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Bloodletting and Vision quest among the Classic Maya
A medical and iconographic reevaluation

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Keywords: Maya, bloodletting, ##

Introduction
This article (1) deals with the medical and organic bases of bloodletting among the Classic Maya. It is interested specifically with the question of whether it was possible to produce visions by harvesting blood from the human body, a hypothesis first presented by Peter Furst (1979) and later by Linda Schele and Mary Miller (Schele and Miller 1986: 177).

A tabulation of different methods of drawing blood from the human body will be accompanied by a short anatomic survey. A consideration of the causes and mechanisms of altered states of consciousness allows assessing whether blood sacrifice can create trances. The latter considerations are based on interviews with physicians specializing in neurology and psychiatry, who practice at the county hospital in Lüdenscheid, Germany. It appears that bloodletting alone is not able to produce visions, but rather that psychological and pharmacological stimulants contribute to it.

At this point a remark about the methods is appropriate: while the medical aspects presented here are based on clinical studies, a comparable experimental approach is impossible in the case of the ancient Maya. We have only fragmentary information about many aspects of the Classic Maya. It is, however, possible in some cases to supplement information that is missing for the Classic period (A.D. 250 to 950) from Colonial sources (after A.D. 1540). I have done so in the following to provide a fuller picture. Yet, I am aware that Colonial and Classic sources are separated by several hundred years and that the Colonial sources may not accurately reflect Classic period customs.

Previous research
The fact that the Maya of the Classic period made offerings of their own blood has been known for a long time on the basis of numerous iconographic and epigraphic analyses (among others Proskouriakoff 1973, Joralemon 1974, Baudez 1980, Stuart 1984 and Winters 1986). In these previous works, a very detailed iconographic system was recognized of how the various aspects of the blood sacrifice were displayed and the ritual action was depicted together in writing and pictorial representations.

Yet, few works dealt with the techniques of sacrifice as well as with the ritual aspects from a medical perspective. Peter Furst attempted in 1974 to provide a connection between bloodletting, pain and vision. Robicsek and Hales (1989) did a surgical evaluation of heart sacrifice. Kremer and Flores (1993) analyzed the so-called “ritual self-decapitation”. I will focus on the hypotheses of Furst and of Schele and Miller about inducing visions by harvesting

(1) The present article summarizes the results of a paper originally written during summer 1999 and presented during summer term 2000 in Nikolai Grube’s advanced seminar “Recent approaches in the exploration of Classic Maya religion” at the Institut für Altamerikanistik und Ethnologie at the University of Bonn.

Figure 1a. Lady Xook lets blood by pulling a thorn-lined rope through the mutilated tongue. Note the bowl that catches the rope on a staple of blood-spotted paper. Yaxchilan Lintel 24. Drawing: Ian Graham. In: Graham 1977: 3-53.
blood from the human body, since it is the best known and most accepted. A more comprehensive discussion of it will follow in the main part of this paper together with the critique.

**Bloodletting in Maya art and writing**

The act of bloodletting can be demonstrated by iconographic and epigraphic evidence. Carolyn Tate (1992: 88) gives a list of iconographic elements that allow the identification of this theme. Among them are a set of bloodletting equipment, consisting of a bowl with lancets, stingray spines, cord, and bark paper. Representations of this equipment are embedded together in explicit scenes of this act, as on Yaxchilan Lintel 24 (Figure 1a). A special costume is also of importance in the art of Yaxchilan, with women wearing a Mexican year-sign headdress. The explicit scenes at Yaxchilan allowed Tatiana Proskouriakoff (1973) to identify several hieroglyphs that occur in the written context of bloodletting and vision scenes, the verb T714 (see below) and the sign T712, proposed to be the hieroglyphic representation of an obsidian lancet (Proskouriakoff 1973: 172). The appearance of visions is connected with the representation of a bent centipede body (it is also called “vision serpent,” Boot 2000: 193) from whose maw an anthropomorphic figure frequently emerges (Figure 10).

