CHAPTER 10

Origin of Myths Related to Curative, Antidotal and Other Medicinal Properties of Animal "Horns" in the Middle Ages

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10.1 A BRIEF HISTORY OF ALICORN

In late Medieval and Renaissance times, alicorn was a sought-after and very expensive commodity in Europe (Shepard, 1930; Gotfredsen, 1999). In 1609, Thomas Decker compared the value of a single horn to half a city. In 1553, the King of France's alicorn was valued at £20,000. Half a century later, the British royal family's Horn of Windsor was valued at £100,000 (though perhaps this is an early example of a decimal-point error: A later reference states £10,000). Exaggeration aside, at its zenith alicorn, was worth 20 times its weight in gold, and even diced or powdered alicorn half that much (Shepard, 1930).

Consensus on the archetype of alicorn was reached in the 13th century: Spiral horns began to appear on unicorns in Christian art around the year 1200 and became the iconographic standard within a century or so (Lavers, 2009). This "horn" (it is a tooth) belongs to a large marine mammal, the narwhal. Narwhals frequent the seas around eastern Canada and Greenland, but occasionally wash up on beaches as far south as Britain and Germany. Narwhal tusks also traveled south as trade items. The seas around Greenland, via the Norse, supplied most of Europe's alicorns, though tusks from northern Eurasia probably ended up on the market too.

Some 12th-century Europeans came to believe that unicorn body parts had medicinal virtues. By the end of the 14th century, this belief had become attached to alicorn, as had the idea that alicorn could detect poisons (Shepard, 1930). Between the 15th and 17th centuries, alicorn was regularly used by the wealthy as a defense against

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poisoners: It was believed to perspire in the presence of adulterated food and drink (it doesn't). From the late 16th century, poorer people entered the market for alicorn powder, sold for the treatment of numerous ailments. The constituents of powders being difficult to confirm, powdering was the key to tapping the dispersed wealth of ordinary people, and business boomed.

The alicorn bubble was punctured in the 1630s but took over a century to deflate. Copenhagen merchants asked Ole Wurm, Regius Professor of All Denmark, to identify alicorn. Wurm stated flatly that it was the tusk of an animal that lived in the waters of the North Atlantic. Confronted with a choice between truth and profit, the merchants of Copenhagen carried on trading. Nevertheless, the craze for alicorn gradually faded through the 17th century and eventually fizzled out (Shepard, 1930; Lavers, 2009).

10.2 ORIGINS

From where, whom, and what did Europeans get the idea that alicorn had protective and curative powers? This is not an easy question to answer owing to the fragmentary nature of the literary record. The earliest Medieval source is *Physica* by Hildegard of Bingen (1098–1179). Having first reworked some Christian allegory, Hildegard offers her understanding of the unicorn's medicinal virtues (Miller, 1960):

> *Pulverise the liver of a unicorn, give this powder in fat prepared with yolk of egg and make a salve, and there will be no leprosy... The leprosy comes of course oftentimes from the black bile and from the black stagnant blood.*
>
> *If you make a girdle from the hide of the unicorn and gird yourself with it, no plague however severe and no fever will harm you. Also if you make shoes from the hide and wear them, you will always have sound feet, sound legs and sound joints, and also will no pestilence harm you while you are wearing them.*

Her instructions are added to by a later hand:

> *If a man is afraid of being poisoned, he should place the hoof of a unicorn under the plate on which the food is or under the cup which contains his drink, and if there is poison in it, they become boiling hot if they are warm, but if they are cold they will begin to steam and thus will he know that poison is mixed therewith.*

Alicorn is not mentioned. Hildegard says elsewhere that under the unicorn's horn lies reflective metal, so she knows *of* alicorn, but seemingly not of any properties connected with it deserving of mention. News of alicorn's power then, seemingly, arrived and spread across Europe over the next two centuries (Shepard, 1930).

