup by a second bird-like creature (9b). A large jug is shown between them.

PLATE 10. Painted Maya vase (Codex style).

Time period: Late classic.

(Tentative) provenance: ?

Present location: private collection.

Description: A large jug with a syringe on top of it is flanked by a canine creature (left) and by a male holding a drinking cup (right).

PLATE 11. Painted polychrome Maya vase.

Time period: Late classic.

(Tentative) provenance: Petén or adjacent area, Guatemala.

Present location: private collection.

Description: There is a large jug with a probable enema syringe on top of it. A male is painted on the jug or sitting in front of it. According to Coe (pers. commun. 1985), this personage is probably God N.

PLATE 12. Painted polychrome Maya bowl (Red Band Style).

Time period: Late classic, Tepeu 1.

(Tentative) provenance: Guatemala.

Present location: private collection.

Previous publication: Robicsek 1978.

Description: The centre of the scene shows a large jug with small circular forms on top of it, and dotted lines are coming out of it (12b). A personage is either painted on the jug or sitting next to it. The jug is flanked by a large black bird (left) and another animal (right). Left of this scene, two males are gathered around a huge enema syringe, out of which evidently something is pouring (12a), while the right part shows a smaller jug, again with small circular forms on top (12c). It is surrounded by two males, the left one holding a possible enema syringe.

PLATE 13. Painted polychrome Maya bowl.

Time period: Late Classic, Tepeu 1.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Previous publications: Anonymous 1976b; Hellmuth 1978; Robicsek 1978; Torres 1984.

Description: The scene shows three Water Lily Jaguars with objects that might be small jugs at the tip of their tail (13a middle; 13c middle; 13e left). Out of the objects the same scrolls are coming as out of the cigarette held by one of the Jaguars, who also has a jug in front of him with a possible syringe on top (13d right). Besides the Jaguars, there are four monkeys, each of them with a cigarette from which scrolls are being emitted (13b middle; 13c left; 13d middle; 13e right). One of the smoking monkeys seems to hold up an enema syringe, while the figure in front of him is conspicuously holding his hand near his anus (13e middle). There are four of such indeterminate creatures in the scene (13b left; 13b right; 13c right; 13e middle). Hellmuth (1978) suggests that they are frogs, but this view is not shared by Robicsek (1978). One of them is holding something that might be a water lily flower in his hand (13b left). Several personages are wearing a bib.

PLATE 14. Painted polychrome Maya vase.

Time period: Late classic, Tepeu 2.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Previous publications: de Smet 1981b, 1984.

Description: The scene shows two males (14a, 14b), who are kneeling in front of God D on a throne (14c). The left male has a cup in his hand and a cigarette in his mouth (14a). The other one is holding a deer antler in his left hand. He is kneeling next to a jug with a probable enema syringe on top of it. Besides the jug, there is a plate filled with segmented rectangular forms (14b).

PLATE 15. Painted polychrome Maya vase.

Time period: Late classic, Tepeu 2.

(Tentative) provenance: Petén, Guatemala.

Present location: Museum of the American Indian, New York.

Description: God D is seated on a throne (cf. plate 14c). Under the throne, jugs are depicted with plume-like forms coming out of them.

PLATE 16. Painted polychrome Maya vase.

Time period: Late classic, Tepeu 2.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Previous publications: Torres 1984.

Description: Two large jugs are standing next to a throne, on which a male with a large enema syringe in his hand is seated (16a). A female companion is offering a bowl to the male (16c), and there is a smaller jug under the throne (16b).

PLATE 17. Painted polychrome Maya vase.

Time period: Late classic.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Description: Two persons are sitting around a jug, filled with bundles of stick-like forms (cf. plate 14b). The left person is holding an enema syringe. Above the enema jug stands a tripod full of large circular forms (cf. plate 18d).

PLATE 18. Painted polychrome Maya vase.

Time period: Late classic.

(Tentative) provenance: Campeche, Mexico or Petén, Guatemala.

Present location: private collection.

Condition: repainted.

Previous publications: Coe 1978; Hellmuth 1978.

Description: In the left part of the central scene (18b), there are two pairs of a male and a female. The females have their hands tucked under the armpits of the companion. In front of the males, there are two jugs with enema syringes on top, and scrolls are being emitted from one of the syringes (bottom). The right part of the central scene (18c) shows two female servants (left side), who are facing two males (middle), accompanied by two other females (right). The upper male is fanned by his servant. He has a jug in front of him and the female behind him offers him a bib. The lower servant holds up a mirror to the male who is apparently painting his face. He has an U-shaped object in his left hand, possibly a paintpot. Coe (1978) identifies all the four males as God N.

Behind the central figures, three monsters are playing a musical instrument (18d). They are almost identical to the one, who is sitting in a hut on the left (18a), and who seems to be their conductor. According to Coe (1978), they may represent Rain Beasts. The orchestra instrumentarium consists of a rattle (top), a drum (bottom left), and a turtle shell struck with a deer antler (bottom left). There is a jug with a syringe on top, out

of which scrolls are coming, behind the rattle player. A tripod filled with oval forms is shown in front of him.

