Archaeol Anthropol Sci
DOI 10.1007/s12520-012-0112-5

ORIGINAL PAPER

A 4,000-year-old shaman's stone cache at Casita de Piedra, western Panama

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Received: 4 June 2012 / Accepted: 30 November 2012

Abstract During new excavations at the preceramic rockshelter of Casita de Piedra in western Panama, a cache of 12 unusual stones was recovered near the back wall, dating to between 4800 and 4000 cal BP. The stones include quartz, pyrite, a chalcedony vein nodule, a bladed quartz and jarosite aggregate and a human-modified dacite cylinder. Based on the unusual lithic types and the context of the cache, we suggest that these stones once belonged to a ritual specialist, such as a healer or shaman. Special stones are frequently mentioned as being an important component of a shaman's ritual paraphernalia in ethnographic records of various historic Native American groups throughout Central and South America, including the Bribri and Cabécar of southeastern Costa Rica and western Panama (formerly known as the 'Talamanca'). The cache of stones recovered at Casita de Piedra may represent the earliest material evidence in Central America of shamanistic practice.

Keywords Shamanism · Archaeology of ritual · Stone cache · Lithological description · Preceramic · Bribri · Cabécar · Panama

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Introduction

Many ethnohistoric and ethnographic accounts document the presence of religious specialists, often defined as 'shamans', among indigenous communities in Central and South America (e.g. Fock 1963; Furst 1993; Glass-Coffin 1999; Guevara-Berger 1993; Joralemon and Sharon 1993; Langdon and Baer 1992; Madsen 1955; Metraux 1949; Ramírez de Jara and Pinzón Castaño 1992; Reichel-Dolmatoff 1975, 1979, 1985, 1987; Ryan 2004; Stone 1962; Wilbert 1979; Winkelman 1990). Unfortunately, we know very little about the history of these specialists and their role prior to European contact. Archaeological evidence for early religious practices such as shamanism is often limited and can be challenging to interpret. But when such evidence is recovered, it provides a valuable perspective into the antiquity and complexities of human spiritual beliefs and accompanying behaviours.

Here, we report on the discovery of a cache of unusual stones at Casita de Piedra, a small preceramic rockshelter in the Chiriquí province of western Panama. The cache of twelve stones was discovered near the back of the shelter behind a large boulder, and dates to between 4800 and 4000 cal BP (unless otherwise noted, all dates are given in calibrated years BP). We propose that the cache is a group of special objects used by a ritual

Published online: 27 December 2012

specialist, such as a shaman or healer, at the site. If our interpretation is correct, it constitutes the earliest material evidence in lower Central America of shamanistic practice.

Environmental setting

Casita de Piedra (BO-1) is a small rockshelter situated on the Pacific slope of the Central Cordillera of Western Panama, in the province of Chiriquí (8°44′32″ N, 82°17′ 08″ W) (Fig. 1). It is located 37 km north of the provincial capital David and 17 km east of the town of Boquete. The shelter is formed by the overhang of a huge granitic boulder, which provides approximately 24 m^2 of floor space behind the dripline (Ranere 1980a). The boulder rests on a 25-m-high terrace, 175 m southwest of the confluence of the Rio Chiriquí and its tributary, the Rio Casita de Piedra. Other boulders of various sizes are scattered throughout the region. The rockshelter faces east-northeast, thus the interior receives sun in the morning hours but by noon it is shaded. Sediments within the dripline are not permanently dry, being affected by slope-wash, capillary action and occasionally wind-blown rain. Although it is situated just 4 km south of the Central Cordillera (ca. 2,000–2,300 m above mean sea level (amsl)), the elevation of site is only 754 m amsl because of its location within the deep Rio Chiriquí valley. The topography around the site rises relatively steeply to Cerro Guacal (1,242 m amsl) and Cerro La Lata (2,231 m amsl) to the west, the Central Cordillera to the north, and Cerro Pinola (1,361 m amsl) and Cerro Fortuna (1,490 m amsl) to the east (Fig. 2).

The area receives 3,000–3,500 mm of precipitation annually (Instituto Geográfico Tommy Guardia 1988), the majority of which falls between April and November, although there are no months without rainfall. From December to March, the prevailing winds switch to the north, and precipitation comes over the cordillera from the Atlantic, descending into the piedmont region as fine mists or light rain, called *bajareque*. Temperatures are moderate, ranging from 27 °C during the day to 13 °C at night, with little seasonal variation.

This climate supports vegetation transitional between seasonally dry deciduous tropical forest at lower elevations, and pre-montane humid tropical forest at upper elevations (Tosi 1971). The modern vegetation around the rockshelter is a mosaic of secondary forest, cleared fields, and disturbed areas, the result of farming activities and right-of-way maintenance for a nearby major trans-isthmian oil pipeline (Petroterminal de Panamá, S.A.). Remnants of more mature forest can be found along creeks (*quebradas*) and other watercourses, at higher elevations and where slopes are too steep for cultivation or grazing. Agriculture in the area today is limited to small-scale mixed farming, primarily subsistence crops, pasture and cash crops like *guandú* (pigeon pea, *Cajanus cajan*) and coffee (*Coffea arabica*).

Archaeological context of the cache

The Casita de Piedra rockshelter was first identified and tested by Anthony J. Ranere in 1970 during a survey of Chiriquí for preceramic sites (Ranere 1980a). Upon returning to the site in 1971, Ranere excavated a 2×5-m block, extending from the back of the shelter out past the dripline (Ranere 1980a) (Fig. 3). He recovered a stratified sequence of cultural material to a depth of 1.2 m. Six radiocarbon dates on wood charcoal indicated that the site was occupied during the preceramic period, from 6610±120 to 2940±70 ^{14}C years BP (Ranere 1980a) (Fig. 4). He did not find any ceramics; however, the shelter had been used as a campsite in recent times.

Ranere (1980a) inferred from the occupational debris that the shelter was regularly used as a dwelling for extended periods of time throughout the preceramic period. The preferred raw material for tool manufacture during the earlier Talamanca phase (8000–5200 cal BP) was andesite, used for fashioning large percussion-flaked bifacial wedges, scraper planes, and choppers. Additionally, unmodified flakes were often used as expedient tools. The following Boquete phase (5200–2100 cal BP) was distinguished by a shift in technology: bifacial wedges disappeared, small tabular wedges became abundant and pestles and polished celts made their first appearance. A wider variety of raw material was used for flaked tools, including chalcedony, obsidian, and quartz. Edge-ground cobbles, milling-stone bases and nutting stones were used in both phases (Ranere 1975, 1980c, d, 1992; Ranere and Cooke 1996).

From December 2006 to January 2007, Dickau undertook new excavations at the site in order to obtain samples for radiocarbon, archaeobotanical, and sediment analyses. Three 1×1-m units were excavated, adjoining Ranere's original block; one at the back of the rockshelter, one mid-shelter at the dripline and one outside the dripline towards the talus slope (Fig. 3).

Ranere (1980b) identified seven major stratigraphic levels at Casita de Piedra in 1971 (Fig. 4); these same strata were clearly visible during our 2006–2007 excavations. We briefly describe them here:

Stratum A

The humus layer. Variable in depth ranging from 0 to 10 cm thick. Outside the dripline, this stratum was removed during construction of an access road sometime after 1971 and replaced by compact fill.

Stratum B

Silt with some rocks, light brown within the dripline and tan orange outside the dripline. Thickness ranged from 20

Fig. 1 Map of western Panama showing the location of Casita de Piedra

to 30 cm, with clear contact with strata above and below. This stratum contained numerous artefacts and some charcoal.

Stratum C

Dark brown loam (silt with sand and clay) with some pebbles and cobbles and high organic content. The stratum ranged from 10 to 40 cm thick. Stratum C had the highest amounts of charcoal of all the strata and was second only to stratum E in artefact density.

Stratum D

Silt with some clay, and fewer rocks than stratum C above, light orange tan within the dripline and brown outside the dripline. Stratum D was a relatively thin layer, ranging from 10 to 15 cm thick. Like stratum C, it had abundant charcoal and artefacts but less than stratum C above or stratum E below. It was difficult to distinguish stratum D from stratum C outside the dripline.

Stratum E

Clayey dark brown silt with sand, cobbles and pebbles and abundant organic matter ranging from 20 to 40 cm thick. It contained numerous pebbles and granules of decomposed granite, particularly outside the dripline. Of all the strata, stratum E had the highest density of artefacts.

Stratum F

Clayey silt with some sand, decomposing granite and a few larger cobbles and boulders. It was more compact than stratum E above with a higher clay content and lighter colour (brown to red-brown). It varied between 15 and 40 cm thick. The artefact density was much less than Stratum E above. The contact with stratum G below was very clear.

Stratum G

Highly weathered silt–clay with numerous large rocks increasing in frequency with depth, particularly outside the dripline. The clay was bright red orange within the dripline and orange outside the dripline. Within the rockshelter, this stratum was sterile, and marked the end of cultural materials. Outside the shelter, a handful of artefacts and a few small fragments of charcoal were found in the upper few levels of stratum G, but by 30 cm into the stratum, there was no more cultural material and the excavation became dominated by large rocks with very little soil.

Each stratum was excavated in arbitrary 5-cm levels until a natural stratigraphic change was encountered. These levels were designated by sequential numbers; e.g. levels B1, B2 and B3. Because strata thicknesses varied across the rockshelter, the number of levels within a stratum sometimes varied between excavation units. Within this paper, stratigraphic levels are referred to as strata and excavation levels as levels.