Where did these supra-Hildegardian notions from? Readers familiar with the unicorn's pagan roots might suspect the works of the Ancients, especially of Ctesias (c. 400 BC) and Aelian (c. 200 AD), in which the one-horned ass, one of the unicorn's literary ancestors, is credited with medicinal and antidotal powers (Lavers, 2001). However, both Aristotle and Pliny used Ctesias as a source, yet neither attributes strange qualities to the ass's horn. Pliny in particular would surely not have omitted such information had he known it. Just as peculiar, medical authors of Greek and Roman times, most notably Hippocrates and Galen, make no mention of the therapeutic properties of one-horned animals. The Bible and the Latin *Physiologus* (a medieval book of allegorical stories mostly about animals: see Lavers, 2009) are silent on the matter too. A tale linking the unicorn with poison does exist in the eastern lineage of *Physiologus* texts, but it seems to have been unknown in the West at the relevant time. As argued by Godbey (1939), the antitoxic and medicinal properties of the one-horned ass may have been added by a later copyist, who perhaps thought the Ancients had tried to describe a rhinoceros, whose horn was commonly associated with such properties in later writings (see below). True or not, there is no convincing connection, and much that argues against one, between the Ancients' writings on unicorned animals and the development in Medieval Europe of alicorn's reputation as a medicine and detector of toxins.

With such doubts in mind, the unicorn scholar Odell Shepard turned his suspicions eastwards. In *The Lore of the Unicorn* (1930), he makes his case by mentioning a few eastern ideas about unicorns before passing sentence on Medieval Arab writers and moving on. Shepard was knowledgeable and assiduous and not at all renowned for glossing over a subject, so perhaps he foresaw where an investigation of such matters might lead.

10.3 UNICORNS OF THE ARAB WORLD

In Hildegard's time, translations of Arabic texts were filtering into Europe. Is it merely coincidence that medicinal alicorn appeared when this transfer of knowledge was taking place?

Several one-horned animals roamed Medieval Arabic texts. Al-Biruni, a polymath of the late tenth and early 11th centuries (d. 1048), describes, for example, the karkadann in his book on India (See Ettinghausen, 1950 for quotations and a detailed treatment):

> *It is of the build of a buffalo, has a black, scaly skin, a dewlap hanging down under the chin. It has three yellow hooves on each foot, the biggest one forward, the others on both sides. The tail is not long. The eyes lie low, farther down the cheek than is the case with all other animals. On the top of the nose there is a single horn which is bent upwards. . .*

A further fragment of al-Biruni's work adds that the horn is conical, bent backwards and longer than a span, that the animal's ears protrude like a donkey's, and that its upper lip forms into a finger-shape. There is no doubt that this is the Indian rhinoceros, about which al-Biruni learned when he was in India. Al-Biruni was one of very few Medieval writers who knew the rhinoceros, however, which is why the karkadann subsequently diversified into several literary lineages of mythical animals. The gulf between the rhinoceros and the karkadann was widened when artists began drawing karkadanns with long, straight horns, rather than short, bent ones, and further still when they moved the horn from the rhino's nose to the karkadann's brow (for no reason anyone can divine). In the 16th century, rhinoceroses became better known and representations of karkadanns become increasingly recognizable as rhinoceroses, but in the critical time period of interest, the karkadann was routinely represented as a quadruped with a long horn sticking out of its forehead. This horn had become linked with poisons by the end of the 13th century. An early reference is made by al-Qazwini (d. 1283), who says that the substance is used both as an antidote and in the manufacture of knife handles (Ettinghausen, 1950), and later writers add that the horn perspires in the presence of poison. Here we seem to have the unicorn's geographically distant but genealogically close relative.

Did the karkadann inherit its powers from the unicorn or vice versa? A clue lies in the writings of al-Qazwini. Karkadann horn was used in the manufacture of knife handles, in which respect it was similar to another substance, khutu, with a longer literary history and a reputation for reacting in the presence of poisons. One suspects that karkadann horn inherited its reputation from khutu when both substances sat side by side in the workboxes of Arab cutlers.

Khutu was used as a poison detector and antidote in the Muslim world from the first half of the 11th century at the latest, because al-Biruni describes the material and its uses. Hildegard composed *Physica* in the middle of the 12th century, at least a century after al-Biruni's report on khutu, and by this time, European alicorn does not yet appear to have been linked with poisons. Absence of evidence is paradigmatically tricky, but the early date of tales about antidotal horns in the Arab world suggests that the mythological tradition traveled with the dominant flow of ideas then filtering from the Arab world into Christian Europe.

