

Psychoactive plants and southern African hunter-gatherers: a review of the evidence

by

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ABSTRACT

It is widely accepted that Bushman shamans enter into altered states of consciousness and that their experiences of such states are intimately bound up with the imagery represented in southern African rock art. Most accounts of contemporary trance performances by Kalahari Bushmen emphasise that such states are attained in ways that exclude the use of psychoactive plants. This paper reviews the relevant anthropological, ethnohistoric and archaeological literature to argue, on the contrary, that psychoactive plants may sometimes be employed by Kalahari healers at present and that they may also have been used among more southerly hunter-gatherers at times in the past. The paper concludes by suggesting ways in which future research on this topic might be developed.

INTRODUCTION

It is well attested that hunter-gatherers in general, and the Kalahari Bushmen of southern Africa in particular, have an intimate, detailed and extensive knowledge of the plants around them (e.g. Lee 1979; Silberbauer 1981). It is equally well established that some of these plants are employed for medicinal purposes and that Kalahari Bushmen seek out altered states of consciousness (e.g. Katz 1982; Lee 1979, 2003; Marshall 1999). Those entering such states are able to undertake such activities as curing the sick and engaging in out-of-body travel. Research over the past several decades has shown that the Bushman rock painting and engraving tradition of southern Africa is substantially a record of comparable actions on the part of medicine people in altered states of consciousness.¹ Such individuals are generally termed shamans and the correspondence between their actions in the Kalahari today, and among now extinct Bushman groups further south in the nineteenth century, and what is represented in the art is close and compelling (Lewis-Williams 1981, 1992, 1995, 1998, 2003; Lewis-Williams & Dowson 1999; Lewis-Williams & Loubser 1986). Although the point is contested (Helvenston & Bahn 2003, 2004), the likelihood is strong that some rock art traditions elsewhere in the world have similar shamanistic associations and also reflect and represent the experiences of individuals in altered states of consciousness (Dronfield 1995; Lewis-Williams 2002; Lewis-Williams & Dowson 1988, 1993; Whitley 1992).

A crucial component of the criticism of this conclusion, as it relates to Upper Palaeolithic art in Europe, centres on the apparent absence from the archaeological record of the remains of plants containing substances capable of producing the entoptic

¹ This is so even though Solomon (1997) has drawn attention to the mythological associations attributed to some rock art imagery by nineteenth century Bushman informants. Other studies (e.g. Deacon 1994; Guenther 1994) show little or no correspondence between the content of Bushman myths and that of rock art.

imagery experienced in many altered states of consciousness (Helvenston & Bahn 2002, 2003). One problem here is the degree to which some of these plants, such as mushrooms, may be detectable in the archaeological record. Moreover, as Lewis-Williams (2004) and Pearce (2004) point out, Helvenston and Bahn's (2002, 2003) argument is also logically flawed, not least because entoptic imagery can be produced in ways that do not require the consumption of hallucinogens. A further consideration is that such imagery constitutes but a small proportion of rock art, both in southern Africa and elsewhere, and that a range of mind and mood-altering substances does in fact exist, which could facilitate, alone or in combination with other factors, the visions experienced by trancing shamans. Only some of these plant derivatives are specifically hallucinogenic (i.e. capable of inducing changes in mood, thought and behaviour such that sensory images are distorted in different and unusual ways), rather than psychoactive (capable of affecting mental function; Carson *et al.* 1988: 396–397), although the distinction between the two is not always absolute and some psychoactive substances can also affect perception.

Africa, and specifically southern Africa, is often considered to have relatively few psychoactive plants of cultural importance (Dobkin de Rios 1990; Emboden 1980; Schultes & Hofmann 1979), although the recent discovery in KwaZulu-Natal of a hallucinogenic mushroom of the genus *Psilocybe* indicates that lack of research may be an issue here (Reid & Eicker 1999). The fact that Watt and Breyer-Brandwijk (1962) in their monumental survey of the medicinal and poisonous plants of southern Africa, classified most psychoactives as poisons, further complicates the matter (Manton Hirst *pers. comm.*). It is therefore perhaps unsurprising that it has frequently been stated in the literature that psychoactive substances are not consumed as part of contemporary Bushman trance rituals (e.g. Guenther 1986: 269; Lewis-Williams 1997a: 817), or are (were) only rarely so employed (e.g. Lewis-Williams 1995: 144; Lewis-Williams & Dowson 1999: 32). However, recent publications (e.g. Keeney 1999) suggest that the foregoing conclusion may be seriously misleading and draw attention back to earlier papers (Katz 1982; Winkelman & Dobkin de Rios 1989) that reported on the possible use of psychoactive plants by some Bushman groups. In the light of these publications, and the recent debate on the role of psychoactive plants in the production of the imagery represented in Upper Palaeolithic rock art, we felt that it would be helpful to draw together the disparate and scattered evidence for the employment of such plants by southern African hunter-gatherers. This evidence takes three forms—ethnographic, ethnohistoric and archaeological (in the form of rock art itself)—each of which we examine in turn.

ETHNOGRAPHIC RECORDS: *FERRARIA GLUTINOSA*, GWA AND OTHER PLANTS

The starting point for any general assessment of the evidence for the use of psychoactive plants by southern African hunter-gatherers has to be the work of Marlene Dobkin de Rios. In a paper published almost twenty years ago (Dobkin de Rios 1986), she drew attention to the parallels between the trance states entered into by Ju/'hoān shamans and those reported from drug-induced altered states of consciousness. She also argued that western academic bias and rapid cultural change among Kalahari Bushmen, might have led anthropologists to neglect potential evidence for the use of mind-altering drugs. A subsequent paper (Winkelman & Dobkin de Rios 1989) examined

15 species of medicinal plant recorded in use among the Ju/'hoānsi by Lee (1979). Five of these contained known psychoactive substances and two more were documented as producing fatalities or severe toxicity. Six species had close relatives for which psychoactive, toxic or fatal reactions are known, while only one was both non-toxic and non-psychoactive (information was insufficient to assess the status of the fifteenth species listed).