Linda Schele and Mary Miller (1986: 179) recognized that no direct (epigraphic) relationship exists between blood sacrifice and the rise of a vision. They suspected it on the basis of the clustering of certain iconographic motifs. Tatiana Proskouriakoff (1973: 169) was the first to recognize that the hieroglyph T714 (Figure 2) which is now read as /TZAK/ (Grube 1991: 86) always occurs in the inscriptions, when the appearance of visions in the form of a bent centipede is depicted in the accompanying iconography. The *Diccionario Cordemex* (Barrera Vasquez 1980: 850) paraphrases tzak with conjurar nublados and conjurar temporales. As Diane Winters (1986: 235) has observed, T714 never occurs with scenes of bloodletting. On the other hand, only iconographic indications of the blood sacrifice occur with the appearance of visions. The problem is embedded in the semantic dimension of the word tzak, which describes a cultural concept familiar to the ancient Maya, but whose exact, emic notion is lost to us, though we can approximate its meaning. For this reason it was not necessary to describe the events more closely in the inscriptions, the scenes depicted show rather “key motifs” of the whole rite. Consider the following example: the term “celebrating high mass”, its contents and their sequence are understandable for a person familiar with Christian liturgy and need no further comment, whereas a person with a different cultural background may not understand it. The text (Table 1) of Lintel 25 of Yaxchilán (Figure 10) exemplifies how the ancient Maya described this ritual:
Figure 3. Spine of the Atlantic Stingray (*Dasyatis sabina*), which has its circulation area in the Gulf of Mexico. Download from http://nersp.nerdc.ufl.edu/~pmpie/spine.jpg on 07-16-2000.

A1 jo’imix chan mak 5 Imix 4 Mak [9.12.9.8.1, October 23, AD 681]
B2 u tzakaw k’awiilal she conjured the “supernatural” appearance
C1 u tok’pakal of the flint and shield
D1 aj’ak’o chaak Aj’ak’ O Chaak [denomination for the figure in the maw]
E1 u k’uhul tzak it is the divine conjuring of the
F1 chan winikhaab? 4 K’atun lord
F2 izsamnej b’ahlam Shield-Jaguar
F3 u cha’n aj nik he is the captor of Aj Nik
F4 k’uhul siiyaj-chan? Holy lord of
ajaw bakab Yaxchilán Bakab
G1 u ba’anil na’obl this is her depiction of the first entrance
G2 wi’té-naabh (into the) house of the dynasty founder
H1 cha’hom the “Scatterer” is
I1 ixi k’abal xook Lady K’abal Xook
I2 u yoktel (it is) her “appearance”
I3 tan ba’ siiyaj-chan? on the plaza of Yaxchilán

Table 1: Yaxchilán, Lintel 25, Inscription (Transliteration and translation: Sven Gronemeyer)

Methods of bloodletting
Several body parts were used for the withdrawal of blood as well as a series of instruments to puncture and perforate and various methods to catch the blood.

Iconographic and figurative representations of both Classic and Postclassic periods show the piercing of the tongue, penis and ear lobe to withdraw blood (Figures 1a–c). Ethnohistorical sources further testify to bloodletting from the arms (Tovilla 1960: 183) and the lips and cheeks (Landa 1959: 49). Within the framework of this paper, I will limit myself to tongue and penis perforations because of the abundance of the sources. The ear lobe sacrifice is limited to the Codex Madrid. Schele and Miller allude in their discussion of the so-called “scattering rite” to the withdrawal of blood from the groin (Schele and Miller 1986: 182–183). The scattering rite usually depicts the dropping of what looks like pellets and is interpreted as the casting of liquids which remain unspecified in the inscriptions. Since this rite is exclusively carried out by men, Schele and Miller presumably refer to the perforation of the penis here. Diego de Landa confirms these practices in his *Relación* and continues to explain (Landa 1959: 49, chapter 28):

> Que hacían sacrificios con su propia sangre cortándose unas veces las orejas a la redonda, por pedazos, y así las dejaban por señal. Otras veces se agujeraban las mejillas, otras el labio de abajo; otras se sajaban partes de sus cuerpos; otras se agujeraban las lenguas, al soslayo, por los lados, y pasaban por los agujeros unas pajas con grandísimo dolor; otras, se harpaban lo superfluo del miembro vergonzoso dejándolo como las orejas, [...].