PLATE 19. Painted polychrome Maya vase.

Time period: Late classic.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Condition: repainted.

Previous publications: Robicsek 1978; Torres 1984.

Description: A male is standing in front of a large jug with a syringe and a drinking cup on top of it (19a), while a female companion is untying his loincloth (19b). The netted head-dress of the males indicates that they represent God N's or his devotees. This vase painting is one of a series, all of which show females undressing males (plates 19-23).

PLATE 20. Painted polychrome Maya vase.

Time period: Late classic, Tepeu 2.

(Tentative) provenance: Guatemala.

Present location: private collection.

Condition: possibly repainted.

Description: Both sides of the vase show a male standing in front of a jug with a drinking cup on top (20a, 20b). The male is followed by a female, who appears to untie his loincloth (cf. plate 19).

PLATE 21. Painted polychrome Maya vase.

Time period: Late classic, Tepeu 2.

(Tentative) provenance: Guatemala.

Present location: private collection.

Description: A male is standing in front of a jug, out of which scrolls are being emitted (21a). Behind him a female is standing, apparently untying his loincloth (21b) (cf. plate 19).

PLATE 22. Painted polychrome Maya vase.

Time period: Late classic.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Description: Both sides of the vase show males standing in front of a jug (22a, 22b). They are followed by females, who appear to untie their loincloth (cf. plate 19).

PLATE 23. Painted polychrome Maya vase.

Time period: Late classic.

(Tentative) provenance: ?

Present location: private collection.

Condition: repainted.

Description: A male is standing in front of a jug, followed by a female, who appears to untie his loincloth (cf. plate 19).

PLATE 24. Painted polychrome Maya vase.

Time period: Late classic, Tepeu 2.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Previous publication: Coe 1982.

Description: This part of the vase shows a bird (top), an animal with canine and rodent features (middle), and a male vomiting over an enema syringe (bottom). Coe (1982) identifies this latter personage as God A'.

PLATE 25. Painted polychrome Maya bowl.

Time period: Late classic, Tepeu 1.

(Tentative) provenance: Petén, Guatemala.

Present location: Museo Popol Vuh, Guatemala City.

Previous publication: Hellmuth 1978.

Description: A jug with a possible enema syringe on top is surrounded by a vomiting creature (left) and a Water Lily Jaguar (right).

PLATE 26. Painted polychrome Maya bowl.

Time period: Late classic, probably Tepeu 1.

(Tentative) provenance: ?

Present location: private collection.

Condition: repainted.

Description: A bib-wearing male has his hand in a large jug, apparently to fill up a drinking cup or enema syringe.

PLATE 27. Painted polychrome Maya vase.

Time period: Late classic, probably Tepeu 1.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Description: A vomiting Water Lily Jaguar with a bib around his neck is standing next to a jug with a cup on top of it.

PLATE 28. Painted polychrome Maya vase.

Time period: Late classic, Tepeu 2.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Description: A Water Lily Jaguar is wearing a bib and holding a drinking cup.

PLATE 29. Painted polychrome Maya vase.

Time period: Late classic.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Description: A Water Lily Jaguar (29b) is standing in front of a large jug full of stick-like forms, on top of which there are circular forms (29a).

PLATE 30. Painted polychrome Maya vase.

Time period: Late classic.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Description: One side of the vase shows a male holding a brush or some other flexible object in each hand. He is seated in front of a jug (30a). The other side shows a giant toad- or frog-like monster, characterized by the 'ear' with three dots. There is a vaguely painted jug in front of him (30b).

PLATE 31. Painted polychrome Maya vase (Multiple Resist).

Time period: Late classic, Tepeu 1.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Description: One side of the vase shows a Water Lily Jaguar wearing a bib (31a), while the other side displays a Dance after Death Jaguar, characterized by his red-orange scarf (31b). The latter character is a common participant in scenes representing a special dance performed after human sacrifice. This vase therefore raises the possibility of a relation between the enema ritual and the dance after death ritual (cf. plate 32).

PLATE 32. Painted polychrome Maya vase (Multiple Resist).

Time period: Late classic, Tepeu 1.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Description: On one side of the vase, a smoking male is seated, who has tucked a jug under his left arm (32a). The other side shows a Water Lily Jaguar (32b). He is wearing a red-orange scarf, which is characteristic of a Dance after Death Jaguar (cf. plate

31), but under this scarf, he may be wearing a bib. In his left hand, he carries a portable jug which is commonly seen in Dance after Death scenes, and in his right hand he is holding a possible enema syringe. The simultaneous occurrence of objects characteristic for the enema scenes and for Dance after Death scenes raises the possibility of a relation between the two rituals (cf. plate 31).