Katz's (1982) extensive study of the Ju/'hoān (!Kung) trance dance in the Dobe area of northwestern Botswana provides more detailed information on one of the plants in Lee's list, *Ferraria glutinosa*. Known to the Ju/'hoānsi as *!kaishe* or *gaise noru noru*, this is listed by Lee (1979: 469) as a hallucinogen, although without further discussion. Katz (1982: 281–294) discusses at length its employment as an apparently mind-altering drug once used in teaching people how to handle the experience of trance, although this practice had apparently ceased many years before his fieldwork in the mid-1960s. Katz's principal informant, Kinachau, indicated that the plant's root was used to make a drink which everyone drank, although those who had not previously succeeded in reaching a state of trance drank more of it. He went on to describe how on taking *gaise noru noru* one felt movement in the stomach, chest and back and a pulsating feeling in the back like jabbing, similar to what happens when *n/om* 'boils up' inside a person so that he enters trance. However, Kinachau also made plain that *gaise noru noru* could not by itself create the altered state of consciousness sought via the trance dance and he made no mention of it producing visions (Katz 1982: 292–293). Consistent with this, no relevant phytochemicals have yet been identified in *F. glutinosa*. However, experimental studies on the related *F. welwitschii* have shown that this species is toxic to rabbits (Watt & Breyer-Brandwijk 1962), while many other members of the Iridaceae are capable of producing narcotic overdoses. Circumstantial as they are, we suggest that these findings warrant more detailed scientific investigation of the effects and properties of *gaise noru noru*.

Further information on Ju/'hoān uses of *F. glutinosa* is provided by Marshall (1999) from her work across the Botswanan border in northeastern Namibia. There the Nyae Nyae Ju/'hoānsi believe that it belongs to the gods and that when a healer is particularly favoured by them he is sent one of its roots; these are said to be invisible to others. //Gauwa, the messenger of the great god, urinates into the tortoiseshell medicine container of the healer, who then mixes the *!kaishe* root with the urine and other medicines already inside the container to produce a bitter and potent brew. 'When a man drinks it, he may go mad for a while', but even if this does not happen he will acquire sufficient *n/om* to be able to enter trance and heal (Marshall 1999: 53).

A second potentially psychoactive plant discussed by Katz (1982: 168–169) remains unidentified.² Termed *gwa* by the Ju/'hoānsi, its roots were cooked and either eaten or drunk by women participating in the Drum Dance, the principal arena in the mid-1960s by which Ju/'hoān women in the communities studied by Katz entered altered states of consciousness. As with *gaise noru noru*, *gwa*'s principal role seems to have been in the training of novice trance-dancers and experienced healers undertook its preparation and administration. *Gwa* was not seen as being 'real' *n/om*, but rather 'another element,

² However, the term *gwa* is recorded as meaning *Cannabis* in the Northern !Kung (!Xu) Bushman language of Angola (Bleek 1956: 52) and in the form *!gwā* as referring to a plant (*Waltheria indica*) used as snuff in !Kung itself (Bleek 1956: 391).

akin to the drum and the singing, which helps to activate num' (Katz 1982: 169). *Gwa* is very probably identical to the *!gwah* plant discussed by Lee (2003: 136), the roots of which are chopped up and boiled to produce a tea drunk by some dancers before participating in the Drum Dance. As the active principle of the drug, if any, is clearly not a prerequisite for entering a state of trance, Lee suggests that it may have a psychological, rather than a psychochemical, effect on those drinking it. However, this conclusion seems to us to be a *non sequitur*, or at least insufficient: while trance can certainly be attained without drugs, this does not mean that drugs cannot, by psychochemical means, produce altered states of consciousness.

First hand accounts from several Kalahari Bushman healers strengthen the case for the consumption of medicinal plants playing an important part in the attainment of altered states of consciousness among southern African hunter-gatherers. Mabilelo Shikwe, for instance, recounts how his brother and grandfather had given him a medicine that made him 'boil inside',³ that he continued to use this medicine himself now, even as an old man, and that he also employed it when teaching others (Keeney 1999: 30–31). Motaope Saboabue was similarly given 'medicine' when learning how to trance, describing his experience of it in these words, which leave little doubt that the effect was to produce an altered state of consciousness:

When you take it, all ailments are cured and then you feel a light inside you. The strength of the medicine is that it teaches you to see the light. Later you will be able to see the light without taking the medicine...When you see the light during the healing dance, it is so bright that it looks like daylight even though it is actually evening. This light brings about very special kinds of things. I become so tall that I see the people as small, as if they are standing far below me. It's like I am flying over them. Although I am physically blind, I can see everything in this light. This is when I truly see (Keeney 1999: 59–60).

One of those taught by Motaope, Tete Morewrang, terms this medicine *Mokgonastole*, meaning 'I can do anything and I can heal anyone'. A second plant, described as a 'parasite that draws on other roots', is apparently even more powerful, its roots being used in a tea and its flowers for smoking (Keeney 1999: 65). Tete Morewrang continues to drink *Mokgonastole* to help him heal, emphasising that it must be consumed on an empty stomach and immediately before dancing. Taken thus, the effect is described as follows:

It feels like drinking fire. As soon as you set the cup down, you feel the fire. If you drink water, your legs will tremble. The fire inside you gets hotter and hotter until all that you can see is the light (Keeney 1999: 67).

Other healers also report that they first learned to trance having taken medicine prepared from roots (Keeney 1999: 75, 93, 113), an experience reiterated by the woman healer Tlixgo Gcao who had, as a young woman, eaten and drunk medicine prepared from unnamed roots before engaging in the Elephant Dance. The medicine's purpose, so she said, was to 'make [her] belly hot' and to allow her to 'shake more strongly (Keeney 2003: 114–115). Finally, we note the report given by Nisa, another Ju/'hoan woman, which is fully consistent with this. In this case, her mother prepared a root in combination with some bulbs and beans into a horrible-tasting medicine so that she might learn to trance in the Drum Dance. Nisa drank the mixture several times, vomiting in between,

³ 'Boiling' is a widely employed metaphor for the experience of tapping into *n/om* and thereby entering trance. It provides the title for Katz's (1982) study of the Ju/'hoan trance dance and was also employed by /Xam Bushman informants in late nineteenth century South Africa (Lewis-Williams 1981: 78).

but finally succeeded with its help in experiencing an altered state of consciousness. Subsequently, she used the medicine several times, before giving up doing so as she became more proficient (Shostak 1990: 301–302).

