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To cite this article: Jessica L. Tingle & Tahar Slimani (2017): Snake charming in Morocco, The Journal of North African Studies

To link to this article: <http://dx.doi.org/10.1080/13629387.2017.1296357>



Published online: 17 Mar 2017.



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Snake charming in Morocco

Jessica L. Tingle* and Tahar Slimani

Faculty of Sciences Semlalia, Department of Biology, Biodiversity and Ecosystem Dynamics Laboratory, Marrakesh, Morocco

ABSTRACT

We provide an overview of the history of Moroccan snake charming, and then we describe the current state of snake charming performances in Morocco, drawing from observations, interviews, and analysis of published materials. Because Marrakesh represents the most prominent centre of snake charming in the country, this paper provides detailed information on performances in the well-known Place Jmaa el Fna. The cities of Meknes, Taroudant, and Tangier also host snake charmers. Weekly markets, or souqs, in rural areas historically involved entertainers such as snake charmers, but observations in several of these souqs revealed none. Charmers use several snake species for their trade. This study documented: the Egyptian Cobra (*Naja haje*), Puff Adder (*Bitis arietans*), Horned Viper (*Cerastes cerastes*), Moorish Viper (*Daboia mauritanica*), Montpellier Snake (*Malpolon monspessulanus*), Horseshoe Whip Snake (*Hemorrhhois hippocrepis*), and Viperine Snake (*Natrix maura*). We discuss several explanations for avoidance of harm from the venomous species. Finally, we outline present and future challenges of the practice.

KEYWORDS Aissawa; snake charmer; Morocco; Egyptian cobra; puff adder; human–reptile interactions

Introduction

The practice of snake charming has existed in the Mediterranean region for more than two millennia, if not longer. For example, the Marsi exerted legendary powers over snakes in ancient Rome, and the Pauliani displayed their skill in snake-handling competitions during the Italian Renaissance (Nutton 1985; Park 2001). Roman literature gives accounts of snake charming tribes in Libya who did not succumb to venomous snakebites, most famously the Psylli (Lucan 2008; Aelian 2011). Descriptions of Moroccan snake charming in the French and English literature go back to at least the late 1700s. For a while, it was in vogue for Europeans to travel to destinations such as Morocco, then write an account of their travels for the European audiences back home, much like medieval Muslim travellers who published *rihlas* upon

CONTACT Jessica L. Tingle ✉ jessica.tingle@email.ucr.edu 📧 Department of Biology, Biodiversity and Ecosystem Dynamics Laboratory, PO Box 2390, Marrakesh 40000, Morocco

*Present address: Department of Biology, University of California, Riverside, 900 University Avenue, Riverside, CA 92521, USA.

their return home. These Europeans often peppered their accounts with flowery descriptions meant to convey the exotic otherness of Morocco (e.g. Holt 1914; Andrews 1922; Epton 1958). In some cases, descriptions of their firsthand observations provide valuable information on contemporaneous Moroccan practices, while in other cases, it is difficult to separate very much useful fact from the orientalist fantasy. Here, we explore the evolution of snake charming performances in Morocco, using published literature augmented with our own interviews (see the [appendix](#)) and observations of snake charmers.

All observations occurred between January and November 2014. The majority of these observations occurred on the Place Jmaa el Fna of Marrakesh, a well-known site continually frequented by snake charmers. We chose Jmaa el Fna as our main research site because the literature indicated it as the best-known and largest centre of snake charming in Morocco. We chose further locations based on information from the literature and interviews about where else in Morocco snake charmers perform or have historically performed.

History

Descriptions of Moroccan snake charming performances in eighteenth- to twentieth-century European literature share some common elements. Performers included a group of musicians (often playing flutes, tambourines and/or drums) and a principal charmer. Snake charmers often had a characteristic appearance, exemplified in the following description:

The principal actor has an appearance of studied weirdness as he gesticulates wildly and calls on God to protect him against the venom of his pets. Contrary to the general custom of the country, he has let his black hair grow till it streams over his shoulders in matted locks. His garb is of the simplest, a dirty white shirt over drawers of similar hue completing his outfit. (Meakin 1906, 152)

At the beginning of the performance, the principal charmer invoked the saint Mohammed ben Aissa and sometimes had the crowd say a prayer from the beginning of the Quran. The performer indicated that those who give money will gain God's blessing and protection. Then the performance began, sometimes with magic tricks, and then with feats involving snakes. Examples of these feats include inserting the snake's head down the throat, or even eating a snake; allowing a (likely non-venomous) snake to bite the charmer to prove his immunity to venom; allowing a snake to envenomate a chicken to prove the snake's deadliness. The charmer often danced wildly, sometimes acting as if in a trance. The performers collected more money from onlookers at various points (Lempriere 1794, 35; Brooke 1831, 420–421; Thomson 1889, 367–368; Meakin 1906, 152–155; Grame 1970). Religion

or mysticism has played an enduring role in snake performances around the world. Ibn Battuta, the famous fourteenth-century traveller from Tangier, reported on a religious brotherhood in Iraq that incorporated snakes into their practices. He said that following afternoon prayers and a meal,

they began the musical recital. They had prepared loads of firewood which they kindled into a flame, and went into the midst of it dancing; some of them rolled in the fire, and others ate it in their mouths, until finally they extinguished it entirely. This is their regular custom and it is the peculiar characteristic of the Ahmadi brethren [also known as the Rifai fraternity]. Some of them will take a large snake and bite its head with their teeth until they bite it clean through. (Ibn Battuta 1962, 273–274)