They offered sacrifices of their own blood, sometimes cutting themselves around in pieces and they left them in this way as a sign. Other times they pierced their cheeks, at other their lower lips. Sometimes they scarify certain parts of their bodies, at others they pierced their tongues in a slanting direction from side to side and passed bits of straw through the holes with horrible suffering, other slit the superfluous part of the virile member leaving it as they did their ears, [...] (Translated in Tozzer 1941: 113–114)

Different instruments were available to the Maya to pierce their body and to draw blood. Very common were the spines of native stingrays (Figure 3), lancets that imitate stingray spines (2), obsidian and flint blades, agave thorns, or bone awls. Such instruments are shown in the sacrificial bowl on Lintel 25 from Yaxchilán (Figure 4).

The perforation of the tongue
I proceed with some remarks about the anatomy of the tongue (*Lingua*, Figure 5). The tongue fills the whole length and width of the oral cavity and is an essential auxiliary organ for tasting, speaking and chewing. One distinguishes between external tongue muscles which essentially are used

(2) According to Christian Prager (pers. communication: 1999) such lancets could have been set into the wound to secure a continuous flow of blood after the wounds had been pierced by other implements. On account of the presence of “Perforator God” motives (cf. Joralemon 1974: 62), such lancets probably only had symbolic function, since jade also produces no sufficiently sharp blade in order to make a cut.
for the movement of the whole organ and the inner muscles that modify the shape of the tongue. The coordination of both types can occur synchronously. The motor nerve on the topside stretches to the tip of the tongue (*Apex linguae*) (Blotevogel 1950: 29f).

Iconographic examples suggest that the tongue was pierced in the area of the tip. This is for example displayed in the painting on the eastern wall of Room 3 of Structure 1 in Bonampak, and in the Codex Madrid (Figure 6). It remains, however, unclear, how the tongue was held during the perforation so that it would not slip out of one's grasp. The tongue was possibly dried with a piece of cloth before the perforation. Another very simple method to immobilize the tongue, though it cannot be demonstrated, is to place the outstretched tongue onto a plane base on which it would then be supported immobile.

One should also point out that a perforation of the tongue involves the risk of an infection or even sepsis resulting from the use of unsterilized instruments. The process of healing a cut into the tissue caused by sharp blades takes more time than other injuries, because the tissues are completely severed and connecting fibers need to be rebuilt. In the opinion of Rainer Brocksieper, physician for inner medicine consulted on this topic, food intake delays the healing of a tongue wound. We can also assume that chewing problems occurred and that the reduced flexibility of injured tongue muscles may have resulted in disarticulation.

Information about the measures of the cord that was pulled through the tongue must remain speculative. However, the iconographic material allows to recognize that the cord was pulled through the tongue from top to bottom. One can see on Lintels 17 and 24 from Yaxchilan how the hand which holds the cord above the tongue shapes a kind of loop with three fingers, through which the rope is moved. The other hand clasps the cord in order to pull it through the perforation in the tongue, then the cord drops into a basket filled with other offerings. On Lintel 24 of Yaxchilán (Figure 1a) the thorns incorporated into the rope are pulled through the wound with their ventral side coming first. If pulled the other way, they would have bored into the underside of the tongue like barbs.

One should consider the inscription (3) that accompanies the scene on Lintel 24 of Yaxchilán (Table 2).