A series of ten new accelerator mass spectrometry (AMS) dates (Table 1) from charcoal samples obtained during the 2006–2007 excavations generally corresponded well to Ranere's original dates. However, a date on wood charcoal and a carbonised nance (*Byrsonima crassifolia*) seed from the base of Unit 10 (stratum G) revealed that the shelter was occupied by at least 9370±50 ^{14}C years BP (Beta-243606, δ^{13}C=−25.4‰; 10710 to 10490 cal BP), approximately 3,600 years earlier than originally documented. Thirteen andesite flakes, including one fine-grained thinning flake suggestive of bifacial reduction techniques (Ranere, personal communication, 2007), were recovered from the same level. In level F3, 20 cm above, we obtained an AMS date on wood charcoal of 9150±50 ^{14}C years BP (Beta-243605, δ^{13}C=−26.2‰; 10480 to 10460 and 10430 to 10220 cal BP), confirming the antiquity of occupation at the rockshelter.

The cache of unusual stones recovered during the 2006–2007 excavation was situated in Unit 7, between 42 and 51 cm below datum (SE corner at surface) within stratum C (Fig. 5), 40–50 cm from the back of the shelter (Fig. 6) and behind a large boulder (see Fig. 3). It is unclear if this boulder was present at the time the cache was deposited, or was a more

Fig. 2 The area around Casita de Piedra, looking north towards the Cordillera Central. The location of Casita de Piedra is indicated by an *arrow*

recent introduction. If it was present 4,000 years ago, then the area between the rock and the back wall may have been an ideally protected spot for the cache. Outside of the immediate cache area, stratum C contained debitage, several flaked stone tools and grinding stones and abundant charcoal. No specific hearth features were observed despite attempts to identify them; however, the amount of charcoal and fist-sized rocks suggests that this rear section of the rockshelter was a favourite spot for building fires.

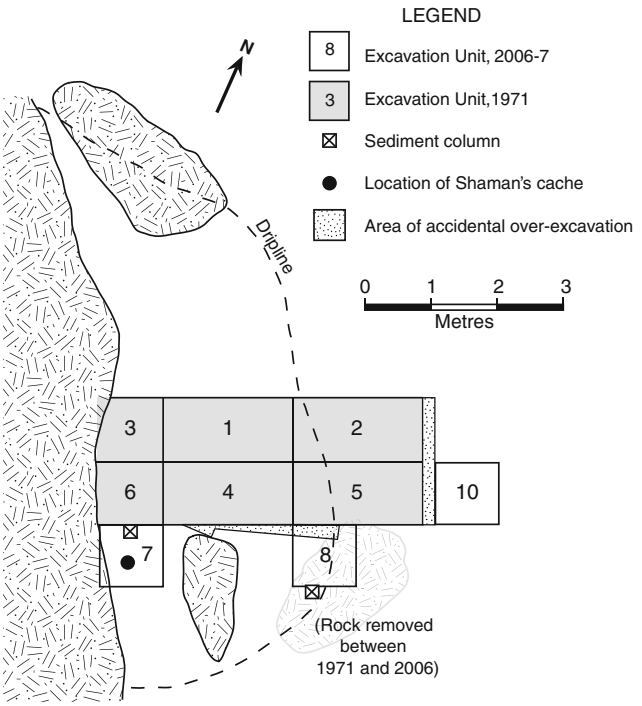

Fig. 3 Planview of excavation units at Casita de Piedra. Modified from Ranere (1980a, Fig. 3.0-4)

The cache was deposited sometime between 4,000 and 4,800 years ago (calibrated). An AMS determination on wood charcoal recovered immediately under the cache yielded a date of 4060±40 ^{14}C years BP (Beta-243598, $\delta^{13}C=-25.7‰$; 4800 to 4760, 4690 to 4680 and 4640 to 4430 cal BP). A date on wood charcoal collected in the same unit, 25 cm above the cache in stratum B was 3750±40 ^{14}C years BP (Beta-243597; $\delta^{13}C=-26.0‰$; 4240 to 3980 cal BP) (Fig. 5). It is highly unlikely that these dates could be affected by 'old wood' effect. The rockshelter is situated in a very humid environment where dead wood and vegetation decay rapidly. The area within the dripline frequently gets wet, and any wood left within the shelter would have likely rotted relatively quickly.

No difference in soil colouration suggestive of a pit feature was visible within or immediately around the cache. The soil throughout stratum C was a rich, dark-brown clay–silt, with very high organic content. The pH was relatively neutral, around 6.5–7.0 (based on a field test by Dr. Pedro Botero, 16 January 2007). The high organic content of the soil and the density of cultural material indicate frequent and heavy use of the shelter around this time period.

The artefact assemblage recovered from stratum C in Unit 7 was similar to that found by Ranere (1980c) in this stratum in the rest of the rockshelter. The majority of flakes and tools were derived from a dark to medium grey andesitic rock, with a small amount of quartz, chalcedony of several different colours and poor-quality pebble obsidian. Ranere's (1975, 1980c, d) analysis of the flaked-stone tool assemblage from his original excavations at the shelter, which included experimental approaches, led him to conclude that the majority of the tools were manufactured and used for woodworking, particularly the bifacial and tabular wedges, and the graving tools. The majority of ground-stone lithics were handstones and edge-ground cobbles made from modified granitic river cobbles, along with fragments of a grinding stone base and several hammerstones.

Starch analysis on ground stone-tools and a flake knife from the shelter show they were used to process a variety of plant foods, including maize (*Zea mays*), manioc (*Manihot esculenta*), yams (*Dioscorea* spp.), arrowroot (*Maranta arundinacea*) and zamia (*Zamia* sp.) (Dickau 2005, 2010; Dickau et al. 2007). Macrobotanical analysis of carbonised remains from the shelter deposits identified palm nuts (*Acrocomia aculeata* and *Attalea butyracea*) and tree fruits, such as annona (*Annona* sp.), algorrobo (*Hymenea courbaril*), nance (*B. crassifolia*) and canistel (*Pouteria* cf. *campechiana*) (Dickau 2010; Smith 1980). This mix of cultivated and collected species implies that subsistence was based on farming and gathering resources from nearby gallery forest. Hunting and fishing were likely also practiced, but no animal bone was recovered within the deposits, despite water screening, presumably because it did not preserve.

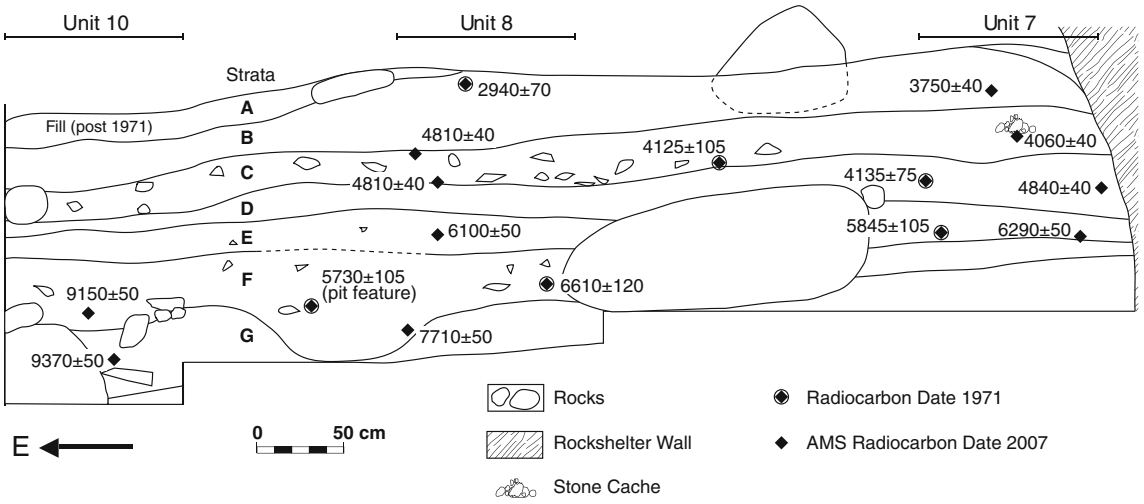

Fig 4 Stratigraphic profile of the Casita de Piedra rockshelter along the south wall of Ranere's original excavation block, plus unit 10, with approximate locations of radiocarbon dates and the stone cache. Placement of units 7 and 8 are indicated. Adapted from Ranere (1980b, p. 253, Fig. 1.1)

The observed patterns of artefact distribution suggest that the entire small rockshelter, including the back area around the cache, was used for a variety of domestic activities including food preparation and cooking, tool manufacture and retouch, and by inference, woodworking.