PLATE 33. Painted polychrome Maya vase.

Time period: Late classic.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Previous publication: Hellmuth 1978.

Description: A bib-wearing jaguar is carrying a jug full of pointed forms in his backpack. A possible enema syringe is sticking out of his belt.

PLATE 34. Painted polychrome Maya plate.

Time period: Late classic.

(Tentative) provenance: Campeche, Mexico or Petén, Guatemala.

Present location: Denver Art Museum, Denver.

Condition: repainted.

Description: The middle of the plate shows a male on a throne, who is being offered a probable cup by a servant. The rim shows jugs with things sticking out of them and personages holding drinking cups. One of the jugs is flanked by musicians with rattles and a drum (rim left).

PLATE 35. Painted polychrome Maya vase.

Time period: Late classic, Tepeu 2.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Description: A man who is sniffing or closely looking at a bouquet-like object, is standing next to a large jug with a row of things on top of it.

PLATE 36. Painted polychrome Maya vase.

Time period: Late classic.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Description: The scene shows large jugs (36a, 36b) and a man holding a bouquet-like object close to his face (36a far left).

PLATE 37. Painted Maya vase (Codex style).

Time period: Late classic.

(Tentative) provenance: ?

Present location: private collection.

Previous publication: Robicsek and Hales 1981.

Description: A large jug appears to be tumbling over, thereby spilling its contents.

PLATE 38. Painted polychrome Maya vase.

Time period: Late classic.

(Tentative) provenance: Petén, Guatemala.

Present location: Mint Museum of Art, Charlotte.

Condition: possibly repainted.

Description: A female holding an animal is seated on a throne.

Hellmuth (pers. commun. 1984) identifies her as the Moon Goddess holding a rabbit, her sexual companion. A jug is standing in front of her and other jugs are seen under the throne. The latter ones show black-eyed circular forms on top of smaller plain ones.

PLATE 39. Painted polychrome Maya vase.

Time period: Late classic, Tepeu 2.

(Tentative) provenance: Petén, Guatemala.

Present location: private collection.

Description: A female is carrying a jug.

PLATE 40. Painted polychrome Maya vase.

Time period: Late classic.

(Tentative) provenance: ?

Present location: Royal Museums of Art and History, Bruxelles.

Description: An animal is carrying a small jug.

PLATE 41. Painted Maya vase.

Time period: Late classic.

(Tentative) provenance: Highlands or Motagua, Guatemala.

Present location: ?

Description: A large jug with protruding rod-like objects (41b) is surrounded by an animal personage (41a) and a human figure (41c) with a cup in their hand.

PLATE 42. Painted polychrome Maya bowl.

Time period: Late classic, Tepeu 2.

(Tentative) provenance: central Petén, Guatemala.

Present location: Museo Popol Vuh, Guatemala City.

Previous publication: Hellmuth 1978.

Description: On the right, a jaguar is carrying a syringe and a jug.

PLATE 43. Painted polychrome Maya bowl.
Time period: Late classic.
(Tentative) provenance: Petén, Guatemala.
Present location: private collection.
Description: A mammal is jumping out of a jug.

APPENDIX D
PROCEDURE FOR THE PLASMA LEVEL DETERMINATIONS OF CAFFEINE

by

Jan H.G. Jonkman and Wim J.V. van der Boon
[Pharma Bio-Research International, Assen, The Netherlands]

Extraction procedure

100 μ l of plasma was brought in a centrifuge tube of 5 ml. 100 μ l of the internal standard solution (D4030 50 mg/l in water), 100 μ l of water, 100 μ l of ammonium sulphate solution (saturated) and 3.0 ml of dichloromethane were added. The tube was vortexed for 2 min and centrifuged for 5 min at 4900 t.p.m. The water phase was removed, and the organic layer was transferred to a centrifuge tube with a conical bottom and evaporated at 55°C under nitrogen. The residue was resolved in 1000 μ l of the mobile phase by vortexing for 30 sec. 10 μ l was injected into the HPLC system.

High Performance Liquid Chromatography (HPLC)

The HPLC system consisted of the following components: Pump: Waters, type M45; Detector: Waters, Model 441 U.V. 280 nm R=0.01; Injection sytem: Waters, wisp 710B; Integrates: Spectra Physics, SP 4100; Column: Merck, Hibar column packed with Lichrosorb Si-60-5 μ m, catalogue number: 50388, length: 250 mm, I.D.: 4.0 mm.

The sample was concentrated with the aid of the sample concentrator type SC-3 of Techne.

The chromatographical conditions were: room temperature; flow rate: 1.0 ml/min.; pressure: 1300 p.s.i.; composition of mobile phase: chloroform 55%, n-heptane 41%, methanol 4%, and acetic acid 0.05%.