The reader may now have an inkling why Odell Shepard chose not to hunt the source of alicorn's power outside Christian Europe, but the foregoing is merely straightforwardly obscure. The natural historian cannot be content with 'khutu' as an answer to the likely source of alicorn's powers, but must ask the obvious next question: What is khutu?

10.4 KHUTU

The identity of khutu is a mystery that is a thousand years old and counting (Lavers and Knapp, 2008). A horn-like substance that reacts to poison brings to mind rhinoceros horn (Ettinghausen, 1950; Chapman, 1999), but in Arab literature, rhinoceros horn did not attract antidotal properties until the late 13th century (Ettinghausen, 1950), and probably gained them from khutu, the full transfer taking until the mid-15th century when rhinoceros horn was credited with khutu's characteristic reaction of sweating (Ettinghausen, 1950).

After extensive investigations, Laufer (1913, 1916) and Ettinghausen (1950) came to definite conclusions about what kind of material khutu was. In what follows I assess their claims, before dealing with some aspects of the khutu literature that they ignored or overlooked. Six descriptions of khutu are presented below in order to give an idea of the literature on khutu that Laufer and Ettinghausen were confronted with (a seventh, unknown to either investigator as he worked on the problem, will be forthcoming later). Synonymy of the words khutu, chatuq, khatu, khatuq, habaq, khataq, and other variants was demonstrated by Dankoff (1973).

Al-Biruni's description of khutu in an 1121 text by al-Khazini (Laufer, 1913) reads:

> *It is asserted that it is the frontal bone of a bull living in the country of the Kirgiz who, it is known, belong to the northern Turks. . .The Bulgar bring from the northern sea teeth of a fish over a cubit long. White knife hafts are sawed out of them for the cutlers. The middle portion is distributed among the single hafts, so that every piece of the tooth has a share in them; it can be seen that they are made from the tooth itself, and not from ivory, or from the chips of its edges. The various designs displayed by it give the appearance of wriggling.*

Elsewhere in the same work, al-Biruni adds information on khutu's shape and color (Laufer, 1913):

> *It originates from an animal; it is much in demand, and preserved in the treasuries among the Chinese who assert that it is a desirable article because the approach of poison causes it to exude. It is said to be the bone from the forehead of a bull. Its best quality is the one passing from yellow into green; next comes one like camphor, then the white one, then one colored like the sun, then one passing into dark-gray. If it is curved, its value is a hundred dinar at a weight of 100 drams; then it sinks as low as one dinar, regardless of weight.*

Ibn al-Husayn Kashghari's 11th-century definition of chatuq (Ettinghausen, 1950) runs:

> *Horn of a sea fish imported from China. It is said that it is the root of a tree. It is used for knife handles. The presence of poison in food is put to the test by it because when broth or other dishes in the bowl are stirred with it the food cooks without fire, or if the horn is placed on a bowl it sweats without steam.*

A text on precious stones by Ibn al-Akfani (d. 1348) includes a passage derived from al-Biruni's work (Laufer, 1913):

> *Chartut is also called chutww. . .al-Biruni says: it originates from an animal. It is said to be obtained from the forehead of a bull in the region of the Turks in the country of the Kirgiz, and it is said also that it originates from the forehead of a large bird which falls on some of these islands; it is a favorite of the Turks and with the Chinese. . .The Ichwan al Razijans state that the best is curved, and that it changes from yellow into red, then comes the apricot-colored one, then that passing into a dust color and down to black.*

A Chinese work, Cho Keng Lu, compiled in 1366 by T'ao Tsung-I, reads (Laufer, 1913):

> *Ku-tu-si is the horn of a large snake, and as it is poisonous by nature, it can counteract all poisons, for poison is treated with poison. For this reason it is called ku-tu-si.*

A passage in al-Ghaffarı's mineralogy of c. 1511 reads (Laufer, 1913):

> *The hutu is an animal like an ox which occurs among the berber and is found also in Turkistan. A gem is obtained from it; some say it is its tooth, others, it is its horn. The color is yellow, and the yellow inclines toward red, and designs are displayed in it as in damaskeening. When the hutu is young, its tooth is good, fresh and firm; when it has grown older, its tooth is also dark-colored and soft.*

There are other examples of this kind of description (Laufer, 1913, 1916; Ettinghausen, 1950; Dankoff, 1973; Said and Harmeneh, 1973; Said, 1989), but the problem of placing khutu in the natural world should already be apparent. Khutu is allegedly a horn, a tooth, a bone, and the root of a tree. It is derived from a bull or ox, a bird, or a snake, while something resembling khutu, though clearly not, it is owned by a fish.