The cache

The cache does not seem to have been part of any sort of 'sacred' space or restricted area, a point to which we will return in the discussion. The stones within it were found tightly clustered, with some of the smaller stones (stone 1, the cylinder and stone 12, the 'flower' stone) resting on top of the others (Fig. 6). This strongly suggests that the stones were originally deposited within a bag or basket, which has since decomposed. As mentioned, there was no visible difference in soil colour or texture within or around the cache. To investigate the possibility that the stones were once inside a container of some sort, phytolith analysis was done on a sediment sample taken from within the cache, and the results compared with a bulk sediment sample from the same level, taken on the northern border of the same unit approximately 50 cm away (see Fig. 6). The two phytolith samples showed nearly the same assemblage of taxa and only minor differences in their frequencies (Fig. 7). The exception was a higher percentage of Bambusoideae-type

Table 1 AMS radiocarbon dates from Casita de Piedra

Lab#	Unit	Level	Measured age BP	Conventional age BP	$^{13}C/^{12}C$ ratio	Calibration (cal BP (cal BC))	Notes
Beta-243597	7	B2	3,770±40	3,750±40	−26.0	4240 to 3980 (2290 to 2030)	Wood charcoal
Beta-243598	7	C4	4,070±40	4,060±40	−25.7	4800 to 4760 (2850 to 2810), 4690 to 4680 (2740 to 2730) and 4640 to 4430 (2690 to 2480)	Wood charcoal, under feature (shaman's cache)
Beta-243599	7	D3	4,820±40	4,840±40	−23.8	5640 to 5580 (3700 to 3630) and 5530 to 5480 (3580 to 3530)	Sapotaceae testa, back of shelter near wall
Beta-243600	7	E5	6,320±50	6,290±50	−26.8	7310 to 7160 (5360 to 5210)	Wood charcoal
Beta-243601	8	C1	4,810±40	4,810±40	−25.2	5600 to 5560 (3660 to 3610) and 5560 to 5470 (3610 to 3520)	Large chunk of wood charcoal
Beta-243602	8	C5	4,840±40	4,810±40	−27.1	5600 to 5560 (3660 to 3610) and 5560 to 5470 (3610 to 3520)	Large chunk of wood charcoal under rock
Beta-243905	8	E3	6,070±50	6,100±50	−23.1	7160 to 6850 (5210 to 4,900) and 6810 to 6810 (4860 to 4860)	Wood charcoal
Beta-243604	8	G1	7,690±50	7,710±50	−23.7	8590 to 8400 (6640 to 6450)	Wood charcoal
Beta-243605	10	F3	9,170±50	9,150±50	−26.2	10480 to 10460 (8530 to 8520) and 10430 to 10220 (8480 to 8280)	Composite sample from level, includes *Byrsonima crassifolia* pit
Beta-243606	10	G2	9,380±50	9,370±50	−25.4	10710 to 10490 (8760 to 8540)	Composite sample from level, includes *B. crassifolia* pit

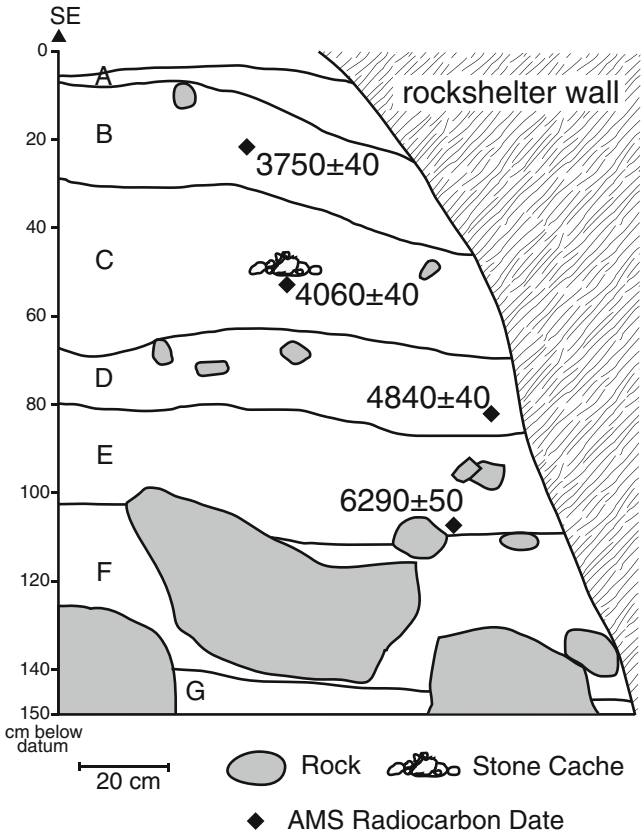

Fig. 5 Stratigraphic profile of the south wall of unit 7, showing the location of the stone cache and 2007 radiocarbon dates

phytoliths and a lower percentage of arboreal granulate globular phytoliths within the cache sediments. While this suggests that a species of Bambusoideae may have been associated with the cache, its frequency outside the cache is still relatively high, and therefore the difference between the two contexts may simply reflect spatial variation. If the stones were kept and buried in a bag or container, this container was constructed of materials that do not produce diagnostic phytoliths.

The twelve stones have different and unusual shapes and lithologies (Fig. 8). They were examined by Redwood using non-destructive visual methods: a ×20 magnification hand lens, a binocular microscope, a magnet and a tungsten carbide scraper to determine rock and mineral hardness.

Stone 1: small dacite cylinder (735a)

This is a short cylindrical-shaped stone, 35 mm long and 25 mm in diameter, of porphyritic dacite, a volcanic rock (Fig. 8a). It contains approximately 25 % phenocrysts, composed of quartz crystals <0.5 mm in diameter, vugs 1.0 to 1.5 mm long with crystal cast shapes of plagioclase and biotite, and numerous smaller vugs about 0.1 mm in diameter. These are set in a fine-grained, siliceous matrix. The vugs are usually empty but some contain partial fill of a soft, crystalline mineral that is probably alunite. There are some narrow (<1 mm) quartz veinlets which cross-cut the rock cylinder.

The rock is a dacitic crystal tuff (the broken quartz crystals indicate a tuff rather than a lava) and was probably deposited sub-aerially based on lack of bedding. It has been hydrothermally altered by a process of matrix silicification and leaching out of the plagioclase and biotite phenocrysts to leave vugs, giving an alteration texture known as 'vuggy quartz'. The quartz phenocrysts were stable and were not leached. There was subsequent precipitation of minor alunite in the vugs. The alteration was caused by acid leaching by low-pH (1.0–2.0) hydrothermal fluids in a volcanic or sub-volcanic environment, removing all components except silica from the rock. An increase in fluid pH to *ca.* 3.0–4.0 is shown by deposition of alunite. This type of hydrothermal alteration is known as advanced argillic alteration, and forms at shallow to surficial levels in active volcanic environments. It is often associated with mineral deposits in high-sulfidation epithermal systems, and can form extensive lithocaps above porphyry copper deposits (Sillitoe 2010).

Of all the stones in the cache, this was the only one that was intentionally modified. The outer surface is smooth and there are some grooves around the circumference, probably scratch marks. The ends of the cylinder taper slightly. The ends have been broken across the cylinder along natural fractures at an angle of 80–90° to the axis. Originally, the cylinder was probably longer.

Stone 2: white quartz (735b)

This is a small flake (23×18 mm; 7 mm thick) of white, translucent quartz with prismatic quartz crystal faces parallel to the long axis of the artefact (Fig. 8b). One side of the flake is flat. It is a broken piece from a quartz vein. The edges are somewhat rounded, possibly the result of alluvial or colluvial transportation and weathering prior to being collected. It does not appear to be the product of flaked stone tool manufacture.

Stone 3: bladed quartz and jarosite aggregate (735c)

This is an aggregate formed of crystalline quartz platelets coated with an abundant earthy, ochre-coloured mineral, probably jarosite, formed by the oxidation of pyrite (Fig. 8c). The quartz aggregates occur in elongate masses up to 25 mm long, randomly oriented to form a lattice or 'bladed quartz' texture with flat, elongate voids lined with small quartz prisms. The voids were originally platy calcite crystals upon which grew quartz and then pyrite. The calcite subsequently dissolved to leave the voids, due to a decrease in fluid temperature, and the pyrite oxidised to jarosite, prior