The reports which we have cited come from a variety of ethnolinguistically different Kalahari Bushman groups and show a widespread interest in the use of medicinal plants as aids to entering the altered states of consciousness sought by Bushman healers. Some of these plants may be credited with supernatural potency independent of their pharmacological properties. This is certainly the case, for example, with the Ju/'hoānsi in respect of the *zao* (*Terminalia sericea*) and */ana* (*Acacia giraffae*) trees, which they believe to be capable of influencing the rain (Marshall 1999: 166), and perhaps also of the unidentified *zau* and *mai* roots, which they employ as curative medicines and as aids for successful hunting (Marshall 1999: 149–150). Animal species may also have medicinal value, as with the *g/abib* turtle among the Bushmen of the southern Kalahari, who value it and its eggs for their ability to invigorate by 'shooting strength into all parts of your body' (Steyn 1984: 122). Distinguishing between those substances which achieve their effects psychologically and those which, in part or in whole, do so psychochemically, will require a sustained programme of ethnobotanical and ethnopharmacological research, capable of identifying precisely which medicinal plants contain psychoactive substances, and the nature and specific effects of those substances. However, even with the limited evidence available at present, particularly that presented by Keeney (1999, 2003), we suggest that the use of psychoactive plants in obtaining access to altered states of consciousness may be more widespread among Kalahari Bushman groups than has frequently been stated.

ETHNOHISTORIC RECORDS FROM THE SOUTHERN BUSHMEN: *CANNA*, *O-/ŌĀ* AND *QAT*

As a result of genocide, displacement and assimilation (more-or-less forced) into neighbouring agricultural societies, virtually no Bushman communities survive today south of the Kalahari, although recent political changes in South Africa are encouraging a reassertion of Bushman identity and ancestry on the part of some. To build upon the Kalahari evidence that we have just reviewed, we turn to ethnohistoric records south of the Limpopo and Gariep Rivers, for the most part of nineteenth century date. Foremost among them is the testimony obtained from a Bushman informant named Qing by Joseph Orpen (1874) in his travels in the highlands of Lesotho during the summer of 1873–74. As most recently reviewed by Lewis-Williams (2003), Orpen was able to obtain from Qing not only explanations of three rock-paintings from sites along the upper Senqu (Garipeg) River, but also several myths that relate the doings of the creator deity /Kaggen and his family. Regrettably, Qing's testimony does not take the form of a verbatim record, but is instead a narrative strung together by Orpen from his fieldnotes, the content of which had itself passed through at least one intermediary stage of translation between its original Bushman expression and its rendition in English (Orpen 1874: 3). Despite these difficulties, it nonetheless offers us a critical resource for understanding nineteenth century Bushman thought and occupies a central part in the argument that Bushman rock art is largely shamanistic in its associations (Lewis-Williams 1981). Of specific concern to us here is a substance called *canna*, which occurs in five, possibly six, different contexts in Qing's accounts and plays an important part in some of the myths that he recounted.

In the first of these stories /Kaggen's wife Coti is told to grind *canna* so that he may enquire what kind of animal is the new eland calf to which she has given birth. Having sprinkled *canna* on the calf, it eventually replies affirmatively to /Kaggen's question 'Are you an eland?' (Orpen 1874: 3–4). The ability of *canna* to help someone or something achieve a goal, perhaps one that is expected to be beyond its abilities, is also evident on a subsequent occasion when /Kaggen rubs *canna* on the beak of the *qeviv* or *tswanafike* bird (the mountain chat, *Oenanthe monticola*) so that it will report back on the success of his son Cogaz's retrieval of a woman from the Qobé giants (Orpen 1874: 6). More intriguing are three further instances of its use, all of which suggest that *canna* was thought capable of facilitating the transformation of people from one state into another. Thus, /Kaggen is able to change the snakes with whom his daughter has taken refuge into people by striking them with a stick and then sprinkling their snake skins with *canna*, the result being that 'the snakes turned from being snakes, and they became his people' (Orpen 1874: 5). Later, when /Kaggen's son Cogaz is killed by the baboons and tied to the top of a tree, /Kaggen rescues him and 'gave him *canna*, and made him alive again' (Orpen 1874: 8). Finally we have an extended story about the hero Qwanciqutshaa who, after experiencing nasal bleeding and throwing himself into a river, turns into a snake to escape his pursuers. At this point, his girlfriend 'made *canna* and put pieces in a row from the river bank to the hut. And the snake came out and ate up the charms, and went back into the water, and the next day she did the same'. The snake continued to eat the charms and was eventually held captive by the girl, who smothered it in a kaross, sprinkled the skin with *canna* and then burnt it, after which Qwanciqutshaa was restored to life as a person. His (new) wife was then told 'to grind *canna*, and she did so, and he sprinkled it on the ground, and all the elands that had died became alive again' (Orpen 1874: 7).

Not only do we seem to be dealing here with a substance capable of assisting the transformation of people or animals from one realm into another, but specifically with something that can restore the dead to life. Significantly, as Lewis-Williams (1981: 81) and Katz (1982: 214–216) have convincingly shown, 'death' is a Bushman metaphor for the experience of entering trance, one that Qing himself used when attempting to explain to Orpen the meaning of three antelope-headed men depicted on the wall of Melikane Shelter (Orpen 1874: 10). Could *canna* thus not merely be something with what we might otherwise term 'magical' properties, but also a substance directly associated with the transformations of experience involved in entering altered states of consciousness? Lewis-Williams (2003: 47) has, indeed, already raised this possibility and we note that Qing's account of the doings of Qwanciqutshaa include quite obvious references to trance experience (nasal bleeding and going underwater), linked in the second case to his consumption of *canna*. Qing's further comment (Orpen 1874: 10) that individuals engaged in the trance dance ate 'charm medicine, in which there is burnt snake powder' may thus also relate to *canna*, given its evident associations with snakes and charms in the stories that he had previously recounted.⁴ As Lewis-Williams (2003: 39–40, 47) points out, the apparent death and rebirth of snakes as they slough

⁴ Qing's specific words at this point in Orpen's (1874: 10) account of his narratives might even suggest a parallel with the consumption of psychoactive plants by those beginning to learn how to enter altered states of consciousness in today's Kalahari: '...blood runs from the noses of others whose charms are weak, and they eat charm medicine, in which there is burnt snake powder.'

their skins and the depiction of a spotted rinkhals on the famous Linton panel from the Drakensberg Mountains of the northern Eastern Cape province, reinforce the association between snakes, life/death and trance. Collectively, then, Qing's statements, as reported to us by Orpen, suggest that *canna* may have been a substance (presumably a plant) with psychoactive properties and that it may have been consumed as part of trance dance rituals. We see no reason to assume *a priori* that it, any more than the bows, digging sticks and pots that also feature in Qing's accounts, was merely a supernatural substance, not a real one, and thus ask if we can identify it botanically.