APPENDIX E
PROCEDURE FOR THE PLASMA LEVEL DETERMINATIONS OF HARMINE

by
Laurent Rivier
[Institute of Legal Medicine, Lausanne, Switzerland]
and
Pierre Baumann
[Psychiatric University Clinic, Lausanne, Switzerland]

Extraction procedure

Typically, 1 ml of plasma was diluted with 1 ml of water and 50 ng of harmine added as internal standard. The pH of the water was brought to 9 with 2N NaOH and 1 ml of a toluene/isoamyl alcohol mixture (85:15) was added. The toluene/isoamyl alcohol fraction was reduced to 50 μ l and 3 μ l were injected into the GC-MS system.

Gas chromatography/mass spectrometry (GC-MS)

Analyses were carried out on a combined GC-MS instrument (Model 5985A, Hewlett-Packard, Palo Alto). Typical GC conditions used throughout were: SE-54 WCOT fused silica capillary column (25 m x 0.3 mm i.d.). The column was connected directly to the MS source and the carrier gas flow rate (helium) was 1.5 ml/min at 200°C through the end of the column. Temperature conditions were: initial oven temperature 155°C for 0 min; heating rate 30°C/min; final temperature 260°C for 10 min. Injection port for splitless injections was maintained at 280°C and the transfer line and ion source were 250°C and 200°C, respectively. For allowing the sensitivity and specificity necessary for accurate harmine and harmine quantifications, Selective Ions Monitoring (SIM) or Mass Fragmentography was used. Using this mode, the MS was set up for detecting 4 ions representative of the molecules (182.0 for harmine and 169.0, 197.0 and 212.0 for harmine). Each ion was measured for 100 msec. Calibration curves were obtained by proceeding standard solutions in the same way as the plasma samples.

The calibration curve obtained by SIM with harmine as internal standard indicated that the response of the detector was linear over the 0 to 50 ng/ml levels.

The limit was set up to 2 ng/ml as it was from such a level that a clear signal emerging from the noise could be measured. It was found that harmine is a good internal standard as no signal at all could be detected at the place of emergence when drug free

plasma was used. This is not the case for norharmine (*).

(*) Baumann,P., Rivier,L. and Perey,M. (1983) In: A.Frigerio (Ed.) Recent Developments in Mass Spectrometry in Biochemistry, Medicine and Environmental Research, Vol.8, pp.7-18

APPENDIX F

SOME RITUAL PLANTS AND REPUTED BOTANICAL INTOXICANTS OF NEW GUINEA NATIVES (*)

Scientific name	Vernacular name	Tribe or area	Uses	Additional remarks
<u>Acalypha insulana</u> (Euphorbiaceae)			is also known as <u>Acalypha hellwigii</u> ; New Guinea natives are sometimes said to smoke the leaves of var. <u>mollis</u> (1,41)	Leaves are also used as tobacco wrapper (26)
<u>Acorus calamus</u> (Araceae)	api	IAI-people	Rhizome is eaten in certain ceremonies, whereafter the participants feel able to contact spirits (48)	
		Raiapu Enga	Huntsmen spit chewed sweet flag into the nose of their dogs to promote their ability to locate game (10)	North American Sioux Indians spit masticated sweet flag into the mouth of a puppy to make it a fierce watchdog (23)
<u>Alocasia</u> sp. (Araceae)		Baining	Participants in dancing ceremonies are said to eat <u>Colocasia esculenta</u> or tubers of <u>Alocasia indica</u> , followed by <u>Laportea</u> leaves to counteract the poisonous action (19,20)	The New Guinea flora does not include the Javanese <u>A.indica</u> , but other <u>Alocasia</u> species (41); in Australia, juice of <u>Alocasia macrorhiza</u> is considered an antidote for <u>Laportea gigas</u> (25)
		Wewäk- Boikin	Malevolent sorcerers may start with eating a 'gombi' mixture which includes wild taro, wild lemon, grated coco-nut, bark of the 'mali' tree, and several kinds of ginger (12)	

Scientific name	Vernacular name	Tribe or area	Uses	Additional remarks
<u>Amaracarpus</u> sp. (Rubiaceae)		Gimi	Vide <u>Elaeagnus</u> sp.	
<u>Amaranthus</u> sp. (Amaranthaceae)	tumeni	Orokaiva	'Tumeni' and 'siroru' (flame-coloured coxcomb) are included in a mixture intended to provoke a ceremonial shaking-fit (44)	
<u>Archontophoenix</u> sp. (Palmae)		New Britain	Nut is chewed as intoxicant (26)	The collection of the State Herbarium in Leiden contains only <u>Archontophoenix</u> from Australia (41)
<u>Beaumontia</u> sp. (Apocynaceae)		Lake area or Kema valley	Smoked instead of tobacco (22)	Misspelled as 'Bomoncia'; said to occur among the Australian Arunta as well (22)
<u>Bubbia</u> sp. (Winteraceae)	kikisira	Gimi	Man of power smokes tobacco with 'kikisira' bark to pass into a dream-like state during a healing ceremony (13)	
<u>Capparis</u> sp. (Capparaceae)	kara	Western islands Torres Straits	To become a magician, the novice must eat the unripe fruit; leaves and root are eaten by magicians wanting to be wild (15)	