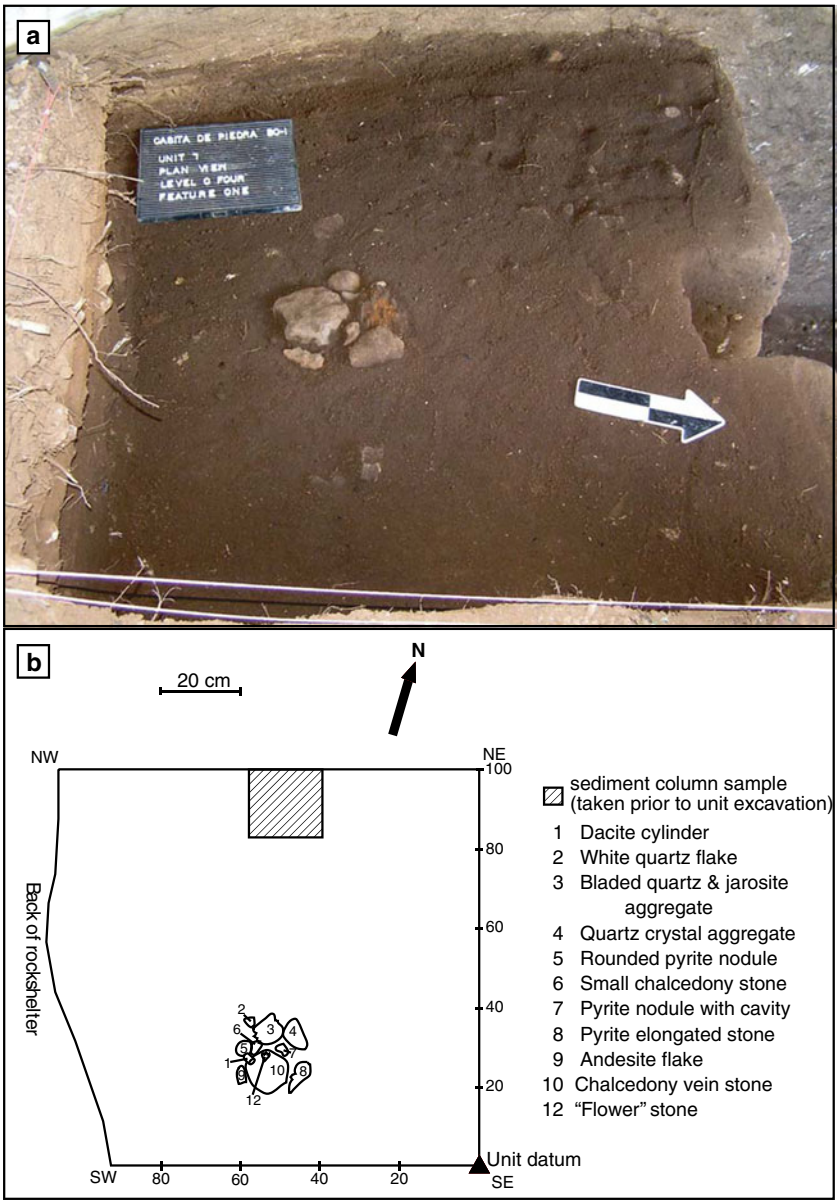

Fig. 6 The cache in context in unit 7: **a** Photograph of the cache during excavation. **b** Planview of unit 7, level C4 showing the cache location

to the stone's collection, use and deposition in the rockshelter. This bladed texture is typical of low sulfidation epithermal veins and geothermal systems and was first described by Lindgren (1933). Bladed calcite forms at shallow depths as a result of fluid boiling (Corbett 2002; Hedenquist et al. 2000; Simmons and Christenson 1994).

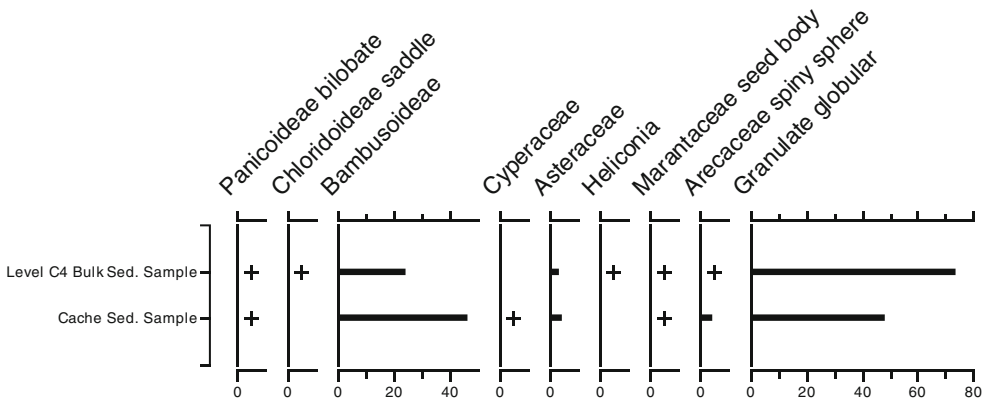

Fig. 7 Phytolith frequencies (percentages) from a bulk sediment sample in level C4 compared with a sediment sample from within the cache. Frequencies lower than 2 % are indicated by a *plus sign*

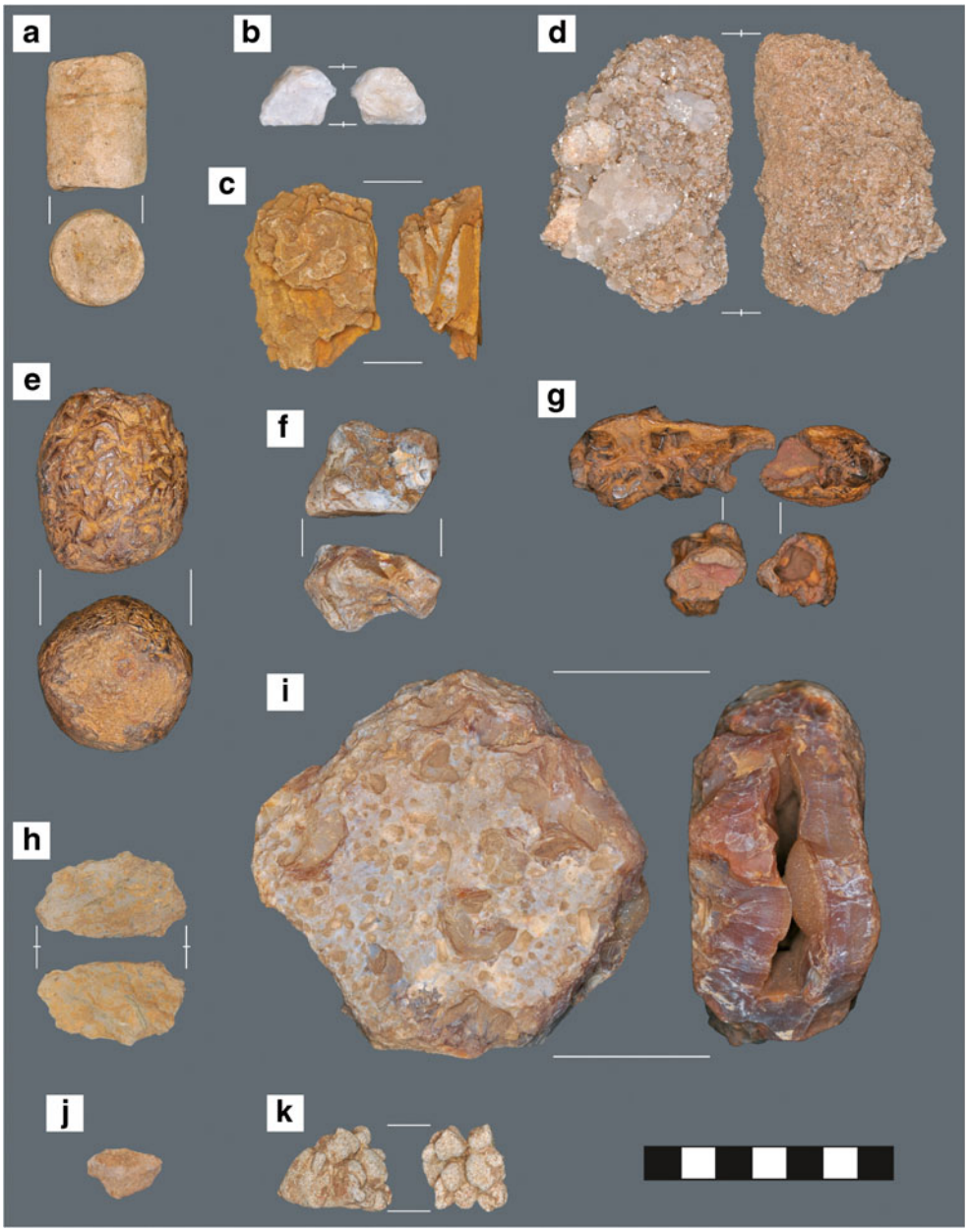

Fig. 8 The cache stones: **a** stone 1, small dacite cylinder (735a); **b** stone 2, white quartz (735b); **c** stone 3, bladed quartz and jarosite aggregate (735c), not all fragments shown; **d** stone 4, quartz crystal aggregate (735d); **e** stone 5: rounded pyrite nodule (735e); **f** stone 6, small chalcedony stone (735f); **g** stones 7 and 8, elongated pyrite nodule with cavity (735 and 735 h); **h** stone 9, grey andesite flake (735i); **i** stone 10, chalcedony vein (735j); **j** stone 11, small rock flake (735 k); and **k** stone 12, 'flower' stone (735 l). Scale is in centimetres

Unfortunately, this fragile aggregate could not be removed intact during excavation. In situ, the aggregate measured approximately 50 mm high and 75×60 mm at its base (see Fig. 6b). Only one fragment is shown in Fig. 8.

Stone 4: quartz crystal aggregate (735d)

This stone is a mass of quartz crystals with a high, gemmy lustre (Fig. 8d). The stone is somewhat flattish in shape, measuring 77 mm long, 50 mm wide and 29 mm thick. The crystal shapes are stubby prisms 1–5 mm long, and some coalesce into flat masses with a bladed quartz texture. The crystals form an open network with high porosity and permeability. The pores are coated by a pale red-brown earthy clay mineral. No other minerals are present. The quartz crystals are of hydrothermal vein origin and the bladed quartz texture is typical of low sulfidation epithermal veins, similar to Stone 3 described above. The coarse grain size of the quartz crystals is unusual. The stone shows little evidence of damage or wear which suggests that it was picked up very close to its original source.

Stone 5: rounded pyrite nodule (735e)

Stone 5 is a heavy oval nodule measuring 49 mm long by 40 mm in diameter, formed by intergrown aggregate pyrite crystals (Fig. 8e). The crystals are cubic in shape, with faces 6 to 8 mm long. The pyrite has oxidised on the surface to a

dark brown mineral, probably goethite. The heaviness of the artefact indicates that the majority of the sample is still pyrite and that oxidation is thus only surficial. One end is rounded with large crystals, whereas the opposite end is more flat and has broken crystals of fresh pyrite which have only partially oxidised to tan colour, probably jarosite. The broken crystals on this flatter end suggest that the artefact was used as a small pestle for grinding.