Likewise, a religious brotherhood has been associated with Moroccan snake charming: the Aissawa (also transliterated as Aissaoua, Aïssawa, 'Isawa, 'Isawiyya, and Isowa, by various authors). At other points in Morocco's history, other groups may have participated in the practice. Brunel (1926, 146) mentioned a group called the Hnaïchiya (whose root is the same as the Moroccan word for 'snake'), composed of the Aissawa as well as the Jilâla and Rhâhla. When the Hnaïchiya performed in public, members of the Aissawa typically charmed snakes or played music while members of the latter two groups executed feats such as drinking boiling water or devouring snakes. The Aissawa, like other popular brotherhoods, are often held in low regard for their practices (Brooke 1831, 416–421; Epton 1958, 86–87; Crapanzano 1973, 1).

The founder of the Aissawa brotherhood, Sidi Mohammed ben Aissa, lived from approximately 1465 to 1526 C.E., studying with several sheikhs across Morocco and later founding his own brotherhood in Meknes (Brunel 1926, 2; 10–16). Ben Aissa gained a reputation for having power over ferocious beasts and venomous snakes. In a poetic work titled 'At-Tâiyya', he himself stated that 'men and jinn are all at my devotion as well as reptiles (venom) and the wild beasts of the desert' (Brunel 1926, 21). Several legends describe this power of Ben Aissa and his followers, including the following particularly famous one:

It is said that Sheikh ben Aissa wandered the desert with forty of his disciples. Those who felt the pangs of hunger complained to their Master, who did not respond. Having been made to hear the new complaints, the irritated Sheikh ordered them to eat poison. The disciples obeyed his order to the letter and they filled up with snakes and scorpions. They weren't inconvenienced in the least.

It is in memory of that miracle and thanks to Baraka attributed to the Prophet and the Sheikh that the Aissawa claim immunity to the venom of all kinds of beasts, vipers as well as centipedes and scorpions. The bites and stings of these beasts, venomous though they may be, have no effect upon them. (Brunel 1926, 145)

Brunel (1926, 45) points out that all of these stories represent the Aissawa's efforts to elevate their patron's saintly status, and that many sects have similarly produced stories to aggrandise their founders, attributing to them miracles that fuel their popular image. Thus, it is unclear whether the Aissawa have incorporated snake handling into their rituals since the time of their founding, or whether the practice originated sometime in the 200 years after ben Aissa's death.

The Aissawa historically used their affinity for snakes to perform various community services, like removing problem snakes from human habitations or silos (Brunel 1926, 146). They also provided magical talismans meant to protect people from snakebite, which often required the recipients to refrain from harming snakes (Brunel 1926, 149–150), and had a reputation for healing snakebites and scorpion stings (Brunel 1926, 151; Westermarck 1926, 354–355). Additionally, snake charmers treated several unrelated ailments using snake parts: they rubbed a dried snakeskin on the eyelids of those who complained of eye ailments; if a baby were sick, then the snake charmer could hold a viper by its tail, breathing on top of it to place the baby under the care of Sidi ben Aissa; alternately, the charmer could supposedly cure a sick adult by grasping a viper in his hands, sucking its head, and then breathing on the client while saying 'I soak you with the baraka [blessing] of the Hnâichî' (Brunel 1926, 150). These activities formed part of a large repertoire in which snake charming performances were only one of the Aissawa's roles.

Modern performances

Jmaa el Fna in Marrakesh remains the most visible centre of snake charming in Morocco; thus, we focus our description of snake charming performances there.

Several (usually five) groups of snake charmers sit, squat, or stand in strategic points of Jmaa el Fna, usually with an assortment of Egyptian Cobras and Puff Adders spread in front of them, harmless snake species grasped in the hands of a few handlers. Groups generally comprise 4–10 people, all men, ranging in age from their 20s–70s. A long-term study estimated that Marrakesh hosted approximately 70 charmers between 2003 and 2014, divided into five closed groups (Pleguezuelos et al. 2016). A musician with the flute and one or more drummers play sporadically to draw attention to the group. The flute players usually sit quite far from where the snakes lie, making no pretence that the music has any effect on the snakes. Those charmers with drums use them not only to produce sound, but also for waving in front of the cobras so that they will stand up defensively and spread their hoods wide in an attempt to scare off the aggressor. Drums may also cover snakes not actively involved in the performance at a given time. Snake charmers sometimes rinse the snakes in buckets of water, no matter the time of

year. One charmer said that the action keeps the snakes clean. In the summer, a charmer said that the water helps to cool the snakes off, jokingly calling the bucket a snake 'swimming pool' (20 May 2014).