Our starting point is the extensive documentary evidence, reaching back to the seventeenth century, for the Khoekhoe inhabitants of the Cape chewing the roots and stems of *canna* for their narcotic effect (e.g. Kolbe 1731;⁵ Waterhouse *et al.* 1979). Thunberg (1986: 248, 303) confirms this, and adds that *canna* was first chewed and then smoked by Bushmen as well. In both South African English and in Afrikaans the term *canna* can refer to two different kinds of plants. The first, with an origin reaching back to Sparman's (1975) travels in the late eighteenth century Cape Colony, consists of several species of the genus *Salsola*, which were employed by both Khoekhoen and Dutch-speaking settlers to make soap. None of these taxa is reported to have psychoactive properties, unlike two succulents of the family Aizoaceae, *Sceletium anatomicum* and *S. tortuosum*, which we discuss below. Although spellings remained variable, reflecting the difficulty of expressing Khoisan click sounds in the Roman alphabet, a comparison of the nineteenth century usages recorded by *The Dictionary of South African English* (Silva 1996) shows that the term referring to *Salsola* spp. was normally spelt 'ganna' during the 1800s, whereas that used for *Sceletium* spp. was generally spelt 'canna' or 'kanna', with 'kanna' the modern form. While acknowledging the possibilities of mistranslation inherent in Orpen's account of Qing's words, and remembering that in the modern Kalahari some *n/om*-containing plants are valued for non-psychoactive reasons, we suggest that the date of Orpen's writing and the associations that *canna* holds in Qing's mythology, make an identification with *Sceletium* spp. plausible.⁶

Today *S. tortuosum* has come under commercial cultivation, easing pressure on the wild population, which is restricted to the Karoo regions of western South Africa. Traditionally, it was used dried and either chewed (hence the alternative Afrikaans name, *kougoed* or 'chewing stuff'), smoked, or powdered and inhaled as a snuff. Smith *et al.* (1996: 126–127) note that the common traditional method of preparing *kougoed* by crushing the plant material, fermenting it in closed containers and drying the finished product, may remove harmful oxalates that irritate the mucous lining of the mouth, gut and nasal passages, while retaining the alkaloids that produce a psychoactive effect. Alternatively, and among the Khoekhoen of the Little Karoo, *S. tortuosum* was combined

⁵ Smith *et al.* (1996: 121) note that Kolbe's (1731) illustration is certainly not of *Sceletium* sp. and that it may have been included in his text for visual effect, not botanical accuracy. That he is referring to the same plant as other commentators, both before and later, nonetheless seems likely, and the illustration reproduced in Simon Van der Stel's journal of his journey through Namaqualand (Waterhouse *et al.* 1979) is certainly of a species of *Sceletium*.

⁶ An identification of *canna* with 'the hallucinogenic (*sic*) plant known in southern Africa as dagga and elsewhere as Indian hemp or marijuana' (*pace* Lewis-Williams & Dowson 1999: 130) is not supported by any English language sources of which we are aware. It may be worth noting, however, that the term *kane* is recorded as meaning *Cannabis* in a Southern Bushman language from the Theunissen area of the Free State (Bleek 1956: 300).

with honey and water to produce an intoxicating beer known as *khadi* (Gordon 1996).⁷ Use of *S. anatomicum* appears to have been less widespread and solely for medicinal purposes or for the relief of hunger (Smith *et al.* 1996: 128). Mesembrine, which occurs in levels of 0.3 % in the leaves and 0.86 % in the stems (Watt & Breyer-Brandwijk 1932), appears to be the principal psychoactive alkaloid present, with considerably higher levels (1–1.5 %) in the prepared *kougoed*, but a clear understanding of alkaloid synthesis by the plants is some way off (Smith *et al.* 1996: 125). Seemingly richer in alkaloids than other mesembrine-containing succulents, *Sceletium* has been shown to be capable of elevating mood and decreasing anxiety, stress and tension. In intoxicating doses it can cause euphoria, but is not considered hallucinogenic, at least when consumed on its own (Smith *et al.* 1996: 125–128). Manton Hirst (*pers. comm.*) has however, drawn our attention to the fact that ingestion of 2–3 mg of the pure extract of *S. tortuosum* results in an experience of moving rapidly, like a river in full spate, through rings of bright white light toward an even brighter light at the end of a tunnel, accompanied by a high-pitched ringing sound in one's ears. The experience lasts three to four hours before tapering off into sleep, the visionary effects being most prominent with the eyes closed.

Sceletium plants from particular areas are believed to be more potent than those from other localities (Van Wyk & Gericke 2000: 172) and alkaloid content also seems to vary with time of year (Smith, Crouch *et al.* 1996; Smith, Field *et al.* 1998). In the case of another narcotic, *Cannabis*, we know that in the mid-seventeenth century it was traded some hundreds of kilometres into the greater Cape Town area from other Khoekhoe communities further to the east (Elphick 1977: 63), and Thunberg (1986: 248) indicates that *canna* was widely traded, and highly valued, by late eighteenth century Khoekhoen in the Eastern Cape. Might it also have been exchanged eastward from the Karoo into the Lesotho highlands? Hard evidence to support this proposition is lacking, but there are several indicators in the archaeological record of connections between hunter-gatherers in Lesotho and those living in the central interior of South Africa, connections which take the form of shared distinctive stone artefact types such as pressure-flaked backed microliths and bifacially pressure-flaked arrowheads (Mitchell 1999) and of finished ostrich eggshell beads for which a derivation in or beyond the Caledon Valley seems plausible (Mitchell 1996). That Bushmen in the Lesotho highlands were able to gain access to *Sceletium tortuosum* is therefore far from unlikely.