<table>
<thead>
<tr>
<th>A1</th>
<th><em>ti jo’ eb’</em></th>
<th>on [the day] 5 Eb</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td><em>jolajun mak</em></td>
<td>15 Mak [9.13.17.15.12, October 28, AD 709],</td>
</tr>
<tr>
<td></td>
<td><em>u b’aah</em></td>
<td>it is her image</td>
</tr>
<tr>
<td>C1</td>
<td><em>ti ch’abil</em></td>
<td>while creating</td>
</tr>
<tr>
<td>D1</td>
<td><em>ti k’ak’al hul</em></td>
<td>under the fire-staff</td>
</tr>
<tr>
<td>E1</td>
<td><em>u ch’ab chan</em></td>
<td>he creates, the 4</td>
</tr>
<tr>
<td></td>
<td><em>winikhaab’ ajaw</em></td>
<td>the 4 K’atun lord</td>
</tr>
<tr>
<td>F1</td>
<td><em>itzamnaaj b’alam</em></td>
<td>Shield Jaguar,</td>
</tr>
</tbody>
</table>

(3) In this paper the inscriptions (Tables 1 and 2) will be given without transcription and morphological segmentation, but only purely phonemic. I will also not discuss for reasons of clarity the often conflicting readings.
It can be seen that the inscription identifies the participants (Shield Jaguar and Lady K’abal Xook) and provides a partial description of the scene (see the allusion to the fire-staff). Yet, the text makes no explicit reference to the blood sacrifice (4).

**The perforation of the penis**

The perforation of the penis is not only common in records from the Classic and Postclassic periods (e.g., Codex Madrid, f. 19b and 82b; Figure 1b) but was also noted in Colonial accounts. Francisco Ximénez gives a detailed and medically interesting description about blood sacrifice among the Manché-Chol-Maya (1973: 164, chapter 31):

> En la ranchería de Vicente Pach vi los sacrificios. Cogían un cincel y un mazo de palo, ponían al que se había de sacrificar sobre una losa de piedra lisa, sacabanle el viril y se lo partían en tres partes, quedando la mayor en medio, cosa de dos dedos a lo largo, [...] sin echar gota de sangre y al parecer sin sentimiento de el paciente [...].

In Vicente Pach’s ranch I saw the sacrifice. They took a chisel and wooden mallet, placed the one who had to sacrifice himself on a smooth stone slab, took out his penis and cut it in three parts two finger breadths [up], the largest in the center [...]. The one who was undergoing the operation did not seem to suffer, and did not lose a drop of blood. (Translated in Schele and Miller 1986: 180)

To understand the damage that can be done to the penis by blood sacrifice, a short anatomical description is in order. The penis (**Corpus penis**, Figure 7) surrounds the ureter (**Urethra**) and two erectile tissues, the **Corpus cavernosum penis** on the dorsal side and the **Corpus cavernosum urethrae**, that runs out into the glans (**Glans penis**), on the ventral side. The foreskin (**Orificium praeputii**) covers the glans as the prolongation of the **Corpus penis**. The entire erectile tissue is covered by a layer of connective tissue about 1 mm in thickness, the **Tunica albuginea**. (Blotevogel 1951: 149f.)

> The Ch’ol rite (5), the Jaina figurine (Figure 1b), the representations in the Codex Madrid, and most importantly, the persons on the ceramic vessel K3844 who have bone markings on the glans could very well be similar representations of the description given by Francisco Ximénez (Joralemon 1974: 61). Also the markings on the penis of the right figure on the south balustrade of House A of the Palenque Palace (cf. Greene Robertson 1985: figure 290) as well as those on the “penis glyph” T761 may very well represent the same description (for a more iconographic approach hereto cf. Jones 1994: 81f.).

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(4) In all inscriptions accompanying scenes of blood sacrifice, the word “blood” is never mentioned. Instead of this, e.g., as seen on YAX Lnt. 24, the text speaks about “creating” something through the bloodletting, expressed by the sign T712, /CH’AB/ (Stanley Guenter, personal communication in 2001).