Most of the time, the snake charmers wait for pairs or small groups of tourists to pass, then they try to elicit money in exchange for holding the snakes or taking photos. Some tourists pay anywhere from 20 to 200 Dirhams for the experience, though others refuse to pay or avoid the snake charmers entirely. Sometimes, Moroccans, perhaps from the newer, wealthier parts of town or on holiday from other cities such as Casablanca or Rabat, also pay to have their photos taken with snakes. The charmers spend much of their time waiting, huddled up under their umbrella for protection from rain or sun if the weather calls for it (as it often does), sometimes chatting, sometimes sharing tea as the time passes. Although the snake charmers of Jmaa el Fna spend most of their time waiting for tourists who will pay money to take photographs with the snakes, they do occasionally put on more vigorous performances, playing their instruments with more energy. During these performances, a group of 30–50 people comprised largely of Moroccans, mostly men, might gather for perhaps 10 minutes or so to watch the charmers. Once, on a breezy summer day with some cloud cover, a group of snake charmers maintained a large number of spectators continuously for at least an hour (5 June 2014). On a different day, snake charmers drew attention by apparently staging a fight in which several men held dangerous Puff Adders by the tail and swung the snakes at each other (10 June 2014). Other times, sustained work on the musicians' part seemed enough to hold the crowd for some time.

On one summer morning (14 August 2014), a performance unlike any others we observed took place. Members of a group of snake charmers played the flute and drums with gusto. A man in his 50s brandished a knife, frequently scraping it on the ground as if sharpening it. He also held a very limp snake Montpellier Snake (*Malpolon monspessulanus*). A few times, he stood up and threw the knife down so that it stuck in the wooden snake box. Sometimes, he held the snake up and pressed the flat side of the knife against its chin, or poked it in or around the chin with the tip. Once he pressed the snake's head down on the wooden box and made an action to mock chopping its head off. Then he made eye contact, grinned, and said it was not dead. Eventually, a different man wearing a loose turban took over the limp snake. Grunting occasionally, he put the snake's belly loosely between his teeth, and walked around to attract attention. Then he went to the musicians and started grunting more frequently. He eventually stopped that behaviour and brought the snake back to his previous location, where he poked it in the belly with a knife several times. After some time, the turbaned man took a handful of non-venomous snakes and then carried them around, sometimes shaking them, and sometimes grunting. His actions

seemed to be an imitation of trance behaviour to attract spectators. Late in the course of the performance, one snake charmer displayed an egg. It was an infertile snake egg that the charmer said came from a Montpellier Snake. It seemed that the egg had been stuck in the reproductive tract of the limp snake from earlier in the performance, a fairly common problem that can lead to death, which is why the charmers were treating the snake with the knife. However, without an observation of the egg's extraction from the snake's body, we cannot confirm this apparent medical treatment incorporated into the performance.

Snake charmers worked every day of the year on Jmaa el Fna. During cold winter days, they huddled underneath umbrellas during rainstorms and got their snakes out during clear spells in between rain. Some days it did not stop raining enough for them to actually perform. During the summer months of June–September, when average daily temperatures in Marrakesh range from 33°C to 36°C and frequently exceed 43°C, the large, open, paved space of Jmaa el Fna serves only to amplify the heat. Yet, the snake charmers still held their places in the square. Ramadan, the month of fasting during daylight hours, fell during the month of July in 2014. Especially when Ramadan occurs in the summer, most Moroccans decrease their daytime outdoor activities, instead coming out after breaking the fast at sunset. However, the snake charmers remained in the baking heat of Jmaa el Fna without recourse to water. On several occasions during that time, most of them had lain down in the shade of their umbrellas, seemingly asleep. Even on the important holiday Eid el Adha (6 October 2014), when the entire city of Marrakesh felt nearly deserted while people stayed inside to feast with their families, several snake charmers remained on Jmaa el Fna throughout the afternoon. There were fewer individuals out than usual, but a walk around the perimeter of the square revealed four or five groups, the usual number. The line of horse carriages that usually occupied one end of the square was also present. Jmaa el Fna was otherwise nearly empty. Restaurants and even most of the ubiquitous orange juice stalls were closed. Very few other performers and only a handful of tourists were present.

Throughout the course of the year, charmers generally set up between 8:30 and 9:30 each morning, and in winter, they packed up around 17:00 or so, but they stayed out later as the days lengthened. In May 2014, they were observed out later than 20:00, after the sun had dipped below the horizon, but they were seen packing up to leave before 20:30. During the month of July, which coincided with Ramadan, the snake charmers stayed out well past sunset, though there were far fewer of them out than during the day. On one particular night, they remained out at 22:00. One night, a flute player and another man who held a large non-venomous snake sat with one single cobra and one single Puff Adder on the ground in front of them, a

smaller showing of reptiles than one usually sees during the day. Both venomous snakes were very close to the mat on which the men sat, but were still several feet away from the men, a distance that seemed to pose a potential safety hazard given the low visibility at that time of night even with the nearly full moon. Because Ramadan and the hottest part of the year coincided, it was impossible to determine if they worked so late because the breaking of the fast leads to more activity after sunset during Ramadan, or because people simply stay out later in the summertime.