Stone 6: small chalcedony stone (735f)

This is a small, somewhat angular chalcedony pebble measuring 32×27×23 mm (Fig. 8f). It has worn and rounded edges and abrasion on the faces, likely the result of water wear; thus, it was probably collected as a stream pebble. The artefact is pale red or peach in colour and translucent. It has weak colloform banding, botryoidal textures and cross-cutting veinlets or fractures. It is similar to stone 10, both formed as low temperature chalcedony fill in a vein.

Stones 7 and 8: elongated pyrite nodule with cavity (735g and 735h)

Stones 7 (735g) and 8 (735h) were found separately during excavation of the cache (see Fig. 6b). However, they are of the same material, and roughly fit together, so therefore may have originally been a single piece (Fig. 8g). The two artefacts form an elongate lumpy concretion. The 'handle' or longer piece is sceptre-shaped and measures 57 mm long by 26 mm (top) to 17 mm (base) in diameter. The 'head' or shorter, rounded end measures 37×21 mm. Together, the complete object is 88 mm long. Most interestingly, when fit together, the stones create a cavity with a roundish opening on one side, which may have been used for holding liquids or solids.

The stones are formed of brown goethite pseudomorphs of cubic pyrite crystals with crystal faces 3–7 mm long. The cavity is lined with very fine-grained hematite. The surface and the crystal edges are worn and polished, probably by handling in the past. The surface is coated by a matrix of a fine-grained, mustard-coloured sediment or mineral with a hardness of about three, which may be jarosite. The stones have a low density indicating the likehood that the pyrite has completely oxidised.

The elongate prismatic shape of the central void indicates that the pyrite crystals grew on a cluster of three prismatic quartz crystals in the smaller piece, and a single quartz crystal in the larger piece. Quartz crystals usually grow uni-directionally from the wall of the vein and doubly terminated, 'floating' crystals are very rare. Examination of the area of fracture between the two parts shows the edges are worn, which indicates that the two fragments were used (or continued to be used) after being broken apart. It is possible that the original intact stone was collected because of the naturally occurring cavity in which ritually important substances were deposited and used. This inference gains credence from the way in which the stone fragmented. One explanation is that repeated use ended up breaking the artefact in the most weakened spot. Alternatively, the repeated burning of material in the cavity, such as resin or tobacco to create smoke or incense, eventually caused thermal shock. Residue analysis on the inside of the cavity in the future may yield valuable insight into the stone's use.

Stone 9: grey andesite flake (735i)

This small flake of a pale grey, fine-grained andesite measures 43×24 mm and 7 mm at its thickest point. It is derived from either a fine-grained tuff or a fine-grained rock such as a dyke (Fig. 8h). The rock has a microgranular or microcrystalline texture, with no banding, and is fairly soft with a platy fracture. It has 5–10 % magnetite as fine irregular grains and a veinlet of banded magnetite with a light tan coloured centre (possibly ankerite). The sample has a strong attraction for a magnet and deflects a compass needle. The surface is coated in a pale beige coloured mineral with a hyaline lustre that may be gypsum or alunite. The magnetite is of secondary hydrothermal origin.

Although the stone appears similar to much of the debitage found at the site, the high amount of magnetite in the flake is not typical of fresh andesite. Ethnographic accounts document the inclusion of magnetic stones in shamans' kits in northern Peru (Joralemon and Sharon 1993). It has been proposed that the Olmec used hematite loedstones (Carlson 1975). It is possible, therefore, that this stone's magnetic properties were noticed and that it was coveted for this reason.

Stone 10: chalcedony vein (735j)

This rounded flat stone measures 95×90 mm and 45 mm high when resting on its flat base, making it the largest in the cache. It is a chalcedony vein, with symmetrically veined sides up to 20 mm wide and an open elongated centre (Fig. 8i). Parallel, fine-grained colloform banding and colour banding occurs parallel to the vein walls, and there is a fibrous crystal growth texture perpendicular to the walls. The chalcedony is translucent with a dull red to orange colour. The open centre has a botryoidal texture coated in fine quartz crystals. The top and bottom surfaces, the vein walls, as well as two edges, are white agate with indentation impressions of quartz crystal tips. Another edge has a large indentation with stepped sides that appear to pseudomorph coarsely crystalline calcite. The stone likely formed as the final fill of low temperature silica (chalcedony) in the centre of a vuggy quartz vein. There is rounding of the outer edges

that may be water wear, suggesting that the stone was collected as a river cobble rather than directly from the vein source.

Stone 11: small rock flake (735k)

This is a small flake (20×14 mm; and 8 mm thick) of a pale red-brown coloured rock with fine-grained quartz and is probably a fine-grained tuff (Fig. 8j). It has probable quartz-alunite hydrothermal alteration, but is otherwise unremarkable. It was found immediately under the largest stones of the cache, but not directly within the cache. For these reasons, we believe that this is an errant flake and not part of the cache.

Stone 12: 'flower' stone (735l)

Although catalogued last, this small, oddly shaped object was actually found at the top of the cache, in the level above. Its significance was realised when the other stones of the cache began to be uncovered. Initially, the excavator (RD) thought it was marine coral because of its rather unusual shape: a flattish top, 25 mm in diameter, with deep grooves, tapering to a pointed base, and 33 mm long (Fig. 8k). Visual petrographic examination by SR showed that, in fact, it was a fine-grained, crystalline, equigranular rock of microdiorite composition.

The stone is formed by a network of fine-grained (<0.5 mm), white lath-shaped minerals, probably plagioclase, with interstitial pale grey translucent quartz and interstitial black magnetite grains. It has fairly strong magnetic attraction and swings a compass needle. The plagioclase is soft and has been altered to kaolinite by hydrothermal alteration or weathering. The deep irregular grooves formed by differential weathering on irregular and intersecting veinlets. There is no evidence of tool marks to suggest that the grooves are human made.

In summary, at least one of the cache stones was definitely fashioned as a tool (stone 1, the cylinder), while another shows signs of having been used as a tool (stone 5, the rounded pyrite nodule). Two others show wear from extensive handling (stones 7 and 8, the elongated pyrite nodule with cavity). Other than stone 1, all pieces are natural shapes. Some show signs of rounding by water-erosion suggesting that they were collected near streams or rivers (stone 6, the small chalcedony stone, stone 10; the large chalcedony vein; and possibly stone 2, the quartz flake). Ethnographic accounts of shamanic stone use among the Kuna in Panama and indigenous groups in the Talamanca region of Costa Rica (modern survivors are the Bribri and Cabécar) mention rivers and watercourses as sources of ritual stones (Barrantes Cartín 2009; Cervantes Gamboa 2003; Guevara-Berger 1993; Velásquez 2004). Other stones in the cache are angular and, in some cases, quite delicate, which indicates they were probably collected from rock outcrops. The diversity of lithologies suggests that the stones originated from multiple geological sources; however, we cannot identify specific deposits or locations yet. The types of deposits represented occur throughout the young volcanic belts of the Central Cordillera of Panama and Central America. They are commonly associated with copper or gold mineralisation. Some stones may have been collected locally, within a few to tens of kilometres of Casita de Piedra. Some may have been picked up further away, or have been acquired through exchange.

Discussion

The nature and composition of the Casita de Piedra stone cache highlight its peculiarity. The twelve stones were found in a tight cluster, indicating that they were part of a single unit, like a kit kept in a perishable container for ease of transportation by the owner. Wear patterns on two of the stones show that they were used to alter or process other materials, although we do not know which kinds. The wide diversity of lithologies suggests that the collection was selectively amassed from different geological sources. The lithic materials are different from those used to make tools at the shelter and neighbouring coeval sites. Viewed as a unit, the cache is distinct among the domestic artefacts recovered at Casita de Piedra. In the absence of additional contextual information, we turn to analogy to interpret this cache of unusual stones.

Analogy in archaeology

The use of analogy has a very long tradition in archaeology. Two approaches are frequently used in New World contexts: the 'direct historical approach' and the 'general comparative approach' (Lyman and O'Brien 2001; Willey 1953; Willey and Sabloff 1993). The 'direct historical approach' assumes that archaeological data from a particular region can be interpreted by reference to ethnographic data from the same region because they are linked by shared ancestry, and are behaviourally comparable on account of their genetic connectivity. The closer the analogues are in space and the more precise the evidence for historical continuity between extinct and recent societies, the stronger the explanatory value of the comparison. On the other hand, the 'general comparative approach' stresses convergence among behaviours observable in societies over much larger geographic distances, which are structurally similar to each other in a cultural-evolutionary sense (see Lyman and O'Brien 2001 for a review and discussion). In this specific case, we suggest that the two approaches are complementary, and argue that the ~4,000-year-old Casita de Piedra stone cache is likely to

have belonged to a ritual specialist akin to the 'shaman' of many historically documented small-scale societies. We address general analogies first, and then proceed to specific historical analogies from Costa Rica and Panama where there is evidence for population and cultural continuity between pre-Columbian populations and surviving Native American ethnia (Cooke 2005).