Some eighteenth and nineteenth century writers record that *canna* was also sometimes consumed with *Cannabis*, a combination that significantly enhanced the latter's effects (Patterson 1789; Stow 1905: 53). It is therefore of great interest that Smith *et al.* (1996: 127) report the same of modern users who combine the two plants, including the experiencing of flashbacks and visions. The effects of *Cannabis*, which frequently include intensifying sensory inputs and enhancing perceptual acuity, are well known to vary greatly according to a number of factors, among them the simultaneous consumption of other drugs (Van Wyk & Gericke 2000: 158). That *Cannabis* was available to southern African hunter-gatherers in precolonial times is not in question, and both it and an indigenous substitute *Leonotis leonuris* were widely consumed by

⁷ In Botswana an intoxicating drink of the same name, makes use of another mesembrine-containing succulent, *Delosperma cooperi*, and species of *Grewia*, both of which also contain alkaloids (Hargreaves 1999).

foragers, pastoralists and farmers alike (Du Toit 1975).⁸ Katz (1982: 180) makes clear that *Cannabis* is sometimes used by Dobe Ju'hoānsi to facilitate entry into trance, although Marshall (1999: 61) explicitly denies the link with trance in the case of their Namibian relatives. Further research is evidently needed on its use and associations in Bushman societies, which include consumption for recreational purposes outside the serious business of spiritual healing in the context of the trance dance.

Qing's account to Orpen (1874), crucial though it is for our understanding of Bushman rock art, is far smaller than the massive archive built up in the 1870s and 1880s by Wilhelm Bleek and Lucy Lloyd, principally from their work with a series of /Xam teachers from what is now the Northern Cape province of South Africa (Deacon 1996). Much of this archive remains unpublished, but the fraction of it that has appeared allows us to suggest another candidate for inclusion in the list of psychoactive plants known to southern African hunter-gatherers. This is a plant variously spelt *sho*:-/a, [o-/ōa, [o-/ōä, s^oo:-/ā, so-/ā, s*sho*-/ōä and s*sho*'-/ōän (Bleek 1956: 173, 182).

According to the /Xam Bushman Diä!kwāin, baboons, who occupied a quasi-human position in /Xam belief systems, might hold a stick of *sho*:-/a in their mouths and thereby learn things that they could not ordinarily know:

My grandfather told me that a baboon holds a stick of *sho*:-/a in its mouth; this little stick tells it about things which it does not know. That is why it seems to understand them well, because that stick of *sho*:-/a has talked to it about them (Bleek 1931: 167-8).

Diä!kwāin went on to explain that the *sho*:-/a prevented the baboon from feeling pain or sickness, while simultaneously teaching it fear:

For its body does not feel as it usually feels, it does not feel comfortable at that time. The *sho*:-/a is doing this to its body, in order to teach it to know. Therefore the baboon is a thing that does not want to die (Bleek 1931: 168).

As both Deacon (1994: 240) and Lewis-Williams and Dowson (1999: 135) have previously suggested, the references here to teaching and dying could be metaphors for the experiences of individuals entering, and learning to enter, states of trance. This possibility is strengthened by a usage of the term recorded in Bleek's *A Bushman Dictionary*, which reads:

He takes out the [o-/ōa with which he works upon the other, then he brings to life the other with it (Bleek 1956: 182).

This seems very likely to be a reference to the use of [o-/ōa to help bring round someone who has fallen into the 'death' of trance, in exactly the same way as is recorded among the /Xam, Ju'hoānsi and other Bushman groups with respect to buchu (Lewis-Williams 1981: 81).

Two further observations are of interest. First, if we examine the second component of the plant's name we find that the /Xam word /ā (/a, /ā:) meant either 'fight', 'die' or 'be killed' (Bleek 1956: 267), all terms used metaphorically to refer to entering and experiencing trance (Lewis-Williams 1997b), or alternatively 'to cut', 'cut up' or 'be cut' (Bleek 1956: 267), meanings which have clear references to one of the plant's principal uses, as we shall see in a moment. The alternative spelling /ōä, on the other

⁸ We note in passing that there is some evidence that nineteenth century Bushmen in the Lesotho highlands may have grown *Cannabis* for their own use. Only a few kilometres distant from two of the painted sites visited by Qing and Orpen (1874), the Likoaeng stream takes its name from the discovery there by the first Basotho settlers (probably in the 1880s) of feral *Cannabis* or tobacco plants (Mitchell 2001; David Ambrose *pers. comm.*).

hand, carries the meaning ‘to rub’, ‘to anoint’, ‘to sweep’ or ‘to wipe’, as in the phrase ‘he does this, the blood which he has sneezed out of the other sorcerer, he *rubs* on the man who is ill’ (Bleek 1956: 355; our emphasis), a usage that recalls our earlier citation from Bleek (1956: 182) about $\int o\text{-}\tilde{o}\tilde{a}$ being used to ‘work on’ another person to bring him back to life. Second, it may be significant, as Deacon (1994: 240) suggests, that in a note on the reverse of the page in which Diä!kwäin discusses *sho:-/a*, he explicates the word *kann*, which does not, in fact, appear in the baboon narrative he was relating. The term is explained as being the place at which his ‘fathers’ had produced rock engravings of gemsbok, quagga and ostriches, a locality which Deacon has been able to identify with the present day farms of Kans and Varskans.