Scientific name	Vernacular name	Tribe or area	Uses	Additional remarks
<u>Castanopsis acuminatissima</u> (Fagaceae)	kawang	Banz area	Seed is said to have similar intoxicating effects as certain mushrooms, when steamed and eaten in quantity (16)	Against the advice of their parents, children sometimes persist in eating the raw kernels, because of their pleasant taste; this often leads to emaciation, anaemia and mouth ulceration (7,17)
<u>Cinnamomum</u> sp. (Lauraceae)		Mailu island	Death sorcerer may chew cinnamon bark to become 'hot' or powerful (29)	Mixture of tobacco and cinnamon is sometimes claimed to cause marihuana-like effects in the New World (28)
	kai-yau-kwera	Kukukuku	Cinnamon leaves are mixed with dog's food to make it a good hunter (8)	
<u>Citrus hystrix</u> (Rutaceae)	tadi	Marind-anim	To become a sorcerer, the novice must take a mixture of various ingredients, including the leaves of <u>Citrus hystrix</u> , <u>Codiaeum variegatum</u> , <u>Cordyline fruticosa</u> , <u>Crinum asiaticum</u> and several unidentified plants (46)	
<u>Citrus</u> sp. (Rutaceae)	ximbung	Wewäk-Boikin	Vide <u>Alocasia</u> sp.	
		Marind-anim	Leaves of the wild lemon tree are used to induce ecstasy (46); sometimes even their smell is claimed to be sufficient (40)	
<u>Codiaeum variegatum</u> (Euphorbiaceae)	kundama	Marind-anim	Vide <u>Citrus hystrix</u>	

Scientific name	Vernacular name	Tribe or area	Uses	Additional remarks
<u>Colocasia esculenta</u> (Araceae)		Baining	Vide <u>Alocasia</u> sp.	
<u>Cordyline fruticosa</u> (Liliaceae)	ngasi	Marind-anim	Vide <u>Citrus hystrix</u>	
<u>Costus</u> sp. (Zingiberaceae)	jangun, jangun fagata	Adzera	Fruit is chewed as substitute for betel nut (18)	
<u>Crinum asiaticum</u> (Amaryllidaceae)	jarangar	Marind-anim	Vide <u>Citrus hystrix</u>	
<u>Cryptocarya aromatica</u> (Lauraceae)	a seren-gachi	Baining	Aromatic massolbark is chewed with lime and a species of betel leaf as substitute for betel nut (21,24)	
	oa	Sentani sea	Bark is chewed during various ritual actions, for instance by media who want to contact supernatural beings (47)	
<u>Curcuma longa</u> (Zingiberaceae)	souwaa	Pawaia	Before young men are admitted to the circle of adults, they must drink a beverage prepared from the rhizome (48)	
<u>Cycas circinalis</u> (Cycadaceae)	baibai, bebai	Gunantuna	Pollen are used as a narcotic (33)	<u>Cycas</u> pollen or male bracts are also reputed to be narcotic in India (38,43)

Scientific name	Vernacular name	Tribe or area	Uses	Additional remarks
<u>Cycas</u> sp. (Cycadaceae)	budzamar	Western islands Torres Straits	Young leaf shoots are eaten by sorcerers wanting to be wild (15)	
<u>Diospyros</u> sp. (Ebenaceae)	kubilgim	Western islands Torres Straits	To become a magician, the novice must inter alia chew this plant (15)	
<u>Elaeagnus</u> sp. (Elaeagnaceae)		Gimi	In divination rites, a mixture of tobacco with leaves of <u>Elaeagnus</u> sp. and <u>Amaracarpus</u> sp. is smoked to pass into a trance-like state (13)	
<u>Endospermum moluccanum</u> (Euphorbiaceae)		Jimi or Mt. Hagen	Used in a ritual context to make young warriors fierce (26)	
<u>Euodia</u> cf. <u>bonwickii</u> (Rutaceae)	kilt	Mt. Hagen-people	Bark is chewed by men during dancing feasts (37)	
<u>Ficus subnervosa</u> (Moraceae)		Rossel Island	Leaves are chewed as substitute for betel nut (17)	
<u>Galbulimima belgraveana</u> (Himantandraceae)	agara	Okapa area	Natives chew a mixture of 'agara' bark and 'ereriba' leaves (<u>Homalomena</u> sp.) to provoke premonitory visions; sometimes the rhizome of 'kaine' (<u>Zingiber zerumbet</u>) is added as well; direct observation of an user has revealed violent tremor with miosis, followed after an hour by calmness and euphoria, and thereafter drowsiness (5,6)	Is also used in a ritual context to make young warriors fierce (26,42)