(5) For this source cf. Joralemon 1974: figure 5. The three markings on the glans could very well be similar representations of the description given by Francisco Ximénez (Joralemon 1974: 61). Also the markings on the penis of the right figure on the south balustrade of House A of the Palenque Palace (cf. Greene Robertson 1985: figure 290) as well as those on the “penis glyph” T761 may very well represent the same description (for a more iconographic approach hereto cf. Jones 1994: 81f.).
awls plugged into their male organs (Kerr 1992: 443, Figure 8) evince the wounding of the Corpus penis or the glans respectively. One could pierce the dorsal side in a slanting direction to avoid an injury of the urethral duct. The iconographic material gives no indication that cords were used during the perforation of the Corpus penis. Yet, the Relación geográfica y histórica de Panama written by Requejo Salcedo in 1640 mentions that the foreskin was pierced (quoted after Tozzer 1941: 114, note 525):

They make a hole in the foreskin of the penis with a fish spine, and through these with a cotton cord, half a finger in width, they all thread themselves together [...].

As with tongue piercing, the danger of infection during the perforation of the penis existed. No further side effects occurred while piercing the foreskin, but as Rainer Brocksieper pointed out to me, during the perforation of the Corpus penis or the glans the danger of an injury of the ureter existed. This damage would have caused pain while urinating. With scaring of the tissue, the danger of closing of the urethral duct existed, which could lead to death by kidney failure. An injury to the erectile tissue and to the surrounding Tunica albuginea may, in addition, have resulted in a temporary loss of sensitivity of the glans and temporary erectile problems.

Let us refer to Jürgen Kremer and Fausto Uc Flores’s investigation (1993: 86f.) to answer how infections were possibly prevented. On vessel K3844 a figure carries a bundle inscribed with ek’abalam, the name of a herb (Croton flavens) whose leaves have a strong styptic effect (Kremer and Flores 1993: 87). To what extent a sore supply of the tongue took place must remain undetermined for the moment, as well as the question whether the techniques of perforation and sore supply were secret medical knowledge (6). As Alexander Voß pointed out to me, a herb called (x-) kaka(l)tun (cf. Roys 1976) contains iodine and may have been used for sterilization of the instruments and the wounds.

The organic basis for entering into trances

Although it may sound paradoxical at first, no sharp separation between the different states of human consciousness actually exist. Between the extremes of being awake and the state of trance exists a gradual transition from one state of consciousness into another (Luczak 1999: 16). As results from researches on hypnosis have shown, people with high creativity and imagination are considerably more susceptible to altered states of consciousness. During trance, an increase in mental activity is registered in the area of the Sulcus calcarinus (Figure 9) indicating intense visual hallucinations (Luczak 1999: 16).

Altered states of consciousness can be caused in two ways: in a pharmacological manner and in a psychological manner. The stimulants for the first type are hallucinogenic drugs. Psychological stimulants are specific techniques for the attainment of a trance state.

In a series of experiments, it was determined that simple alterations of consciousness and slight trance merely influence thinking and cause interferences in concentration, a feeling of losing self-control, strong fluctuations in mood and intense emotionality. In this way, hard trances, above all, cause modifications in the optical perception: hallucinations of colour and shape occur, and in extreme cases even scenic imaginations (Luczak 1999: 19).

(6) The fact, that the contemporary milperos of Yucatán still use ek’abalam (Kremer and Flores 1993: 86) might speak against secret knowledge that was lost with the ancient elite.
The perforation as a trigger of hallucinogenic effects?
Since the blood sacrifice was the central part of the entire rite, should one also consequently assume that it caused altered mental states? Linda Schele and Mary Miller asserted that this might be possible, namely with the release of endorphins caused by the sensed pain and the loss of blood during the sacrifice (Schele and Miller 1986: 177).