Generally, the term 'shaman' is used in anthropological literature to refer to particular individuals who are able to mediate between the real world and the supernatural world because of their ability to penetrate the complexities of the latter using knowledge acquired from spiritual entities (Eliade 1964; Furst 1972a; Hultkrantz 1973; Jones 2006; Winkelman 1990). This knowledge is then used to explain, predict, or avoid events in the real world. A salient characteristic of 'shamanism' in most descriptions and ethnographies is the practice of metaphysical transformation through altered states of consciousness, produced by physical deprivation or consumption of psychotropic, alcoholic and toxic substances, leading to hallucinations and erratic behaviours. The use of many psychotropic plants have been identified among Native American societies, and effects of their chemical constituents on the human brain have been studied in detail (e.g. Davis and Yost 1983; El-Seedi et al. 2005; Furst 1972a, 1976; Harner 1973; Martin 1970; Reichel-Dolmatoff 1971, 1975, 1978, 2006; Schultes 1998; Schultes and von Reis 1995; Sherratt 1995; Wilbert 1979).

The ethnographic record also demonstrates that an important element of shamanic intercourse with the spirit world is to allay or cure illnesses, or cause them in others. Specialist studies have confirmed that shamans who cure possess detailed knowledge of the plant species that are medicinally effective (e.g. Schultes and Hofmann 1979). Other activities of the shaman include finding or calling game animals, managing weather and precipitation and divination (VanPool 2009; Vitebsky 2001). These services are often provided in exchange for payment from the beneficiaries.

Many of these activities often involve the agency of magically imbued objects gleaned from the environment, either unmodified or worked into artefacts. The inclusion of special stones in the ritual paraphernalia of religious specialists such as shamans and healers or *curanderos*, is particularly well documented among present-day indigenous groups in Central and South America (Table 2). Quartz and other rock 'crystals' are the most frequently mentioned, but other types of stones are used as well, including pyrite, magnetic stones and gastroliths from the stomachs of animals (e.g. Joralemon and Sharon 1993). Stones that have crystal structures or translucent and reflective qualities are linked in many ethnographic accounts to transcendent and transformative experiences (e.g. Brady and Prufer 1999; Fock 1963; Karsten 1935; Reichel-Dolmatoff 1979, 2006; Sullivan 1988), and several of the stone types found in the Casita de Piedra cache possessed these qualities (chalcedony, quartz and possibly pyrite before it weathered to goethite).

Taking into consideration the richness of the cross-cultural ethnographic record for special stone use in extant or historically documented small-scale societies, it is understandable that archaeologists' finds of unusual stones (especially in burials) should be interpreted as prima facie evidence for shamanism and curing, through generalised or specific historical analogues (e.g. Cooke et al. 2000; Haberland 1961). Of course, if an essential element in the definition of shamanism—as opposed to other magico-religious practices—is the *alteration of consciousness*, archaeological evidence flounders unless empirically supported by botanical and/or chemical evidence for hallucinogen use or, as second best, paraphernalia for administering these substances. When the two kinds of data are found together, the inference becomes virtually unassailable (e.g. Torres et al. 1991).

The use of analogy in arguing for shamanism must be evaluated carefully for each situation, even with apparently clear evidence of psychotropic drug use, where care must be taken in distinguishing stimulants from real psychotropic substances that cross the blood–brain barrier. In one case from the Bolivian Andes, bundles of leaves of *guayusa* (*Ilex guayusa*) were found in a tomb dated ca. 1500 BP, carefully tied with plant fibres and in association with a snuffing tube, clysters, storage tubes for powder, spatulas, snuff trays and a mortar and pestle (Schultes 1972). The find-site was well outside the natural range of this plant implying long-distance travel or wide-ranging exchange. Schultes (1972), however, was unsure whether *I. guayusa* crossed the blood–brain barrier. More recent chemical studies of *I. guayusa* identified high concentrations of caffeine and theobromine (Lewis et al. 1991), stimulants that are not psychotropic, but in large doses impact the state of mind of the imbiber or snuffer. A second case is the over-reaching associations of Neotropical marine toad (*Rhinella* [formerly *Bufo*] *marina*), both in artistic depictions and faunal assemblages from archaeological contexts, with altered states of consciousness, hallucinations, and shamanism, due to the presence of tryptamine bufotenin(e) (*N*-dimetil-5-hidroxitriptamina) within the milky substance exuded from its parotid glands (e.g. Dobkin de Ríos 1974; Furst 1972b; Kennedy 1982). Despite claims that this substance is a hallucinogen (Weil and Davis 1994), it is still not clear whether it crosses the blood–brain barrier. Even if it does, bufotenin is present in such small amounts in *Rhinella mariana* that ingesting the exudates would expose the imbiber to potentially lethal doses of cardiotoxic bufodienolides, which by themselves can induce unpleasant side-effects such as nausea and vomiting, and even death (Cooke 1989; Weil and Davis 1994). When marine toads and other toxic Anurans are skinned, the

poison glands removed, and the flesh washed, they are a palatable food resource much used by past and present tropical American societies (Cooke 1989). The intemperate inferences found in Dobkin de Ríos (1974) and Kennedy (1982) and often repeated uncritically in general works (e.g. Weaver 1981, p. 124) demonstrate the dangers of misusing analogy. These examples underline the importance of undertaking chemical and cultural studies together in order to assess the likelihood that a plant or animal species found in archaeological contexts really does affect human consciousness.

Among modern indigenous peoples in lower Central America there is no bona fide evidence for the use of the psychotropic drugs commonly employed in South American ritualistic practices (excepting the territory now occupied by the Waunáan and Emberá who use *Banisteriopsis* and *Datura* in ritual) (Reichel-Dolmatoff 1960). Ethnohistoric and ethnographic accounts suggest, however, that tobacco was widely used in ritual (e.g. Bozzoli de Wille 1982; Gabb 1875; Hayans 1952; Loveland 1986; Ryan 2004; Sherzer 2004). Varieties of this plant produce behavioural responses akin to hallucination (Wilbert 1993). Metaphysical transformations by individuals defined as shamans, particularly human-animal transformations, feature prominently in the descriptions of ritual practices among many groups in lower Central America (Cooke 1998; Loveland 1986), including the Bribri and Cabécar of Costa Rica (Bozzoli de Wille 1977, 1979).

To sum up, defining shamanism in ethnology is complex and controversial (Francfort and Hamayon 2001; Vitebsky 2001; Winkelman 1990) but most researchers include the use of altered states of consciousness and metaphysical transformations as essential characteristics. The identification of shamanic practice in archaeological contexts is challenging (Price 2001; VanPool 2009) and usually relies on analogies, both general comparative and direct historical approaches. The accuracy and appropriateness of the use of analogies in archaeology varies on a case-by-case basis. It is intemperate to simply assume that contemporary shamans' behaviour is invariably isomorphic with the behaviour of their prehistoric forebears. On the other hand, the complementary nature of chemical, botanical, and cultural evidence for continuity in the use of drugs in South America (Furst 1972a, 1976; Martin 1970; Naranjo 1995; Reichel-Dolmatoff 1975, 1978, 2006; Schultes 1984, 1998; Schultes and Hofmann 1979; Schultes and von Reis 1995; Torres and Repke 2006; Wilbert 1993) ratifies the value of analogy, in our opinion, and the assertion that shamanism was a part of religious practice among many pre-Columbian societies. Arguing whether the Casita de Piedra stone cache is evidence for 'shamanism' or other ritual behaviour depends on how this term is defined, a point to which we return in our summary.

In the following section, which deals with a specific historical analogy, we describe in greater detail the use of special stones among shamans and healers by past and present-day Native American groups that lived or live on the isthmus of Panama and Costa Rica, within a 190-km radius of Casita de Piedra.

Ethnographic accounts of stone use among 'shamans' in western panama and southeastern Costa Rica

Casita de Piedra is situated in an area that lies just to the west of the Comarca of the Ngäbe and Buglé indigenous groups, formerly known as the 'Guaymí' (Young 1971). Linares and Ranere (1980) used the 'Guaymí' as the modern parallel for the pre-Columbian peoples they studied in western Panama. But the ethnic group that lived in this part of Panama in the seventeenth century were the Doraces or Dorasques, whose language disappeared during the last century (Castillero-Calvo 1995; Constenla-Umaña 1985). The Ngäbé, the Buglé, the extinct Dorasque, and the 'Talamanca' groups of Costa Rica (Cabécar, Bribri, Naso [Teribe] and Brunca [Boruca]), all speak historically related but mutually unintelligible languages of the Isthmian stock of the Chibcha language family (Constenla-Umaña 1991, 1995). Dorasque differs considerably from the other six closely related languages (Constenla-Umaña 1991). Various lines of genetic evidence show that the surviving ethnia descend from an ancestral population rooted in or near the areas in which they now dwell. Standard marker evidence (Barrantes et al. 1990) and, more recently, mtDNA histories (Perego et al. 2012) suggest considerable antiquity (>7,000–10,000 years) for this population and its in situ divergence. The possibility of movements of speakers of ancestral Chibchan languages out of northern Colombia has been proposed (Reich et al. 2012) but the very small size and localised nature of the sampled population in this study and the lack of an estimated time-depth for this influx, limit its historical value. The case for considerable geographic and cultural continuity between pre-Columbian, historical and present-day Native American populations in western Panama and neighbouring Costa Rica is robust.