10.5 THE WALRUS AND THE NARWHAL

Laufer (1913, 1916) worked mainly on the Chinese branch of the khutu problem and Ettinghausen (1950) on the Arabic branch, yet both concluded from their respective literatures that khutu was most likely ivory from the walrus, and perhaps also the narwhal. Walrus tusks are unique in the animal kingdom. The osteodentine core of a walrus tusk has a granular texture, like rice pudding. Al-Biruni's reference to the middle portion of the fish tooth from the northern seas implies that this core differs from the material surrounding it, and he also states that this core cannot be confused with ivory, presumably from an elephant, implying that the material on the outside of a walrus tooth could be so confused. Walrus ivory alone fits this description.

Other lines of evidence that khutu was walrus ivory are best seen in a text that was unknown to Laufer in the 1910s and was discovered by

Ettinghausen only as he was finishing his 1950 treatise and may be the original on which later textual fragments were based. In al-Biruni's Kitab al-jamahir fi mac rifat al-jawahir is the following passage (Said, 1989):

> *. . . When I enquired about the khutu from the members of the diplomatic mission which had come from the Qata'i Khan, they said: "The only merit about it is that it lets out perspiration when any poison comes into contact with it. . .It is the bone of [the] forehead of [a] bull." This is what has been said in books, although the only additional information we could get is that this bull is found in Khirkhiz. Its forehead is thicker than two fingers which would show that it cannot be the forehead of the Turkish bull, as it is smaller bodied. But it could well be the horn. As for the belief that it is the forehead of a bull, it would be the forehead of the mountain goats of Khirkhiz. Only they can have such foreheads . . .*
>
> *It has patterns described over it and bears resemblance to the pith of the teeth of the fish which the Bulgarians bring to Khwarazm [Khiva] from the North Sea which is adjacent to the ocean. It is bigger than the hand in size and the pith is longer in the middle . . .*
>
> *A Khwarazmian happened to find a tooth which was very white on the sides. He had hasps of daggers and knives made from it. The natural patterns described upon it were very thin, white and pale. It resembled the down of a cucumber if peeled in such a manner that that the seed grains are also cut off . . .*
>
> *A tradition which runs about it—and it is extremely difficult to check the veracity of the factual truth behind this tradition—has it that it is the forehead of a big bird . . . . [Natives in the wilderness of China] believe it to be a very large fowl residing in uninhabited regions beyond the sea of Zanj and China, eating large ferocious elephants . . .*
>
> *Amir Abu Jacfar ibn Banu had a large box-like case made of long and broad khutu planks. . . .*

Perhaps, the clearest evidence that khutu is walrus ivory concerns cucumbers: Pare this fruit lengthways with a vegetable peeler and toward the middle a pattern of translucent seeds set in an opaque matrix appears which closely resembles osteodentine (though the osteodentine I own has much smaller "seeds"). This pith is surrounded by cucumber of uniform appearance, just like the dentine surrounding the core of a walrus tusk. The case for the walrus thus seems secure, but other aspects of al-Biruni's text suggest that that is not the end of the matter.

10.6 THE WOOLLY RHINOCEROS AND MAMMOTH

Al-Biruni's avian allusion—"it is the forehead of a big bird"—may be rooted in stories about giant birds originating in Siberia, which may have been based on fossil skulls of woolly rhinoceroses (Laufer, 1916), though the motif may also be connected with the Arabic legend of the rukh (Ettinghausen, 1950), or the use by ivory carvers of the horny excrescence above the bill of the helmeted hornbill (Laufer, 1916).