Pain is directly passed on by receptors embedded in the skin and the inner organs to several regions of the brain. Periphery nerve fibers direct the irritation directly to the spinal cord (Medulla spinalis). The perception of the intensity of the pain takes place in the Gyrus cinguli region of the brain, whereas the subsequent sensation of pain after the initial perception is produced by biochemical reactions in the thalamus.

As the physicians from the county hospital pointed out to me, experiments have shown that the fear of undergoing painful procedures may cause an intensifying of the actual sense of pain. Equally, in the opinion of Dr. Pfennig from the county hospital consulted on this topic, it may be of importance whether the perforation is carried out alone or with the aid of trusted assistants, as mentioned previously by Ximénez on the Manché-Chol. Theoreticians of behavior demonstrated in series of experiments that angst can be learned, unlike innate fright. Consequently, suppressing of fear is also possible to learn (Benesch 1998: 101). By embedding the act of perforation into a ritual context, this may perhaps have increased pain tolerance or caused the participants to accept pain stoically (cf. Furst 1974: 186).

Endorphins are endogenic, pain-blocking oligopeptides that are produced in the pituitary gland (Hypophysis) and the hypothalamus and that react with opiate receptors in the thalamus (Figure 9), the limbic system and the brain stem and adjust the sensation of pain directly in the brain. They are chemically related to the opiate alkaloids to which include morphine. According to Dr. Heusler from the county hospital endorphins produced in the brain as a reflex to pain during perforation are of insufficient quantities to achieve a concentration that would induce a hallucination. They are also reduced through the action of specific enzymes in a very short period of time. The endorphins would have to be synthesized again very quickly to maintain a specific concentration, but this is actually not the case. Consequently, this aspect falls short of a convincing explanation for entering a trance state as Schele and Miller assumed.

However, what endorphins may cause is an euphoric elation, a reason why they are colloquially termed “luck hormones”. After the consumption of drugs containing opiates, one can find a similar behavior among addicts: after extreme happiness, a stage of depression occurs with the diminution of the effect. A similar effect is known from aficionados of extreme sports: endorphins can cause addiction because of their opiate-analogous structure and perennially require new avenues for release.

The loss of blood would then, after Schele and Miller, remain the only possible explanation for the occurrence of hallucinations. Extreme loss of blood can, indeed, induce a comatose state in which a person can perceive visions, but in this case the loss of blood is so extreme that death is fairly inevitable. Even if strong hemorrhages did indeed occur during the rite, the loss of blood would never have been large enough, because of the peculiar anatomy of the respective organs. A professional piercer consulted by the author states that the loss of blood is most often so little that it is barely recognized. (Of course, one must also be aware of the fact that the hole for the piercing which is to be inserted into it is often only 2 mm in diameter.) Nevertheless, all the explanations for the incidence of hallucinations caused by the blood sacrifice as proposed by Schele and Miller are not viable from a medical standpoint.

One should not assume that it was impossible to induce hallucinations during blood sacrifice. In my opinion, hal-
lucinogens of vegetable and animal origin were of significant importance in entering states of altered consciousness, likely in connection with psychological stimulants. These psychological stimulants were part of the preparations to the blood sacrifice that included days of fasting and ritual steam-baths as described by Landa (Schele and Miller 1986: 178; cf. Furst 1974: 188), sensory monotony (MacLeod and Puleston 1978: 75f.) (7), and perhaps ritual dance (8). The weakening of the body caused by fasting and steam-baths leads to a state of hypoglycemia which may cause neurological deficiency symptoms including psychotic states and light trances. I am still unable to determine a direct relationship between the taking of psychiatric drugs, blood sacrifice, vision and subsequent dance, since the inscriptions provide no such reference.