Numerous ethnohistoric and ethnographic sources of these ethnia mention the ritual use of special stones by individuals referred to as 'shamans' (Barrantes Cartín 2009; Cervantes Gamboa 2003; Gabb 1875; Guevara-Berger 1993; Jara 1993; Ryan 2004; Stone 1962; see also Haberland 1961). The specific mineralogical composition of these stones is usually not described, with the exception of Gabb's (1875) account of his trip through Bribri territory. He examined the stones used as 'charms' by shamans, and thought they were 'fragments of calcareous veins, common in metamorphic rocks of the country, ground smooth by friction' (Gabb 1875, p. 509). No calcareous stones were found in the Casita de Piedra cache.

Table 2 Ritual stone use in Central and South American indigenous communities

Group	Location	Stone description	Stone use	Reference
San Francisco Tecospa (Nahuatl)	Valley of Mexico	Different shapes, bright yellow or translucent	Given to shaman by spirits, various uses, including curing rituals: rubbed over patient's body to cleanse	Madsen (1955)
Maya	Yucatan	Crystals	Widely used in religion, curing and divination by shamans and religious specialists, review of references provided by Brady and Prufer (1999)	Brady and Prufer (1999)
Bribri and Cabécar	Costa Rica	Small river stones	Shaman may have several, but two main stones, kept in a basket called *siahko*, wrapped in cotton Consulted for curing, divination; they are the means to contact the spirits Given to shaman on special occasions or inherited, during initiation ceremony where they are sung over, wrapped in bag, then given to novice Sometimes taken from the stomach of a wild pig, tapir or deer	Stone (1962, pp. 42–46, 71)
Bribri and Cabecár	Costa Rica		Specialised individual, *sia'tmi*, caretaker of medicine man's stones	Jara (1993, p. 30)
Bribri	Costa Rica	Fragments of calcareous veins, weathered smooth	Shamans claim their powers are based on magical merits of 'charms', *calculi*, stones they carry with them Obtained from animal viscera	Gabb (1875)
Bribri	Costa Rica	Flat and round (female stones) and spherical (male stones)	*Sia* stones, kept in bag of maguey fibres; used to help shaman communicate with spirits. Inherited after apprenticeship, passed down many generations; can also be found in a sacred river known only to shamans. Used in curing and divination; mediates communication with creator deity and spirits that control particular illnesses, blow over stone to 'excite' it	Guevara-Berger (1993, pp. 381, 388)
Bribri	Costa Rica	Stone from animal's stomach	Presbyterian minister Agustin Blessing (1921–1922, 99–101) observations of the Bribri: shaman sits vigil outside patient's house at night with a magic stone in his left hand, begins to sing and behaviour of stone relays information about illness. Stones are from a valley at the headwaters of the Zhorquin river, or stomach of a dead animal (preferably deer); they can only be collected by shaman. Stones used in curing rituals are also mentioned by Bernardo Agusto Thiel during visit to village of Térraba	Barrantes Cartín (2009, p. 515)
Bribri	Costa Rica	Stones from animal viscera or from river/pool	Male stones (*sió wëwë*) used for hunting rituals, collected from animal viscera; female stones (*sió alaki*) used for curing rituals, come from a river or a pool (Cervantes Gamboa 2003, p. 122). Used in diagnosing illness or divination, shaman prays to the spirits (*Sibö*) and asks for help, answer is conveyed back through the stones; movement is a positive response, no movement is a negative response	Ryan (2004, p. 204)
Kuna	Panama	Semi-precious stones of different colours	Healers (*inatuledis*) use various stones (*akwa nusa*); found along various rivers, some of which no longer exist. Represent great shamans (*neles*) who were transformed; collected by healer using special ritual and songs. Use depends on illness; placed on body, put into patient's drink, or heated with herbs and steam/smoke blown over painful area of body with appropriate songs	Velásquez (2004, pp. 221–222)
Kuna	Panama		Use of 'medicine stones' by *neles* or religious specialists during healing rituals, along with tobacco, cacao and gourd rattle, within a specially prepared enclosure called a *surba*	Hayans (1952)
Kogi	Northern Colombia	Rock crystal	Associated with semen (male fertility) and sun rays	Reichel-Dolmatoff (1951, p. 102)

Table 2 (continued)

Group	Location	Stone description	Stone use	Reference
Tukanoan (Desana, Barosana, Bará, Tukano, Tatuyo, Cubeo, others)	Vaupés, Colombian Amazon	rock crystal or quartzite	Principle shamanistic tool, represent semen and also sun rays; hexagonal shape reflects the form of the universe, structural model for shamanistic energy and other concepts like primordial energy, generative powers, and transformation. Kept in *komóro*, small woven boxes of palm spathe, rectangular or hexagonal in shape, along with other paraphernalia. Where lightening has struck, a shaman hopes to find pieces of scattered crystal; most stones inherited from father, Yellow=male, red=female; crystal used for disease diagnosis, passed over or touched to a patient's body; disease seen through crystal, changes in transparency. After diagnosis, use crystal's energy to re-establish balance, or distort enemy's balance. Also used to allow shaman to see aspects of the world, goes inside crystal and sees people and resources through the six planes; used to produce lightening. Small pieces of crystal in rattle, can be used as magical pathogenic agents	Reichel-Dolmatoff (1971, pp. 48–49, 1979, 1985, 1987)
Sibundoy (Kamsá)	Colombia	Quartz	Obtaining quartz crystal is part of graduation process to status of 'thunder shaman'	Ramírez de Jara and Pinzón Castaño (1992, p. 290)
Wakuenai (Baniwa)	Venezuela, Colombia, Brazil, Isana and Guainia rivers	Polished red stones and quartz-like crystals	Part of sacred paraphernalia	Hill (1992, p. 198)
Pemon	Southern Venezuela	Crystal	Spirits enter novice's body in the form of a rock crystal; among most important objects. Crystals sung to and fed tobacco	Furst (1993, pp. 400-401)
Barama River Carib	Guyana	Black basalt, quartz, sandstone, green jadite and limestone	Each type of stone represents different spirit; stones placed within rattle, tobacco used to communicate with them	Gillin (1936, pp. 158–159, 175)
Waiwai	Guyana/Northern Brazil	Quartz and other	Tobacco smoke blown over stone, to summon helping spirits. Kept in a woven basket (*pokara*) along with other magical equipment; stones often inherited, may also appear or acquired	Wilbert (1979, p. 32) and Fock (1963, pp. 115, 125–126)
Waiwai	Guyana/Northern Brazil	Quartz	Magic stone (*ñukwa*) appears in shaman's mouth during a dream; aids shaman when he blows smoke over it, sings songs with crystal in mouth. Quartz linked with brilliant objects, heavenly light	Sullivan (1988, p. 403)
Quichua	Eastern Ecuador	Polished	'Soul stones', contain soul of shaman. Manioc spirit represented as a black soul stone; connected to transformation	Whitten (1978)
Indigenous groups	Peru and Ecuador		Ethnohistorical accounts of 'pardon' stones, used to cleanse people of sins, also sacred stones that embody Huaca ancestors; northern shamans use stones to cleanse patients. Jesuit missionary Arriaga (1968 [1620]) wrote that healers cleansed patients by rubbing them with sacred stones called *pasca*, along with other objects to absorb sin and capture illness; shaman then blows on rock and blows sin away (Valcárcel 1964). Cleansing patient with stone is still contemporary practice in Ecuador	Glass-Coffin (1999, pp. 207–209)
Campesinos and indigenous groups	Northern Peru	Rock crystals, pyrite, heart-shaped stones, magnetic stone and stones from archaeological ruins, other stones	Stones part of ritual paraphernalia of contemporary curanderos; chosen for shape, mineral type or origin: iron pyrite may be used to symbolise riches (p. 107), clarify a curer's psychic sight (along with 'dark crystals', p. 34), or hypnotise a patient (p. 43) depending on curandero, heart-shaped stones used to treat heart problems, another set of stones to 'enchant' and 'disenchant', magnetic stone used to attract good fortune, other stones for removing pain and anger. Stones are	Joralemon and Sharon (1993)

Table 2 (continued)

Group	Location	Stone description	Stone use	Reference
			inherited from the curer's father, usually part of a sacred bundle of stones and carved figurines, passed down over generations	
Jivaro	Peruvian Amazon	Rock crystal and small white stones	Stone put into a calabash of tobacco water, blessed and given to patient to treat chills; kept in small bag with other paraphernalia	Wilbert (1979, p. 18) and Karsten (1935, pp. 404–405)
Jivaro	Peruvian Amazon	3 red jasper stones	Represent 3 'infants' offered to deity Nunghuí at planting time by women, and contain the female souls of manioc plants; placed under a food bowl in the centre of the garden	Sullivan (1988, p. 369)
Campa (Asháninka)	Peruvian Amazon	3 stones	Novice embarks on a journey to receive the spirit stones of light and/or dark shamanism. Third stone, fed a daily portion of tobacco syrup, metamorphoses into a jaguar 'daughter' when shaman blows on it and allows transformation of shaman into jaguar	Wilbert (1979, p. 18)
Machiguenga (Asháninka language group)	Peruvian Amazon	Light-coloured or transparent, especially quartz	Stones contain spirits, obtained from a celestial being that appears to a novice during drug hallucination, or acquired from male relative; always carried on the body, in a small bag loss leads to death. Fed with tobacco smoke, extension of shaman's mystical physiology; quartz considered curative	Sullivan (1988, p. 418) and Baer (1992, pp. 86–87)