Mammoth ivory was also coveted by medieval Chinese craftsmen (Laufer, 1913). The theory that khutu was mammoth ivory was first proposed by Wiedemann (1991), and though Laufer (1913) tried to refute the idea he could not convince himself that the mammoth and khutu were unconnected. References to the Kirghiz in Arabic texts firmly underscored this suspicion. The Hudud al-'Alam of 982 states that Kirghiz lands supplied large quantities of khutu (Ettinghausen, 1950). The Kirghiz lived across a large area of Siberia between Arab and Chinese civilizations to the south and reindeer herders and marine mammal hunters to the north. Laufer (1916) conceded that trade relations between the Siberian Kirghiz and Arab lands hinted that "bulls furnishing ivory" may allude to mammoths and their tusks disinterred from the semi-frozen tundra of Kirghiz territory. Decades later, Ettinghausen (1950) agreed. As explained below, this "bull" may be a different kind of animal, but mammoth ivory may nevertheless have a connection with khutu. The reputed colors of khutu have always been a puzzle, routinely passed over by previous authors perhaps because fresh bones and teeth are white or yellowish. However, Siberian mammoth tusks may be variously colored, sometimes brightly so, depending on the chemical properties of surrounding rocks and soils. And if mammoth ivory was (a kind of) khutu, other puzzling attributions in the literature would make more sense. For example, cutting up the tusks of walruses or narwhals would hardly yield broad planks suitable for the construction of a large case (see above). Only ivory from an elephant or a mammoth seems to fit that bill. Since the Arabs knew about elephants, Banu's box of khutu planks may well have been made of mammoth ivory.

10.7 BONE FROM THE FOREHEAD OF A BULL

In a supplementary note, Ettinghausen (1950) comments, with obvious exasperation, on the text by al-Biruni quoted above that he discovered only as his work was going to press:

> *Al-Biruni seems to imply that that he has actually seen khutu pieces. It is therefore significant that he distinguishes between the khutu and the fish tooth, i.e., the walrus tusk .... Unfortunately I cannot offer any satisfactory solution of the problem. It seems unlikely that al-Biruni is speaking of the tooth of the sperm whale .... The narwhal has no core with a design ... it is not likely that Egyptians would have paid a high price for hippopotamus teeth, which must have been fairly common in their country .... In case there is no other tooth like that of the walrus—nor a horn resembling it—the only remaining possibility would be that al-Biruni makes a distinction between two types of walrus teeth, perhaps teeth of different sizes or in different states of preservation; or we would have to assume that the cause of the whole confusion is of a semantic nature ....*
>
> *Why our author called the tusk a forehead bone remains another puzzle, especially since he himself preferred to call the khutu a horn.*

This is where the matter was left in 1950. Pressing on, a material would seem to be required which fulfills some or all of the following criteria. It connotes the repeated description "bone from the forehead of a bull," but may be derived from a goat-like animal; it is hornlike, though sufficiently odd in appearance that al-Biruni was not sure what kind of horn it was; it is bigger than a man's hand (but presumably not bigger than, say, his forearm); it may have an internal structure that wriggles or damascenes, and in any case is suitable for the manufacture of knife handles; it is probably linked with the walrus, narwhal, and mammoth owing to its appearance, use, provenance, or association with Medieval trade routes.

One animal fits this template rather well. There are few species of large land animal in the far North, and only one that looks like a bull. We now know that musk oxen are more closely related to sheep and goats than cattle (Darwent and Darwent, 2004), but they have highly unusual horns which neatly fit the description "bone from the forehead of a bull." The horns of a male musk ox grow to form a continuous pad across its forehead, a boss, which is typically two or three inches thick. Underneath, the skull-cap underneath may be 4 in. thick (musk oxen butt heads hard). The musk ox would also make sense of al-Biruni's insistence that the piece of khutu he examined must have

come from a goat (a head-butter) and not a bull (an impaler), because only goat-like animals have such foreheads. Al-Biruni was unsure if the khutu he examined was horn, but that is no surprise if he had been shown the grown-together mass of horny material that is a musk-ox boss; his hesitation would be a surprise, however, if he had been shown any regular kind of horn. And intriguingly, musk-ox horn is still one of a handful of substances that are especially prized by modern-day knife makers who specialize in using Arctic materials (Lavers and Knapp, 2008). Its value lies in its internal figuring, comprising intricate patterns of contorted—wriggling or damascening?—growth lines which form as the horns coalesce to form a boss.

Musk-ox horn thus seems to be a good candidate for the "bone from the forehead of a bull" that wriggles or damascenes (Lavers and Knapp, 2008). Indeed, if such a substance existed at all, no other high-latitude animal has the wherewithal to provide it. That said, one of T. H. Huxley's ugly little facts intrudes upon this otherwise elegant theory: Most authorities think the musk ox died out in Eurasia before al-Biruni's time. Even if that turns out to be true, however, it does not mean that musk-ox horn, still less stories about musk oxen themselves, could not have reached Medieval Arab cutlers.