Localities

The previous section included many details about snake charming in Jmaa el Fna, a large open space in the old part of Marrakesh. During sunlight hours, snake charmers share the space with various others, including orange juice sellers, vendors of assorted items, henna artists, monkey dressers, acrobats, men who display large vultures, and horse carriages. As the sun sinks on the horizon, a multitude of food carts suddenly pops up as their owners prepare for the evening's business. Daytime performers eventually pack up, making way for musicians, storytellers, more acrobats, and carnival-type games, among others. Performers such as these have been a Jmaa el Fna staple for decades, maybe even centuries. As long ago as the eleventh century, Marrakesh provided an important stop for trans-Saharan trading caravans whose routes brought them from such distant cities as Timbuktu and Kano (Demerdash 2009). The continuous flow of travellers through the city, particularly in the area now known as Jmaa el Fna, has demanded entertainment. Although one might not find snake charmers in Marrakesh outside of Jmaa el Fna these days, this was not always the case. In the late 1800s, charmers and other entertainers could be found near the Thursday souq of Bab el-Khamis. Thomson wrote that

not far from the Bab-el Khamis, is a secondary *sok*, where second-hand articles of all sorts, with pottery, spices, native medicines, &c., are sold. Itinerant jugglers and other public entertainers, including the omnipresent snake-charmers, take advantage of the crowd to show off their skill for the expected *flus* [money]. (1889, 364–365)

Even then, however, Jmaa el Fna provided the centre of entertainment for the city, according to Thomson. He clearly refers to Jmaa el Fna when he describes the scene at 'the second or Friday market' which

is held in a large square in the very heart of town. Of all the public sights and scenes which Morocco presents, none attract and delight the traveller more than the exhibitions and entertainments held in the evening in the square of the Friday market ... The Moor naturally wends his way to the market-square, for it is his public recreation-ground, his music-hall, his reading-room, his everything, indeed, that ministers to his enjoyment. (365)

Despite the many available forms of entertainment available in the square, Thomson asserted that snake charming was the most popular and that 'it is on nightly exhibition in every town' (367).

South of Marrakesh in the Souss, the city of Taroudant also has a square filled with performers, locals, and tourists called Place Assareg, often likened to a miniature Jmaa el Fna. Reviews on the travel website Trip Advisor indicate the presence of snake charmers in the square, some of them including photos of a snake charmer in what is clearly Place Assareg. The proprietor of a nearby restaurant became excited when questioned about men who work with snakes, pointing to the square and saying that they work there every afternoon (20 October 2014). He said that they have four or five kinds of snakes, including cobras. Observation of the square from 12:20 to 15:30 that afternoon revealed a shifting entertainment scene that at various times included sellers of animal parts, storytellers, musicians, and men selling various remedies. Crowds gathered and broke, with circles of people often numbering 15–30 strong and once numbering 50–60. While most of the spectators were local, at one point, a tour bus pulled up and about 15 foreigners unloaded to listen to their tour guide while looking at the performers from a distance. Unfortunately, time constraints did not allow observation past 15:30, by which time no snake charmer had appeared.

One can often see a snake charmer or two in the city of Meknes, where they frequent the large square near Bab el Mansour gate in the old part of the city. As in Marrakesh, they ply their trade in a space particularly popular among tourists, beckoning to any who pass by. They share the space with sellers of various wares and men who charge tourists to have their pictures taken with fancily dressed horses. They can be seen any time of the year, though they do not work for the entire day as charmers do in Jmaa el Fna. A server working in one of the square's restaurants said that the snake charmers come out in the afternoon every day, all year round, even on Fridays, when most businesses close down for the afternoon; however, a taxi driver in town contradicted this information somewhat, saying that the snake charmers, like most other Moroccans, take Friday afternoon off (20 June 2014). On that particular June Friday, no snake charmer appeared between the noon and 16:30, contrary to the restaurant server's expectations. One charmer was observed for about half an hour on Saturday, 11 October 2014. With a drum sitting on the ground next to him, he waited with a single Montpellier Snake (*M. monspessulanus*). During the observation period, one tourist approached for a photo, then three young Moroccan men chatted with the charmer, one of them paying to have his photo taken by smartphone with the snake around his neck. The charmer also beckoned to two groups of two to three tourists each without success. At 13:15, he started packing up, during which time the call to prayer began.

Fes may be more hostile towards snake charmers than many other cities. A nineteenth-century British travel writer reported that a snake charmer ('juggler') in Fes had recently died as a result of snakebite, and that as a result, 'the governor summoned all the snake-jugglers in the town, six in number, and sent them to gaol' (Brooke 1831, 414–415). We know of no recent snake charmer presence there.