Other accounts provide details on the origin and methods of acquisition of special stones used in rituals. Among the Cabécar and Bribri, the three most frequently mentioned sources of special stones were: (1) rivers or pools, (2) the internal organs of animals (gastroliths, usually from large mammals like deer, tapir or peccary) and (3) inheritance from a relative or from another shaman during special occasions (Blessing 1921–1922; Cervantes Gamboa 2003; Guevara-Berger 1993; Ryan 2004; Stone 1962). The location of sources or the act of obtaining the stones was often restricted or specialised knowledge that generally was not divulged. For example, gastroliths could only be collected by a shaman (Blessing 1921–1922), and the sacred river where stones were obtained was known only to shamans (Guevara-Berger 1993, p. 381). However, Presbyterian minister Agustin Blessing (1921–1922) was told that one of the river sources of the stones used by Bribri shamans (*sukia*) was a small stream at the headwaters of the Zhorquin River (a tributary of the Sixaola river that originates in the cordillera near the border between Costa Rica and Panama, today within Teribe [Naso] territory). Some of the accounts report that stones from different sources were used for different functions, and emically distinguished. Guevara-Berger (1993) and Ryan (2004) observed a distinction made between 'male' and 'female' stones. Female stones (*sió alaki*), obtained from a river or pool, were flat and round, and used for curing (Cervantes Gamboa 2003; Guevara-Berger 1993; Ryan 2004). Male stones (*sió wëwë*) were spherical or rounded gastroliths, and used in propitiatory rites for hunting and calling game. Although none of the stones found in the cache from Casita de Piedra were gastroliths, some did show abrasion consistent with water erosion from river or stream transport.

The use of stones in curing or divination ceremonies is described in detail in several accounts. They functioned as a medium or conduit through which a shaman could contact and communicate with the spirits who would help in diagnosing illnesses and determining their treatments (Bernardo Agusto Thiel in Barrantes Cartín 2009; Blessing 1921–1922; Guevara-Berger 1993; Ryan 2004; Stone 1962). During divination rituals, the shaman would sing and blow over the stone to 'excite' it, and then use it to mediate in conversations with the creator spirit (*Sibö*) and with other spirits that controlled the illness being treated (Guevara-Berger 1993; Stone 1962). After praying, the shaman would ask questions to *Sibö*, who in turn communicated with the plants and animals and then conveyed the answer back through the stone (Ryan 2004). Movement of the stones was interpreted as a positive response to the questions asked, while no movement indicated a negative response. Similarly, Blessing (1921–1922) reported that a shaman would sit outside the patient's house all night with a sacred stone in his left hand, chanting and singing. If the stone moved, this meant that the illness was not serious.

Several accounts mention that ritual stones were kept in some type of container, although details vary. The Cabécar and Bribri wrapped ritual stones in cotton and kept them in a basket called a *siahko* (Stone 1962). During the graduation ceremony of novice shamans, stones were given to the novice by a head man, wrapped in cotton and tied in a carrying bag that was hung around the novice's neck (Stone 1962, p. 45). Rather than cotton, Guevara-Berger (1993, p. 381) states that these stones were kept in a bag of 'maguey fibres'.[1] Neither maguey (*Agave* spp.) nor cotton (*Gossypium* spp.) produce diagnostic silica phytoliths and would not have been detected in our phytolith analysis of the soil around the cache. Palms (Arecaceae) do produce abundant and diagnostic phytoliths throughout all parts of the plant, but palm phytolith frequencies were quite low in both the cache sediment sample and the outside control sample. We are therefore confident that if the Casita de Piedra stones were kept and buried in a basket like that described by Stone (1962, p. 43), this basket was not made from palm leaves.

The deposition of the Casita de Piedra stone cache

The cache at Casita de Piedra was found near the back of the rockshelter, behind a large boulder. However, there are no other indications of a division of sacred or profane space within the small shelter. Evidence of stone tool manufacture and food preparation, such as lithic debitage, grinding stones, charcoal from fires, and carbonised palm and fruit remains, were all found in the same level as the cache. Physically, this seems to suggest that ritualistic behaviour was very much part of everyday life, or that a person dedicated to ritual lived there as an equal. The rockshelter continued to be used for at least a millennium after the deposition of the cache, therefore this deposition did not signify any sort of 'closing off' of the rockshelter as sacred or restricted space. Despite the lack of other indicators of religious activity (*ritual sacra*) defined by VanPool (2009), such as noisemakers and musical instruments, psychoactive plants and chemicals, altars and activity spaces, and religious imagery, we believe that the cache of stones represents ritual paraphernalia and the practice of religious or spiritual behaviour.

The question of whether the cache was intentionally deposited at the rockshelter 4,000 years ago, or simply forgotten by its owner, is difficult to answer. The stones were clearly important and it is hard to imagine they were merely left behind by accident. Among many groups in Central and South America, magical or ritually important stones were passed down through generations and kept in use over long periods of time (Baer 1992; Fock 1963; Guevara-Berger 1993; Joralemon and Sharon 1993; Reichel-Dolmatoff 1979; Stone 1962; Sullivan 1988; Wilbert 1979). However, there is also ethnographic evidence for shamans being buried with special stones among their paraphernalia when they died (Reichel-Dolmatoff 1951), including among the historic Bribri and Cabécar (Stone 1962). This would support archaeologists' interpretation through analogy of certain burials with special stones being those of shamans or ritual specialists. For example, Haberland (1961) excavated a grave at Buenos Aires in the Valle del General in Costa Rica that contained unique pottery vessels and two highly polished and rounded quartz stones, which he interpreted as the burial of a shaman. The local workmen called the stones '*sukia*-stones', the Bribri and Cabécar name for shamanistic stones (Blessing 1921–1922; Stone 1962), and Haberland observed that these types of stones were still being used in a nearby village by religious specialists he called shamans. At Cerro Juan Díaz in central Panama, a shaft containing several bundles of human bones included one that wrapped an adult and an adolescent, dating to 1820–1580 cal BP. The adult was buried with 55 puma (*Puma concolor*) canines and the adolescent with one raccoon (*Procyon lotor*), nine puma, and 13 ocelot (*Leopardus pardalis*) canines, all pierced through the roots. Within the bundle were a copper ring and two polished and finely worked stone bars of agate and a very hard blue stone, unique at this site. These grave goods were interpreted as evidence for a shaman-curer and his apprentice (Cooke 1998; Cooke et al. 2000). If this is correct, the polished bars may represent the formalisation of the power of exotic stones for ritual purposes in a society much more complex than that of preceramic western Panama. Unfortunately, we cannot determine if the Casita de Piedra cache was intentionally interred as part of a burial, since no bone—animal or human—was recovered at site.

Conclusions

In summary, a cache of twelve unusual stones was recovered during excavations at the rockshelter of Casita de Piedra, situated in the Pacific pre-montane slopes of western Panama. The preceramic cache was found at the back of the rockshelter and is dated to between 4800 and 4000 cal BP based on an AMS date immediately underneath the cache, and an AMS date in the Stratum above the cache in the same excavation unit. Geological analysis of the cache stones reveals a variety of lithologies, including quartz, bladed quartz and jarosite aggregate, chalcedony vein nodule, pyrite, and dacite. The dacite stone was humanly modified into the shape of a cylinder and the three pyrite stones show evidence of use. The variety of lithologies represented indicates that the stones came

[1] The plant usually referred to as 'maguey', *Agave americana*, does not grow in western Panama naturally. It may have been cultivated, but it generally prefers much drier climates than exist in this region. *Agave hurteri* is the only species in the genus documented for the region (D'Arcy 1987).

from multiple geological contexts outside the immediate vicinity of the rockshelter, but all potentially from within the extensive young volcanic belt of the western Panama cordillera.

We propose that the cache found at the Casita de Piedra rockshelter provides the first archaeological evidence in lower Central America for ritualistic activity using specially selected stones, and for specific practitioners of this ritual, in a small-scale society that probably moved residence frequently. Our excavations did not provide evidence for the use of mind-altering substances that induce trance states and transformative visions; therefore, the reader may argue that the stone cache does not represent 'shamanism' per se, if this criterion is used to define this activity. However, we are comfortable with applying the term 'shamanism' to the cache based on analogy. In the geographic context that defines most of the analogies to which we refer, there is ample evidence for metaphysical transformation and curing being subsumed in particular individuals referred to as 'shamans', and the inclusion of special stones among their ritual paraphernalia. Our interpretation is predicated upon the assumption of deep historical and cultural continuity in the narrowest geographic sphere of Costa Rica and central and western Panama, which has been substantiated by human population genetics, historical linguistics, ethnohistory and ethnology.

Acknowledgments Funding was provided by the Social Sciences and Humanities Research Council of Canada (SSHRC). The communities of Casita de Piedra and Quebrada Seca, Chiriquí, Panama, generously provided hospitality and help during excavation. Fieldwork and permits were facilitated by the Smithsonian Tropical Research Institute, Panama, and the Departmento del Patrimonio Histórico of the Instituto Nacional de Cultura, Panama. Lab and logistical support was provided by the Department of Archaeology, University of Calgary. We owe a great debt of gratitude to Anthony J. Ranere for his insights, guidance, and excavation assistance. Thanks to Eduardo Bejerano and Drude Molbo for field assistance, Sonia Zarillo and Scott Raymond at the University of Calgary for helpful discussions, and Yvonne Kjorlien for comments on the manuscript. Initial observations and comments on the cache stones were made by members of the Geology Department at the University of Calgary. We thank two anonymous reviewers for their constructive comments.

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