Scientific name	Vernacular name	Tribe or area	Uses	Additional remarks
<u>Galbulimima</u> <u>belgraveana</u> (continued)		Gimi	For divination, men may pass into a trance-like state by chewing the bark (13)	
<u>Homalanthus</u> sp. (Euphorbiaceae)		New Britain	Used in a ritual context to make young warriors fierce (26)	Indicated as <u>Omalanthus</u> , which is a synonym (41)
<u>Homalomena</u> sp. (Araceae)	ereriba	Okapa area	Leaves are used, sometimes together with <u>Galbulimima</u> bark, to provoke dreams and visions, followed by serious neurological symptoms resembling Parkinson's disease (4,5)	
<u>Kaempferia</u> <u>galanga</u> (Zingiberaceae)	maraba	Okapa area	Root is said to be hallucinogenic (6)	
<u>Lactuca indica</u> (Asteraceae)	kuntigea kada-a	Kukukuku	Seeds are chewed as substitute for betel mixture (8)	
<u>Laportea</u> sp. (Urticaceae)	a mingual, a mangarai	Baining	<u>Laportea</u> leaves of the large-leaved 'a mingual' and of the small-leaved 'a mangarai' are taken by dancers after the ingestion of <u>Alocasia</u> tubers (vide supra) (20)	
	salak	Komba	Death sorcerer eats leaves of a stinging nettle (<u>Laportea</u> sp.?) to become 'hot' (33)	
<u>Palmeria</u> sp. (Monimiaceae)	boma kan	Chimbu	Leaves are eaten by men as a stimulant in time of war (36)	Leaves are also eaten by women as an abortivum (34,36)

Scientific name	Vernacular name	Tribe or area	Uses	Additional remarks
<u>Pandanus</u> sp. (Pandanaceae)	amugl keja	Chimbu	Natives are said to become 'long long' (mad) in the beginning of the year, when pandanus fruits are ripe; this temporary folly is reputed to be provoked by the ingestion of raw or immature nuts of the pandanus tree or even by the smell of its rotting fruit shells (6,16,27,34,42)	The nuts are said not to be from local trees, but from Jimi valley (16); pandanus leaves are used in New Guinea as a cigarette wrapper (22,26)
	tayuaka, hamanga	Kukukuku	Fruit is eaten by boys in puberty ceremony (8)	
<u>Ptychococcus paradoxus</u> (Palmae)		Barriai	Fruit is used as substitute for betel nut (11)	
<u>Pueraria phaseoloides</u> (Leguminosae)		New Britain	Leaves are used as intoxicant (26)	
<u>Strychnos minor</u> (Loganiaceae)			Bark is crushed with ginger and fed to dogs, to stimulate them for hunting (17)	
<u>Zornia gibbosa</u> (Leguminosae)			Used for sorcery (30)	Leaves of <u>Zornia latifolia</u> are smoked in Brazil as substitute for <u>Cannabis</u> (30)

Notes:

(*) Specific exclusions from the table are:

- well-known plants and preparations like tobacco (14,22,33,39), betel (32,33,48), kava (31,33,48), ginger (33,48), alcoholic beverages (26), opium (2) and hemp (35);
- psychoactive plants which are merely reported to have caused unintentional poisoning, such as hallucinogenic Brugmansia species (7,9,17);
- certain mushrooms, which are possibly associated with a native frenzy (16,27);
- plants which are merely used as cigarette wrappers, such as Donax canniformis, Ficus sp., Hibiscus sp., Kleinhovia hospita, Macaranga sp., Myrmecodia brassii and Rubus moluccanus (22,26,36);
- plants without botanical identification, such as the kevo tree in the Bismarck Mountains (3), the kumani creeper in the western islands of the Torres Straits (15), the nong'in plant of the Danga (27), the sota and tsinimp leaves of the Adzera (18) and the yiragai herb of the Kutubu (45).

References:

(1) Airy Shaw 1980 (2) Anonymous 1920 (3) Aufenanger and Höltker 1940 (4) Barrau 1957 (5) Barrau 1958 (6) Barrau 1962 (7) Bell 1973 (8) Blackwood 1940 (9) Bridgewater 1968 (10) Feachem 1972-73 (11) Friederici 1912 (12) Gerstner 1954 (13) Glick 1967 (14) Haddon 1946 (15) Haddon and Seligmann 1904 (16) Heim and Wasson 1965 (17) Henty 1980 (18) Holzknecht 1971 (19) Laufer 1946-49 (20) Laufer 1963-64 (21) Laufer 1965-66 (22) Le Roux 1948 (23) Morgan 1980 (24) Parkinson 1907 (25) Plowman 1969 (26) Powell 1976 (27) Reay 1960-61 (28) Reko 1949 (29) Saville 1926 (30) Schultes and Hofmann 1980b (31) Serpenti 1962 (32) Seyfarth 1981 (33) Sterly 1970 (34) Sterly 1973 (35) Sterly 1978-79 (36) Sterly, pers. commun. 1985 (37) Stopp 1963 (38) Thieret 1958 (39) Van Nouhuys 1932 (40) Vertenten 1916 (41) Vink, pers. commun. 1983 (42) Webb 1960 (43) Whiting 1963 (44) Williams 1928 (45) Williams 1941-42 (46) Wirz 1925 (47) Wirz 1928 (48) Wolf-Eggert 1977.