Snake charmers have regularly performed in Tangier (Leared 1876, 17; Holt 1914, 3). While this study did not include the Mediterranean city, Trip Advisor, personal travel blogs, and tour company websites depict snake charming as a popular modern tourist activity there. Many of them reference the presence of snake charmers in the kasbah area, specifically. Another northern city, Tetuan, has occasionally hosted snake charmers (Brooke 1831, 414), but we have found no recent references to snake charming there.

Weekly markets (*souqs*) in rural areas once provided an important venue for snake charmers, among other travelling performers. These markets provided not only a way to buy and sell goods, but also a way for villagers to find entertainment and to hear news from elsewhere (Troin 1975, 111; Miller 1984, 137). Although many historical sources refer to the presence of snake charmers in the *souqs*, or weekly markets, of small villages, particularly in and around the High Atlas Mountains, this study did not confirm their continued presence.

A man interviewed in the village of Tafza in the Ourika Valley, 37 km south of Marrakesh at the base of the High Atlas, gave the locations and days of several *souqs* in the Ourika Valley where he thought one might find snake charmers: Tnine on Monday; Aghbalou on Thursday; Rhmat on Friday; Setti Fatma on Sunday. He showed confidence in the presence of charmers at the Tnine *souq*, and indicated that due to its larger volume of tourism, the Setti Fatma *souq* would be the most likely in the Ourika Valley to draw snake charmers. He said that snake charmers travel between *souqs* so that they can perform on most days of the week, thereby earning enough money to support their families. Different snake charmers might be present at a given *souq*, but he showed confidence that at least some would show up to any *souq* but the smallest. He pointed out that each valley had its own set of *souqs*, each of the valley's towns hosting a *souq* on a specific day of the week. However, no snake charmer was found in Tnine Ourika on the last Monday of April 2014, despite a thorough search of the large area covered by the *souq*. In fact, when asked whether there were snake charmers there, a few men laughed and one said that Jmaa el Fna is the place to find snake charmers. Likewise, we observed no performers at the Setti Fatma *souq* during a visit on 19 October 2014. One man who had a shop along the road where the market took place said that he was originally from the town of Ouzoud, but had lived in Setti Fatma for 20 years, during which time he never met anyone in the town who worked with snakes. However,

he mentioned that he knew of some men who worked with snakes in another town somewhere in the mountains.

One writer reported the presence of entertainers, including snake charmers, at the Tuesday market of Tleta Henchane, a small town east of Essaouira, in the early 1900s (Bensusan 1904, 203–204). A Tuesday visit to the town in October 2014 revealed the continued presence of this particular weekly souq over a century later. Only one obvious entertainer was present: a man holding a large notepad had drawn a circle of market-goers around himself. He had been drawing pictures on the notepad, and seemed to be in the process of telling stories or news to his audience. It may be that October is wrong time of year to see performers, or that they attend only sporadically. Perhaps the overcast sky which constantly threatened rain that morning would have kept some performers away.

In addition to these above localities, Pleguezuelos et al. (2016) reported the presence of snake charmers in Fez, Safi, Agadir, Taroudant, Ouarzazate, Zagora, Tata, Tiznit, Sidi Ifni, Guelmime, and Tan Tan, mostly in association with tourists, between 2003 and 2014.

Snake species used

Thoughts of snake charmers tend to bring cobras to mind. They are the preferred snake of charmers in many regions, including India, and they certainly constitute a large proportion of the snakes present in Moroccan performances. The Egyptian Cobra (*Naja haje*; بوسكة), reaches greater lengths than any other species in North Africa, usually 1–2 m, and their hood can be 15–18 cm broad (Schleich, Kästle, and Kabisch 1996). This large size draws attention, especially when combined with their impressive defensive behaviour of holding the front portion of their body erect with the hood spread wide. These characteristics contribute to an exciting performance, leading to a high demand for the species. A field guide to Northern African reptiles reports that ‘skilful snake hunters catch a considerable number within a short time. For example, they caught 300–500 of them within a few days near Goulmine, S-MOR in June 1993’ (Schleich, Kästle, and Kabisch 1996, 529). One young snake charmer reported a preference for cobras from some localities over others. He mentioned that there are two deserts from which snakes come, near Ouarzazate and Tan Tan, and snakes in those deserts are different. He specified that there are cobras in both, but they are not the same. When asked how they are different, he replied that the cobras from around Tan Tan live a long time, up to 10 years after they are caught, but that the cobras from Ouarzazate do not last very long, maybe only six months in captivity. Tan Tan cobras therefore cost more money than the Ouarzazate cobras do.