It is becoming increasingly clear that Bering Strait has never presented much of a barrier to the movement of people (Fitzhugh, 1997), and a musk oxen roamed the Arctic slope of North America until the mid-19th century (they were wiped out and have subsequently been reintroduced; Allen, 1912; Lent, 1988). If musk-ox horns were mixed with walrus and narwhal tusks in bundles of Arctic goods, southern recipients may well have had cause to be confused about the distinction between a fish tooth and a bull forehead.

Another possible route around the ugly little fact leads to an established controversy about dating the extinctions of northern Eurasian animals. Until recently, it was thought that the musk ox died out in Eurasia at the end of the last ice age, but Russian mammologists have long suspected that musk oxen might have survived as isolated populations in Siberia long enough to encounter 17th-century Russian explorers (Spassov, 1991). Radiocarbon analyses of Eurasian musk oxen have produced ages of 3000–2700 years (MacPhee et al., 2002; see also Orlova et al., 2004; Boeskorov, 2006; Markova et al., 2015), much later than previously thought. Where the last Eurasian musk

oxen lived is not known, so such radiocarbon dates may be considerably earlier than the true extinction date (this is the Signor-Lipps effect: We can never hope to find the last member of a species in the fossil record, so true extinctions always postdate the age of the youngest physical evidence). Intriguingly, in a burial complex in the Noin Ula Mountains of Mongolia, probably dating from the 1st century BC, two plaques were found impressed with an animal figure that looks very much like a musk ox (Spassov, 1991). Soergel (1942) suggested that the animal is a chimera, having the body of a takin and the head of a musk ox, the latter known to the artist from Siberian fossil skulls. But if Mongolians of the 1st century BC were familiar with such fossils, there seems little reason to deny that Chinese and Arab craftsmen of later centuries might also have been.

A different kind of explanation, arguably the likeliest, involves not the movement of materials but rather of tales about the animals that bore them. Stories about places and animals, as well as physical goods, clearly moved around the Medieval world. Tales of giant birds (woolly mammoth skulls?), or of bulls with outsized foreheads (Eurasian or American musk oxen?), might have traveled with variously colored fish teeth (fresh and fossil marine ivory and mammoth tusks) to be blended into a conundrum that has been confounding literary and natural historians for at least a thousand years.

10.8 CONCLUSION

Al-Biruni thought that khutu was the horn of a goat from the land of the Kirghiz (Siberia). Laufer (1913, 1916) thought it was marine ivory, though he suspected that mammoth ivory might have influenced the literary tradition. Ettinghausen (1950) concurred with most of Laufer's conclusions, though not always for the same reasons, but finished his work still puzzled.

Mammoth ivory may be wrapped up in the khutu enigma, but perhaps not in the way previously supposed. From mammoth ivory could have been derived ideas about khutu's coloration and its connection with cabinet-making. But al-Biruni's wriggling bone from the forehead of a bull does not fit comfortably with the walrus, narwhal or mammoth. Lavers and Knapp (2008) hoped to make it challenging to think of a better candidate for the source of this horn than the musk ox.

But whether musk-ox horn was a kind of khutu, or a story that kayaked across Bering Strait, or merely an oddly musky literary confusion, the geographical source of Medieval speculations about khutu now seems clear. The literature converges on a particular environment, place and people: Arctic Eurasia and its itinerant mammal hunters. Trade goods derived from various living and extinct Arctic animals probably became linked in people's minds and texts because they came from a mysterious place far to the north and made their way along the same trade routes. And eventually, it seems, one odd notion about these Arctic "horns" would circle back northwards and attach itself to an animal of very different provenance, Medieval Europe's fabled unicorn.

DISCLAIMER

I offer here an overview of completed work rather than a guide to the literature; for the latter, please refer to a book that deals broadly with the natural history of the unicorn legend (Lavers, 2009), and two articles on ancient Greek and Roman (Lavers, 2001) and medieval (Lavers and Knapp, 2008) aspects of the natural history of unicorn lore. In the present piece, I use unaccented versions of Arabic names and words.

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