APPENDIX G

MULTIDISCIPLINARY TABLE ON SOME REPUTEDLY PSYCHOACTIVE FUMIGATORIES AMONG MIDDLE AND SOUTH AMERICAN NATIVES (*)

Scientific name	Area	Ethnobotany (**)	Phytochemistry (***)	Psychopharmacology	Efficacy of smoking
<u>Amanita muscaria</u> (Amanitaceae)	Valley of Puebla, Mexico	A curandero is reputed to smoke dried <u>A. muscaria</u> mixed with tobacco as an intoxicant and to perform ritual diagnoses (17)	Muscimol, ibotenic acid (15)	Evidence for hallucinogenic activity is less impressive than in the case of psilocybian mushrooms (15,39)	-
<u>Anadenanthera colubrina</u> var. <u>cebil</u> (Leguminosae)	Paraguay and Argentina	Aboriginal smoking of cevil pods is mentioned in an early source on Paraguay (18), and Argentinian natives are said to smoke jatá-j (=cebil) mixed with tobacco (8). Botanical identifications are not given, but such preparations are associated with <u>A. colubrina</u> var. <u>cebil</u> (53,63)	DMT, 5-OH-DMT in the seed and in the seed pod (26)	True hallucinogenic activity is definitely established for DMT, but not for 5-OH-DMT (15)	DMT is claimed to be effective, when smoked (6)
<u>Anadenanthera peregrina</u> (Leguminosae)	British Guiana	Aboriginal smoking of the pulverized seeds is mentioned in an early source (52)	DMT, 5-MeO-DMT, 5-OH-DMT in the seed (15)	True hallucinogenic activity is definitely established for DMT and 5-MeO-DMT, but not for 5-OH-DMT (15)	The smoking of 6-10 mg 5-MeO-DMT is effective (15). DMT is claimed to be effective, when smoked (6)

Scientific name	Area	Ethnobotany (**)	Phytochemistry (***)	Psychopharmacology	Efficacy of smoking
<u>Calea zacatechichi</u> (Asteraceae)	State of Oaxaca, Mexico	Chontal curanderos prepare an infusion and a cigarette from the dried leaves for clarification of the senses (17,31)	Caleines and zexbrevin in aerial parts (25,44)	-	<u>C.zacatechichi</u> was mildly psychoactive, when inhaled and ingested in an uncontrolled study (17)
<u>Cannabis sativa</u> (Cannabaceae)	Brazil	The Tenetehara Indians smoke the dried flower and leaf as a recreational stimulant (64). Among Mexican natives like the Tepehua Indians, the principal way of <u>Cannabis</u> use is oral administration (23,68)	Delta-9-tetrahydrocannabinol and many other cannabinoids (60)	The mild hallucinogenic activity is well established (36,53)	Well established (2,38)
<u>Cytisus canariensis</u> (Leguminosae)	Northern Mexico	This plant is also known as <u>Genista canariensis</u> (53). A Yaqui shaman prepares cigarettes from the dried blossoms (19)	Cytisine, N-methylcytisine and anagyrine in the leaf (69)	Cytisine and N-methylcytisine have similar peripheral effects as nicotine, but their central activity may be different (1,70)	<u>C.canariensis</u> was mildly psychoactive, when smoked in an uncontrolled study (19)

Scientific name	Area	Ethnobotany (**)	Phytochemistry (***)	Psychopharmacology	Efficacy of smoking
<u>Datura</u> sp. (Solanaceae)	Mexico	Spiked ceramics might be associated with <u>Datura</u> use (30), so finds of archaeological clay pipes with spiked bowls should be mentioned here (43), but substantial evidence for pre-Hispanic <u>Datura</u> smoking in Mexico is lacking. Contemporary data are limited to a vague statement that dried toloachi leaves are added to tobacco cigarettes in the Guanajuato region (46), but this may be a non-aboriginal practice	Scopolamine, hyoscyamine in the leaf (24,53)	The deliriant activity is well established (15)	Well established (56,67)
<u>Erythroxyllum</u> sp. (Erythroxyllaceae)	Peru	Aboriginal smoking is reported for the Omagua Indians (?), but no primary reference is given. The non-aboriginal smoking of coca paste is well documented (27)	cocaine in the leaf (47)	The psychostimulating properties are well established (21)	Well established (40,41)