The presence of vipers, notably the Puff Adder (*Bitis arietans*; لفع), in the snake charmers’ repertoire is puzzling. Despite its immense bulk and slow

crawling speed, this species strikes remarkably quickly, making it potentially more dangerous to work with than other venomous species (Young 2010). The unpredictability of viper strikes in both time and direction compared to cobra strikes makes them more difficult to work with without sustaining a bite. Unlike cobras, they do not forage actively for prey, but rather sit still in one spot (sometimes for weeks at a time) waiting for prey to pass by, hence they are less active than cobras as a performance animal. Probably due to their danger and lack of charismatic behaviour, snake charmers in the Middle East and India shun viper species (Corkill 1939; Dutt 2004). A passage in the Old Testament of the Bible references a type of snake that cannot be charmed: 'the deaf adder that stoppeth her ear; which will not hearken to the voice of charmers, charming never so wisely' (King James Bible 1769, Psalms 58:4–5). According to a doctor devoted to the study of herpetology, 'It seems probable that "the deaf adder" of the Psalms may have been the Levantine Viper, which is found in Palestine and Syria as well as in Iraq, where one of its local names is HAIA TURSHA, that is, the "deaf snake"' (Corkill 1939). Corkill's evidence seems merely circumstantial, but if he were correct, then we might believe that even then, more than 2000 years ago, snake charmers avoided vipers for their performances. Although we did not observe any other viper species in the possession of Moroccan snake charmers, they reportedly also use the Horned Viper (*Cerastes cerastes*; (بوسكة), a small species with a horn-like scale over each eye (Schleich, Kästle, and Kabisch 1996; Pleguezuelos et al. 2016). Hornless snakes are occasionally transformed into faux Horned Vipers by sticking hedgehog quills or spines above the eyes, thus increasing their worth (Ditmars 1910, 330; Schleich, Kästle, and Kabisch 1996). Charmers may also use the Moorish Viper (*Daboia mauritanica*; (حنش صياد = بو نفاخ) in smaller numbers (Pleguezuelos et al. 2016).

Snake charmers throughout North Africa, the Middle East, and the Indian subcontinent have been documented to possess less venomous or non-venomous species (Corkill 1939; Dutt 2004). With these snakes, they can perform feats too perilous to perform with dangerous species. They can also allow spectators to handle the snakes or have their picture taken with one draped around their shoulders. We observed several such species in use on Jmaa el Fna: the impressively large Montpellier Snake (*M. monspessulanus*; (حنش صياد = بو نفاخ); the smaller, beautifully patterned Horseshoe Whip Snake (*Hemorrhois hippocrepis*; (الزريغ = بولمریات); and the Viperine Snake (*Natrix maura*; (حنش الما = راشة راشية), whose triangular head and foul temper sometimes causes it to be mistaken for a venomous viper. Pleguezuelos et al. (2016) found that snake hunters harvested two additional non-venomous species, the Schokari Sand Racer (*Psammophis schokari*) and the False Cobra (*Rhageris moilensis*).

Historically, have snake charmers used the same species that they use today? Because most authors who have described snake charming do not possess specialised knowledge of snakes and cannot usually identify any species beyond the cobra, this question has been difficult to answer with the written literature. All references in the literature make it clear that snake charmers have used cobras since the time of the earliest description of snake charming in Morocco. Puff Adders have possibly been in use for as long as cobras or nearly as long, but the information on Puff Adders is partially conjectural based on writers' descriptions. Charmers seem to have used Puff Adders at least since the late 1800s, perhaps much longer (Thomson 1889, 367–369; Bensusan 1904, 116). It has been impossible to identify any other species used based on written accounts. A private institution in Marrakesh, La Maison de la Photographie, possesses a large photo archive covering about a century of Moroccan history. Examination of these photos allows the identification of some snake species in use. These photos provide evidence that charmers used the harmless species *H. hippocrepis* and probably also *M. monspessulanus* at least as early as 1940 (Belin 1940).

Avoiding harm from venomous species

In keeping with the historical connection to religious brotherhoods, *baraka*, God's grace or blessing, has long explained snake charmers' immunity to dangerous venom. For the Aissawa, this blessing has reached them through their connection to the founder of the order: A pact ties members of the Aissawa together with snakes, especially vipers, giving them a sort of *baraka* with respect to the animals. Their shared connection to Sidi ben Aissa makes them brothers. For this reason, each is bound to do the other no harm. However, if one of them breaks the pact, then the other may harm his treacherous brother in return. The Aissawa take great care to honour this pact, killing vipers only when their lives are in imminent danger. Some will not even sell animals to members of the Rhâhla because the latter might kill and eat the snakes. When some villager finds a snake, an Aissawi will entreat the villager to spare the creature's life, saying that sickness or even death will come as a punishment for the unnecessary killing. (Brunel 1926, 152–153)

Today, some snake charmers still claim this divine protection, though during the present study those who did claimed protection from God without mentioning Sidi ben Aissa.