The steps involved in bloodletting rites
In what sequence were the individual steps of a ritual that involved bloodletting performed? By means of the series of Lintels 24 to 26 of Structure 23 in Yaxchilán (cf. Figures 1a and 10), which show blood sacrifice – vision – war motif, Linda Schele and Mary Miller determined a template for sacrificial actions (Schele and Miller 1986: 177). In Yaxchilán Structure 21 a similar series exists in the form of Lintels 15 to 17, but one that follows the sequence vision – war motif – blood sacrifice (Figure 11). Schele and Miller remark that the motif sequence in Structure 21 is not identical with the one from Structure 23, yet, they didn’t alter their overall hypothesis about the sacrificial sequence, developed on the sequence from Structure 23.

One can examine their sequence from two perspectives: (a) the dates contained in the texts, and (b) the content of the inscriptions and their relation to the iconographic scenes.

The dates on the lintels show that there are time gaps of several years (Lintel 24: 9.13.17.15.12 5 Eb’ 15 Mak, October 28, 709, Lintel 25: 9.12.9.8.1 5 Imix 4 Mak, October 23, 681, Lintel 26: 9.14.12.6.12 12 Eb’ 5 Wayeb’, February 12, 724). Solely because of this reason, a direct association of the proposed parts of the sacrificial sequence is questionable and a cause-and-effect relationship is not given.

Furthermore, as pointed out throughout the paper, we are not able to determine a direct relationship between text and image. The explicit mentioning of blood never occurs in connection with sacrificial actions. The action of “creating” something, expressed by T712 in the context of the bloodletting scenes, never occurs in scenes involving the vision serpent. A closer examination of epigraphy and iconography reveal further inconsistencies when comparing these details with the sequence proposed by Schele and Miller. On Lintel 25 from Yaxchilán, Lady Xook is seen without the iconographic markers on her cheek which are commonly interpreted as blood markers and which she likely spilled during the bloodletting displayed on Lintel 24. The inscription (Table 2) of Lintel 25 reports that she had shedded a substance, probably blood, in the interior of the house of the dynasty founder and afterwards stepped out onto the plaza of Yaxchilán (G1–I3). This description

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(7) The authoress withdrew herself, together with other subjects, for 48 hours into total darkness and silence in a cave. A state similar to meditation was reported to result after time.

(8) Excessive dancing can affect the psyche in connection with a monotonous-rhythmic stimulation through music (as in our contemporary techno culture) and generate trances by stimulus satiation, people almost “drown” in a strong sensory input. A public performance of these rites may easily have stimulated collective trances and mass hysteria.
stands after the text position containing the description of the conjuring (B1–D1).

Though these examples show that we have to reconsider the sequence of steps during the ritual, current proposals of how the blood sacrifice and the vision quest actually were connected and carried out would remain tentative and speculative since it cannot be reconstructed from the sources we have at hand.

**Summary**

After presenting and discussing some of the methods and accompanying rituals and equipment the Maya used to withdraw blood from the body, I examined whether it is possible to produce visions by bloodletting. I conclude that the direct cause-and-effect relationship between blood sacrifice and trances that Linda Schele and Mary Miller advanced in their book “The Blood of Kings” are not tenable from a medical point of view. I suspect that trances were rather provoked by a combination of pharmacological and psychological stimulants. It should be noted that we have to reconsider the sequence of ritual events that involved bloodletting. The evidence we have from epigraphy and iconography does not support any hypothesis of how these events were connected or carried out, mostly the result of a missing one-to-one relation between text and image.

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Sven Gronemeyer: Bloodletting and Vision Quest Among the Classic Maya. A Medical and Iconographic Reevaluation


Nina Müller-Schwarze: Knowing When to Clear the Fields: Manacus vitellinus and Swidden Farming in Northern Coclé, Panamá

Markus Eberl: Human Cranial Plasticity. The Current Re-evaluation of Franz Boas’s Immigrant Study

Rebecca Golden: Violent Cures for Violence: Bad Medicine, Silent Politics, Evacuation and Transit

Book Reviews


Nina Müller-Schwarze reviews Karl G. Heider’s Seeing Anthropology: Cultural Anthropology through Film.