Accounts provided by //Kabbo, who came from a dialectically different /Xam group, describe how the same plant was charred and rubbed into cuts in the skin to form tattoos. One reason for this was to be able to dig up the plant in the first place, for //Kabbo was ‘told by a man whom he knew, not to dig $\int o\text{-}\tilde{o}\tilde{a}$ himself, his arms being free from the accustomed marks of a $\int o\text{-}\tilde{o}\tilde{a}$ ’s man,’ a situation which itself suggests that there was something special, and exclusive, about $\int o\text{-}\tilde{o}\tilde{a}$ (Bleek 1936: 157). Among other properties, $\int o\text{-}\tilde{o}\tilde{a}$ also influenced the behaviour of arrows, was used to treat wounds, brought about a sympathetic bond between hunter and prey, could frighten and disorient game so that its capture became easier, and had negative and adverse effects on women. Reinforcing male dominance in crucial aspects of /Xam society, both meat production and the welfare of women were thus linked through a plant that men (and then only certain men) controlled (Bleek 1936: 144–160; James 2000: 70, 93, 186; Lewis-Williams 2000: 83).

Although the Bleek/Lloyd archive does not provide a specific botanical identification of $\int o\text{-}\tilde{o}\tilde{a}$ or *sho:-/a*, it does describe it as being ‘a plant with a red top and long roots which grows in sand, in or near dry river beds’ (Bleek 1931: 179), while Bleek (1956: 182) records it as meaning simply ‘a certain vegetable medicine’. It clearly did not grow everywhere and was, in fact, traded between different /Xam dialect groups since the Flat Bushmen had to buy it from those living further north in ‘the Orange River’s mountains’ (Bleek 1936: 150). The long root and habitat description might fit *Pancratium tenuifolium*, a member of the Amaryllidaceae widespread in southern Africa that is apparently employed in a similar fashion to $\int o\text{-}\tilde{o}\tilde{a}$ by the Ju’hoānsi Bushmen of the northwestern Kalahari, that is, rubbed into incisions on the head (Dobkin de Rios 1986: 301). *P. tenuifolium* contains a number of alkaloids and can produce visual hallucinations (Schultes 1976). Further work is required to establish the botanical identity of the plants described by //Kabbo and Diä!kwäin, and particularly the possibility of a match with *P. tenuifolium*, but that *sho:-/a* was associated with concepts related to trance, and may itself have been hallucinogenic, seems by no means untenable.

Another psychoactive plant formerly used by southern African hunter-gatherers is *Catha edulis*, or *qat* as it is commonly called. The fresh young leaves and adjacent stems of this plant are commonly chewed for energy, endurance and the alleviation of hunger in East Africa and Yemen, but the species is geographically much more widespread. With experience, users report increased clarity of thought, alertness, a sense of well-being and enhanced sociability. The stimulating effect of the leaves is due to several phenethylamines, including cathinone, which has amphetamine-like properties. Side effects reported from Yemen and the Horn of Africa include a range of symptoms, among them the potential for developing aggressive and paranoid behaviour (Van Wyk

& Gericke 2000: 160). As well as having known medicinal properties in traditional southern African pharmacopoeia, *qat*'s stimulating qualities are valued in parts of the Eastern Cape province, where some users hold that the practice of chewing fresh leaves was first learned from local hunter-gatherers (Hirst 1997). Indeed, Bushmen were observed chewing *qat* in the Tsolo District of the Eastern Cape in the late nineteenth century (Macquarrie 1962: 30) and the common South African English and Afrikaans names for the plant are 'Bushman's tea'. Interestingly, Smith (1966: 149–150) reports that c. 1832 Ecklon and Zeyher observed that consumption of *qat* in the Cathcart district of the Eastern Cape produced a state which they termed 'drunkenness.' Modern Xhosa practice explains this reference: the fresh leaf is chewed and the juice swallowed, after which draughts of cold water are drunk: the liberated cathinone is taken up by the cold water and a mild state of inebriation ensues (Hirst 2002–3).

One of the last surviving southern Bushman descendants to retain knowledge of rock art and the shamanistic beliefs associated with it was a lady called Maqhoqha. Daughter of a well known Bushman rainmaker, she recalled that her sister, Chitiwe, who had also practised as a rainmaker for local Mpondomise farmers in the Tsolo district, would chew the leaves of *Catha edulis* after leaving the cave in which she made rain (Prins 1990: 113). Maqhoqha remarked that the plant, known to her as *igqwaka*, could revive a fatigued and hungry person, and it is thus possible that her sister's use of it was to revive her strength after the presumably tiring business of making rain. Another possibility, though one without direct support, would be that Chitiwe used *qat* to enter an altered state of consciousness, as it is known to be capable of producing slight hallucinations (Emboden 1980: 144; Watt & Breyer-Brandwijk 1962: 179–181). The imagery that it produces can be potentiated by smoking *Cannabis* or *Sceletium* (Manton Hirst *pers. comm.*).

PSYCHOACTIVE PLANTS IN ROCK ART?:
BOOPHANE DISTICHA AND *ALOE FEROX*

The rock art of Africa south of the Limpopo Valley is well known for having remarkably few representations of plants. Those that are depicted may thus be of particular significance. Little can be said of perhaps the best known instance, a painting from East Griqualand showing a woman armed with a digging stick and bag bearing down upon what appears to be a geophyte (Vinnicombe 1976: 280). We recognise that here, and even more so in Zimbabwe, representations of plants seek to capture botanical subjects as a generic category, rather than to serve as scientific illustrations. In some cases however, sufficient detail is shown to allow some attempt to be made at more specific botanical identifications and it these instances that we review here.

That a plant of some kind is depicted in a small overhang at Thaba Bosiu National Monument, Lesotho, has been known since at least the early twentieth century when Victor Ellenberger recorded it. Described and illustrated in detail by Loubser and Zietsman (1994), it forms part of a scene that consists of eight motifs, including two horse-like animals, a giraffe-like creature and a shield of southern Sotho type. To the right of these images and immediately adjacent to the shield is the plant, painted in red and consisting of a bulb, a stem and seven star-like motifs each at the end of a line originating from a common centre at the top of the stem. To the right, remains of two further animals and additional shields are present. Loubser and Zietsman (1994) interpret

the plant-like motif as a depiction of *Brunsvigia radulosa*, a member of the Amaryllidaceae. One of their reasons for doing so is that *B. radulosa* has very few flowered umbels; another is that the motif lacks leaves, which are often produced later than the inflorescence in this species. The presence of a horizontal black smudge across the stem, if deliberate, could further support this identification since it might have been designed to indicate that the plant's root was underground, which is characteristic of *Brunsvigia radulosa*.