Another explanation for charmers' ability to handle venomous snakes with impunity lies with possible innate immunity. An interviewee who grew up in Ouarzazate and Marrakesh suggested that snake charmers share a familial relationship with each other, and that they have something in their blood stemming from an ancestor that provides them with immunity (Ben el Cadi

4 December 2013). While natural selection would unlikely have been strong enough on this group of people to give them innate immunity while other Moroccans remain vulnerable, there remains the potential for an individual to develop immunity during his or her lifetime. Scientists realised over a century ago that just as a person who receives a vaccine or contracts a disease can develop antibodies to prevent future infection of that disease, a person can also develop antibodies to snake venom as long as they receive a dose lower than the minimum lethal dose on the first injection (Fraser 1895). In fact, this development of resistance through exposure in animals has provided us with antivenin, and we also have documentation of humans who have developed enough immunity to survive doses of venom many times the dose that would kill most people (Graham 1992). We might surmise that some of the snake charmers could have built up this type of immunity provided they survived their first envenomation. One particular charmer checked into hospitals eight times between 1991 and 2012 following Puff Adder bites, living through each of the episodes (Chafiq et al. 2014). An individual like this probably has acquired some immunity, but it seems unlikely that all or even most charmers have similarly become immune.

Popular opinion holds that most snake charmers remove the fangs and/or venom glands of snakes, rendering them harmless before using them in performances. Certain snake charmers in India have been documented to employ this method (Dutt 2004), and one writer said of the Moroccan snake charmers that

as people who should be well informed declare that the poison bags are always removed before the snakes are used for exhibition, it is hard for the mere Unbeliever to render to Sidi ben Aissa the exact amount of credit that may be due to him. (Bensusan 1904, 116)

A more recent article commented on the occasional presence of snakes with deformed mouths in Jmaa el Fna, citing fang extraction as the probable cause of the problem (Feriche et al. 2007). Alternatively, a person can force a snake to evacuate the contents of its venom glands. Scientists employ this technique to extract venom for research or for the creation of antivenin, encouraging the snake to bite a membrane-covered tube and then applying pressure to the snakes' head to squeeze out the venom. It then takes the snakes some amount of time to produce more venom, during which time they are rendered less harmful (though the time might vary, and the venom glands may not have been emptied completely in the first place). It has been suggested that snake charmers in Morocco might likewise milk their snakes' venom every so often to keep them harmless (Brunel 1926, 147; Ben el Cadi 4 December 2013). One Moroccan in a High Atlas village said that the snake charmers know which teeth are dangerous, so they break those teeth, and then when

new teeth replace them, the charmers break the new teeth (Ben Youssef 3 April 2014). Some less recent accounts suggest that charmers render the snakes harmless by feeding them eggs, without giving a detailed description of the supposed mechanism (Westermarck 1926, 354; Epton 1958, 179). Charmers may occasionally remove the venom glands or fangs, but based on our observations of snakes with fangs intact along with reports of snake charmers' occasional envenomation, many may not rely on this method.

Despite all of these possible explanations, there remains another, simpler one that this study supports better than the others. Snake charmers spend all day every day with their animals, giving them ample opportunity to observe and learn. This familiarity allows them to predict the animals' behaviour so that they can provoke the snakes just enough for a good show, but avoid being bitten. Additionally, snakes exhausted from heat, cold, or stress would strike less readily and less competently. When asked how exactly he protects himself from these dangerous species, one charmer responded simply that he pays attention (20 May 2014). He also said that the charmers constantly keep a close eye on the tourists, making sure that they do not get too close or accidentally step on a snake. Once, a plain-clothes police officer approached to make sure the researcher was not too close to the snakes and to remind the charmers of the dangers of envenomation. This encounter demonstrates that the tourist police stationed around the square also take an active role in increasing safety through vigilance.

Unfortunately, vigilance sometimes fails due to distraction or bravado, resulting in occasional envenomation. One writer records,

we have seen them pulling the reptiles about, and apparently acting in the most reckless manner. It is supposed by many persons that their poison-fangs have been extracted, so that there is no risk whatever in handling them. But this is certainly not always the case. At Safi, a while before our visit, a snake-charmer, during his performance, was bitten in the forehead by a hooded snake and expired in a quarter of an hour. (Leared 1876, 310)

Deaths resulting from envenomation were also recorded for snake charmers in Tetuan and Fes during the first half of the 1800s (Brooke 1831, 414–415). Puff Adders have killed snake charmers in the twenty-first century (Chafiq et al. 2014). In February 2014, during the course of this study, a snake charmer of Jmaa el Fna died following cobra envenomation.

The future of snake charming in Morocco

The lack of snake charmers in weekly souqs visited during this study indicates that there may be a real chance the practice of snake charming has died out or at least drastically diminished in rural areas. Perhaps fewer Moroccans take interest in snake charmers now that modern technology has provided greater mobility and more forms of entertainment, taking away the incentive

for snake charmers to work at small weekly souqs. Perhaps larger cities simply represent a greater potential market to snake charmers. The tourism industry in many cities likely provides more lucrative business than do Moroccan audiences, even in places like Jmaa el Fna where large numbers of Moroccans watch performances.