Scientific name	Area	Ethnobotany (**)	Phytochemistry (***)	Psychopharmacology	Efficacy of smoking
<u>Lobelia tupa</u> (Campanulaceae)	Chile	The Mapuche Indians are said to smoke the leaves as an intoxicant (32)	Lobeline, lobelanidine, norlobelanine in the leaf (28)	Lobeline has similar peripheral effects as nicotine, but its central activity may be different (49,59)	Recent references on the efficacy of smoking have not been found; there is merely a report associating a smoking mixture of <u>Lobelia inflata</u> and <u>Datura stramonium</u> with the sudden death of an asthmatic (35)
<u>Nicotiana</u> spp. (Solanaceae)	Widespread	Tobacco is undoubtedly the most common fumigatory of Middle and South American aboriginals. The principal species are <u>N.tabacum</u> and <u>N.rustica</u> in Middle America and <u>N.tabacum</u> in South America (48,66)	Nicotine in the leaf (15)	The psychostimulating properties are well established (15,59)	Well established (4,5)
<u>Psilocybe</u> sp. (Strophariaceae)	Mexico	The contemporary smoking of psilocybian mushrooms by a Yaqui Indian has been described (9, 10), but the authenticity of this report is very gravely doubted (14,57). The ancient Aztecs smoked mushrooms as an admixture to tobacco (50), but the botanical identity is unknown	Psilocybin, psilocin (53)	The hallucinogenic activity is well established (15)	The availability of psilocybin is said to be compromised by pyrolytic degradation and by condensation, when it is smoked in a pipe (57)

Scientific name	Area	Ethnobotany (**)	Phytochemistry (***)	Psychopharmacology	Efficacy of smoking
<u>Quararibea funebris</u> (Bombacaceae)	Mexico	The Aztecs used poyomatli, the flower of the cacauaxochitl plant, as an admixture to smoking tobacco (50,51). One of the suggested identifications is <u>Q.funebris</u> (33,65).	funebrine (45)	-	-
<u>Tagetes lucida</u> (Asteraceae)	Sierra Madre, Mexico	The Huichol Indians smoke the dried leaves and flowers, either alone or mixed with <u>Nicotiana rustica</u> (58)	The root contains BBT (11); various non-alkaloidal constituents have been reported for the genus (17,53)	-	-
<u>Trichocereus pachanoi</u> (Cactaceae)	Las Aldas, Peru	This plant is also known as <u>Echinopsis pachanoi</u> (53). Archaeological excavations have yielded what appear to be cigars made from a cactus thought to be <u>T.pachanoi</u> (55)	Mescaline (13)	The hallucinogenic activity is well established (15)	-
<u>Trichocline</u> spp. (Asteraceae)	Argentina	The Chaco Indians smoke the powdered root of <u>T.reptans</u> , either alone or mixed with tobacco. Other species said to be used are <u>T. auriculata</u> , <u>T.dealbata</u> , <u>T.exscapa</u> and <u>T.incana</u> (20,63,71)	Isopimpinellin, phellopterin and trichoclin in <u>T.incana</u> (37)	-	-

Scientific name	Area	Ethnobotany (**)	Phytochemistry (***)	Psychopharmacology	Efficacy of smoking
<u>Virola sebifera</u> (Myristicaceae)	Venezuela	Witch doctors are reputed to smoke the inner bark to cure fevers (53,63)	DMT and 5-MeO-DMT in the bark (12, 34)	The hallucinogenic activity is well established (15)	The smoking of 6-10 mg 5-MeO-DMT is effective (15). DMT is claimed to be effective, when smoked (6)
<u>Virola sp.</u> (Myristicaceae)	Brazil	The bark of an indeterminate <u>Virola</u> species reportedly is smoked by witch doctors as an additive to tobacco (34)	A collected bark sample was devoid of alkaloids (34)	-	-

Notes:

- (*) Reported North American Indian fumigatories other than tobacco include Achillea millefolium (61), Arctostaphylos uva-ursi (62), Cornus stolonifera (29), Datura meteloides (3) = D.innoxia? (24,53), Eriogonum sp. (58), Eupatorium solidaginifolium (62), Leptotaenia californica (22), Lobelia inflata (61), Rhus glabra (61), Sassafras officinale (61), Verbascum thapsus (61), Viburnum opulus (61)
- (**) Since their use as a fumigatory is or may be non-aboriginal, the following plants have been excluded : Canavalia maritima (16), Cestrum laevigatum (53), Leonurus sibiricus (16), Myristica fragrans (54), Salvia divinorum (16), Sida acuta (16), Stropharia cubensis (42), Zornia latifolia (53)
- (***)The following abbreviations are used to indicate constituents:
- | | |
|-----------|-------------------------------------|
| DMT | = N,N-dimethyltryptamine |
| 5-OH-DMT | = 5-hydroxy-N,N-dimethyltryptamine |
| 5-MeO-DMT | = 5-methoxy-N,N-dimethyltryptamine |
| BBT | = 5-(3-buten-1-ynyl)-2,2'-bithienyl |

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