Although the Amaryllidaceae as a family are well known for their alkaloids, and several taxa form part of the traditional medical repertoire of Sotho-speaking peoples (Watt & Breyer-Brandwijk 1962: 23), *Brunsvigia radulosa* itself, though containing alkaloids that work as respiratory stimulants and depressants, is not known to be hallucinogenic, nor does it appear to have been employed by southern African Bushmen. For these reasons an alternative identification can be entertained, one that Loubser and Zietsman (1994) themselves discuss. This would be to suggest that what is represented at Thaba Bosiu is another, and highly poisonous, amaryllis, *Boophane disticha*. This possibility was raised by Dr Bruce Hargreaves, then Lecturer in Botany at the National University of Lesotho, when he first took Loubser, accompanied by Mitchell, to the site in 1988 (Bruce Hargreaves *pers. comm.*). Returning to the three identifying features mentioned earlier, we note first that the association between the red plant image and the black smudge across it can only be uncertain. Second, *Boophane disticha* can in fact, produce flowers without first producing leaves—the photograph reproduced by Van Wyk *et al.* (2002: 53) is graphic proof of this. Finally, we wonder if the paucity of flowered umbels in the Thaba Bosiu image is more a matter of artistic convention than of botanical accuracy, not least because *Brunsvigia radulosa* itself can have many more than seven umbels (Herbage 2004: www.herbage.info/tej/files/H218.htm#4; Missouri Botanical Garden 2004: http://mobot.mobot.org/cgi-bin/search_vast?onda=N01200955). Beyond these points, however, there is a well-developed literature that confirms both the use of *Boophane disticha* by southern African hunter-gatherers and its hallucinatory properties.

Boophane disticha is well known to southern African farmers as a highly toxic plant, responsible for the death of cattle and other livestock, hence its Afrikaans name *gifbol* (poison bulb). The main toxin present in it is buphanidrine, which is a powerful analgesic, hallucinogen and neurotoxin (Neuwinger 1997; Van Wyk *et al.* 2002: 52). However, at least ten other alkaloids are also present, with a total yield of 0.31 % from the fresh bulb (De Smet 1996: 142). As well as being fatal to animals, several cases of human poisoning are documented, either intentional (murder or suicide) or accidental (from the use of traditional medicines). Du Plooy *et al.* (2001) provide an example of the latter, describing the effects of ingesting a medicine containing *Boophane disticha*: the subject started to hallucinate, thinking that someone was attacking him, and, before being arrested, shot one person dead and injured others. Laing (1979) provides a comparable account from Zimbabwe of ingestion being followed by intense visual hallucinations. Today, some diviners and herbalists in Zimbabwe and South Africa use the plant to induce communion with ancestors through visual imagery (Gelfand *et al.* 1985; Nyazema 1984). Its scales are administered to patients either orally as a decoction, or as an enema, sometimes in combination with the profoundly sedative wild yam, *Dioscorea dregeana* (Van Wyk & Gericke 2000: 156–158, 164).

The hallucinogenic properties of *Boophane disticha* are also well attested from the role that it plays in South Sotho male initiation rites in Lesotho and the Free State, where it is called *leshoma*. Laydevant (1932, 1951) records its use to produce a state of intoxication that could sometimes result in a loss of consciousness and comments that its ingestion, mixed with several other ingredients, was believed to imbue initiates with the qualities of their ancestors. More specifically, Ashton (1952: 49) reports how, in the aftermath of being circumcised, initiates were given a large bowl of medicine, consisting of ‘roasted butterfat mixed with a powerful narcotic made of *leshoma* bulb... Each eats a handful and within a few minutes falls into a profound stupor, which lasts for a day or more and effectively deadens all pain.’ A more recent analysis of South Sotho initiation rites by Van Wyk and Kriel (1985) suggests that changes in the precise details of the operation performed have led to the abandonment of this medicine in much of the Free State, although the initiates’ wounds are still wrapped in *B. disticha* leaves because of their pain-numbing effects. Interestingly, in one of the earliest discussions of the topic, Ellenberger and MacGregor (1912: 6, 280–289) cite Basotho initiation songs as evidence for attributing their practice of circumcision to a cultural borrowing from Bushmen. Might their employment of *B. disticha* have the same origin, comparable to the appropriation of flywhisks and beads from an originally Bushman source into the costume of Basotho diviners (Tesele 1994)?

That Bushmen in southern Africa employed *Boophane disticha* is not in doubt. It was widely used as an arrow poison (Schapera 1925) and has been recorded archaeologically in numerous rock-shelter excavations in both the Eastern and Western Cape provinces (Binneman 1997, 1998, 2000; Liengme 1987). In at least some cases, notably in the approximately 2000-year old BDL Member at Boomplaas Cave near Oudtshoorn, leaves of *B. disticha* were used to line what have been interpreted as storage pits, perhaps in order to keep insects away from their contents (Deacon 1984: 77). That this may not have been the only reason for their use is suggested by their presence in a grave associated with a painted stone at Tierkloof in the Eastern Cape (Binneman 1999). None of this adds up to proof, but it is nonetheless striking that one of just four known representations of plants in the rock art of Africa south of the Limpopo Valley plausibly depicts a species widely used by late Holocene southern African hunter-gatherers; a species which has well attested hallucinatory properties, continues to be employed in traditional medicines among several Bantu-speaking peoples and is specifically associated with South Sotho male circumcision rituals—for which there is some historically early evidence of a Bushman association. We doubt that this is coincidence.

A similar conclusion may, though with less certainty, be warranted in respect of the two other paintings of which we are aware. One, first published by Stow and Bleek (1930: plate 51), comes from the Zastron area of the south-eastern Free State and was recorded in the 1870s. It shows nine human figures to the left of five large antelope and at least three aloes, not all of which are shown in the published reproduction. Two broadly parallel lines of blue dots are present above the antelope and three of the humans hold what seem to be branches; a fourth such branch is depicted above a prostrate human figure. The scene was interpreted by one of the /Xam Bushmen working with Wilhelm Bleek and Lucy Lloyd as representing ‘hunting and sticking things in the ground’, and Stow and Bleek (1930: plate 51) note that brushes of ostrich feathers were sometimes used to mark out game drivelines, suggesting that this may be what is shown

here. Regrettably, no information seems to have been obtained on the significance, if any, of the aloe images.