Globalisation may impact the aspirations of at least some snake charmers. One man in Jmaa el Fna had previously lived in Orlando, Florida, working as a musician at Disney for several years before returning to Marrakesh to resume work as a snake charmer. Another proudly showed a paper with immigrations stamps on it, and said he had flown from Casablanca to New York. The effects of a wider potential world audience showed up long before the present. An English travel writer who lived in Marrakesh for a year in 1949 recorded an encounter with a snake charmer who aspired to work at Bertram Mills Circus in London (Mayne 2003, 61–63). The man had sent the circus a letter expressing this aspiration and had received a letter back informing him of the lack of vacancies for circus artists in the coming season. As exchange between different parts of the world proceeds at ever faster rates, international work could become more feasible.

Animal welfare issues could affect the future of snake charming in Morocco. Although most individuals we observed seemed to have a healthy weight and good outward appearance (the exceptions being one Puff Adder with a mouth infection and one cobra apparently near death with an eye infection, emaciation, and poor skin appearance), snakes in this situation might not have a high longevity, and charmers need to replace snakes that no longer serve for their performances. One snake charmer said that when the snakes get sick, another member of the group treats them with medicine that he possesses; he gave no further details. All of these snakes are subjected to a constantly stressful environment in Jmaa el Fna. The high traffic of people, noise, and efforts of the snake charmers to keep them always on the defensive for performance's sake all likely take a toll. Additionally, as ectotherms, which do not produce their own body heat, snakes must use different parts of their environment to maintain optimum internal temperatures. The snakes on Jmaa el Fna have little to no freedom to do so. They probably suffer on cold winter days or on hot summer days despite attempts of the snake charmers to provide them with shelter from rain or shade from the sun at appropriate times. The snake charmers themselves commented on several occasions that very hot weather and cold weather are bad for the snakes. They seemed relieved for the sake of the snakes on days when the weather had cooled after an especially hot period. However, they continue working on those worst days despite their awareness of the ill effects on their animals. Without another source of income, they likely cannot afford to take those days off.

The large number of snakes required by charmers every year leads to consistent harvest from wild populations. Some charmers catch the snakes themselves, while many charmers buy the animals from snake hunters.

In a typical year, hunters catch 1000 or more Puff Adders, nearly 1000 Egyptian Cobras, nearly 1000 Horned Vipers, several hundred Moorish Vipers and hundreds more non-venomous snakes, not all of which survive for use in the snake charming trade (Pleguezuelos et al. 2016). For many of these species, hunters captured specimens of above-average size (Pleguezuelos et al. 2016), which could lead to disproportionate negative impact on the population if those individuals are the fittest in the absence of snake hunters or if the biased harvest otherwise affects the population genetics of these species (Allendorf et al. 2008). Pleguezuelos et al. (2016) found evidence that cobra populations have declined and the species may face a reduced range as a result of pressure from the snake charming industry.

Any future legislation to protect both individual welfare and snake populations could limit the ability of snake charmers to continue practising their trade. It is important to strike a balance between the welfare of captive animals, protection of wild populations, and consideration of human livelihood needs, a difficult balance to strike. Many Indian charmers have found alternative ways to make a living since legislation effectively outlawed snake charming, such as by focusing on musical performances or the sale of instruments and educating communities about reptiles using their hard-earned natural history knowledge (Dutt 2004). They have observed many species in captivity and in the wild, learning about their ecology and behaviour. Many charmers seem eager to share their herpetological knowledge, sometimes in great detail, carrying out a form of public outreach. By considering possible uses for snake charmers' specialised skill set, conservation measures could more successfully strike a balance between wildlife needs and human livelihoods.

Acknowledgements

We gratefully acknowledge the following: Jim Miller, for providing helpful comments at the formative stage of the project; Brian Sherman, James Miller, and Abdellah Bouazza for providing helpful comments at various stages of the projects; Wafa, for brainstorming ideas and teaching relevant Darija vocabulary; the snake charmers and other participants who patiently provided information, especially Driss and Ghali; La Maison de la Photographie, for providing access to their archives of photographic material; the anonymous reviewer; and the editors.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by a scholarship provided to J. L. T. from the Fulbright Scholar Program of the United States Department of State Bureau of Educational and Cultural Affairs (Moroccan-American Commission for Educational and Cultural Exchange).

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Appendix

Interviews

- Ben el Cadi, Wafa. Fes. 4 December 2013.
- Ben Youssef, Khalid. Tafza. 3 April 2014.
- Restaurant proprietor. Taroudant. 20 October 2014.
- Restaurant server. Meknes. 20 June 2014.
- Shop owner. Setti Fatma. 19 October 2014.
- Snake charmers. Marrakesh.
- 7 January 2014.
 - 2 February 2014.
 - 5 February 2014.
 - 14 February 2014.
 - 12 March 2014.
 - Marrakesh. 25 March 2014.
 - Marrakesh. 19 April 2014.
 - Marrakesh. 20 May 2014.
 - 10 June 2014.
 - 11 July 2014.
 - 14 August 2014.