Much more recently this scene has been complemented by an extraordinary panel showing 35 aloes, in a rock-shelter in the Cradock district of the Eastern Cape province, some 300 km to the southwest. The aloe in question has been provisionally identified as *Aloe ferox*, the bitter aloe (National Museum, Bloemfontein 2003: www.nasmus.co.za/ROCKART/news.HTM#aaloes). The juice of this species has long been collected to produce a purgative that, under the name of Cape aloes, remains an important export commodity, and it is also used as an ingredient in several other medicines (Van Wyk & Gericke 2000). While the flowers and leaf gel of the plant can be eaten, and the leaves provide a very effective treatment for wounds and burns, its copious nectar is narcotic and capable of producing temporary paralysis (Watt & Breyer-Brandwijk 1962: 15–16). Hirst also reports that its dried juice is mildly mind-altering when smoked in some quantity (Manton Hirst *pers. comm.*).

CONCLUSION

What we hope to have shown in this review is that evidence for the consumption of psychoactive and potentially psychoactive plants by southern African hunter-gatherers, and for their employment in ritual contexts to facilitate access to altered states of consciousness, is more widespread than has previously been thought (Table 1). Admittedly, this evidence is sometimes circumstantial, even tentative, and only one hallucinogenic plant—*Boophane disticha*—has yet been documented directly from the excavated record, an instance that merits much more systematic study than we have given it here, notably in the case of the Tierkloof painted stones (Pearce 2003). It is nonetheless our conviction that these data raise the definite possibility that psychoactive plants were at times and in places, used by Bushmen to gain entry into trance and may thus be implicated in acquiring some of the imagery subsequently depicted or engraved in southern African rock art. That the only images of plants in the rock art of Africa south of the Limpopo should, where identifiable, be plausibly attributable to species with known psychoactive properties is particularly interesting in this regard. Helvenston and Bahn's (2002, 2003) criticisms of shamanistic understandings of Bushman rock art, which are misplaced on other grounds (Lewis-Williams 2004; Pearce 2004), fail to take this evidence into account. Furthermore, they confuse the issue of whether entoptic images can, or cannot, be generated as a result of consuming a few specific hallucinogens with the much broader question of the content of the art and the role possibly played in its production by a wider range of psychoactive plants.

Clearly, much further work is required if southern African researchers are to develop the points we have raised. In particular, much more systematic pharmacological assessment is needed of the plants used in trance-related and other ritual contexts by contemporary Bushman peoples. An obvious starting point would be with the plants used in the tortoise shell containers of healers (Marshall 1999: 56–58, 149–150). More systematic examination of the existing ethnographic evidence, including unpublished components of the Bleek/Lloyd archive, may yield further instances of plant use similar to those that we have reviewed. Furthermore, since both medicinal and hallucinogenic plants have been recovered from cave sediments in Texas (Boyd & Dering 1996), we should not exclude the possibility of comparable finds being made in southern Africa

where suitable preservation conditions exist and appropriate recovery and analytical techniques are employed. Our own assessment of published palaeobotanical data from excavations in the Western and Eastern Cape provinces and KwaZulu-Natal has not yet succeeded in making such identifications (except in the case of *B. disticha*), but it has not been comprehensive, and has excluded sites elsewhere in southern Africa. Finally, given the presence of smoking pipes in several Later Stone Age contexts (Sampson 1974) and the possibility of recovering residues from them, it is also conceivable that physicochemical evidence of the use of psychoactive plants may be recoverable archaeologically, and not just of *Cannabis* as has already been done elsewhere (Van der Merwe 1975). In conclusion, while we completely agree with Lewis-Williams (2004) and Pearce (2004) that psychoactive plants may have been used in ways that have left no trace in the excavatable archaeological record and that Bushmen, and others, have undoubtedly accessed altered states of consciousness without using such plants, we are convinced that the time is overdue to encourage the study of their use by southern African hunter-gatherers. This paper is, we hope, a small step along that route.

TABLE 1

Psychoactive and hallucinogenic drugs used by southern African hunter-gatherers.

Plant	Form of consumption	Kind of evidence	Principal sources
<i>Aloe ferox</i>	Nectar? Dried juice smoked?	Rock art	Nat. Mus., Bloem. 2003; Stow & Bleek 1930
<i>Boophane disticha</i>	Eaten? (also used medicinally, as a storage pit liner and as an arrow poison)	Rock art Ethnographic	Loubser & Zietsman 1994 Ashton 1952; Van Wyk & Kriel 1985
<i>Cannabis sativa</i>	Smoked, sometimes probably along with <i>Sceletium</i> spp.	Ethnographic and ethnohistoric	Katz 1982; Stow 1905
<i>Catha edulis</i>	Chewed	Ethnohistoric	Prins 1990; Smith 1966
<i>Ferraria glutinosa</i>	Roots used to make drink	Ethnographic	Katz 1982
<i>Gwa, !gwah</i>	Roots cooked and eaten/drunk	Ethnographic	Katz 1982; Lee 2003
<i>Pancratium tenuifolium</i>	Rubbed into incisions	Ethnographic	Dobkin de Rios 1986
<i>Sceletium anatomicum</i> <i>Sceletium tortuosum</i>	Chewed, inhaled (as snuff), smoked (sometimes along with <i>Cannabis sativa</i>)	Ethnographic and ethnohistoric	Smith <i>et al.</i> 1996; Smith <i>et al.</i> 1998
	= <i>canna</i> (eaten?)	Ethnographic	Orpen 1874
	Also brewed into beer (<i>khadi</i>)	Ethnographic, but not hunter-gatherers	Gordon 1996; cf. Hargreaves 1999
<i>sho</i> :-/a, {o/-õä	In tattoos and skin incisions	Ethnohistoric	Bleek/Lloyd archive
Unknown roots	Cooked and eaten/drunk	Ethnographic	Keeney 1999, 2003; Shostak 1990

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