

# Ashadar, The Tibetan Priest's Time-Stick: A Comedy of Errors in Nomenclature

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During my exploration of the pre-modern astronomical instruments produced in the Indian Subcontinent<sup>1</sup>, I came across fifteen specimens of a carved wooden column dial. The dial consists of a straight wooden staff with an octagonal cross-section; it is divided lengthwise into eight columns, each carrying a separate scale for measuring time in a particular solar month (Fig. 1). Since the sun's declination is symmetrical before and after the solstice, one column can be used in two corresponding solar months on either side of a solstice. Thus eight scales are adequate for the twelve solar months.

The scales are divided in the traditional Indian time units called *ghatis* of 24 minutes duration. The *ghatis* are numbered serially from the top to the bottom according to the length of the half-day in that particular solar month. The numbers are carved in high relief in the wood. Above each scale, there is a hole for the insertion of the horizontal gnomon. On each scale, the Sanskrit name of the corresponding solar month is engraved. The staff is equipped at the bottom with an iron spike, which is pushed into the ground so that the column stands upright when in use.

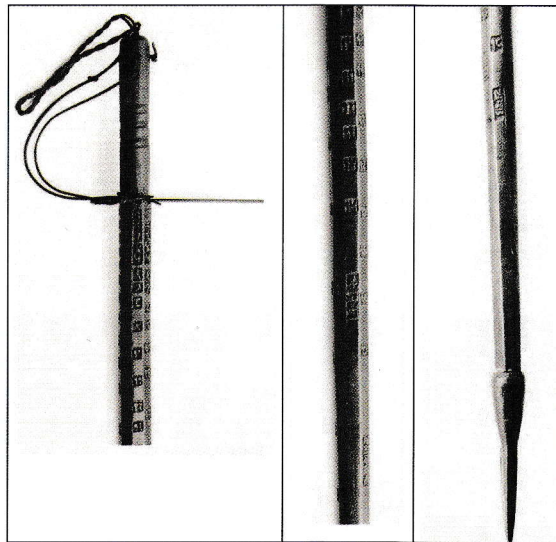


Fig. 1 Wooden Column Dial, shown here in three segments, length 112 cm, private collection, Photos courtesy of the late Professor Gerard Turner.

For measuring time, a horizontal gnomon of a prescribed length is inserted into the hole above the scale meant for the current solar month and the staff is turned slowly towards the sun so that the gnomon throws its shadow exactly on the scale below. Where the end of the shadow touches the scale, the number indicates the *ghatis* elapsed since the sunrise if it is the forenoon, or the *ghatis* that are remaining up to the sunset if it is the afternoon.<sup>2</sup>

Today there are extant fifteen specimens of carved wooden column dials, of which eleven are with different museums in the UK (see the Table at the end of this article). In the UK these column dials are generally labelled as 'Ashadar-stick' or 'Tibetan Priest's Time-stick'. This nomenclature is based on a series of errors.

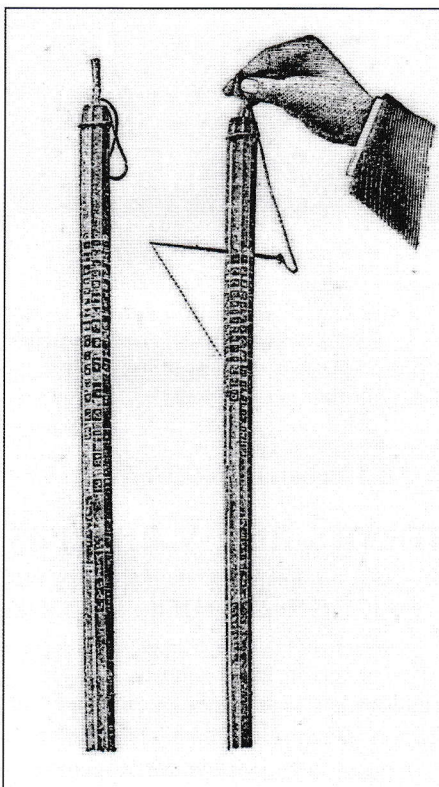
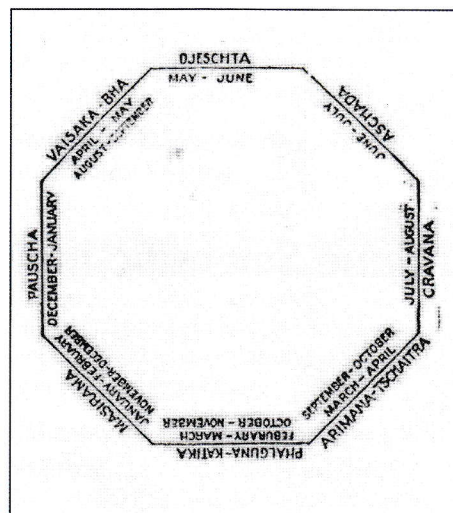


Fig. 2 'Pilgrim's Staff with Sun-dial', The Horological Journal, 1899.



The source of these errors is a German Professor who exhibited a 160 cm long carved wooden column dial in the horological exhibition in Berlin in 1898. The *Deutsche Uhrmacher-zeitung* published the descriptions of some of the exhibits in several instalments in 1898 and 1899. The carved wooden column dial was the very first item to be described in the issue of October 1898, because the exhibitor claimed it to be about two thousand years old. The description consists mainly of the Professor's own statements. An exact English translation of this description was published in the *Horological Journal* in its issue of January 1899 (pp. 69-70) under the title 'Pilgrim's Staff with Sun-dial', together with two illustrations (Fig. 2).

The account in the *Horological Journal* reads as follows:

'It was an East Indian pilgrim's staff, 160 centimeters long, and at the widest places about four centimeters thick, and so arranged that it could by means of the divisions cut into its eight lateral surfaces, perform the services of a sun-dial. ...

The explanation given by Prof. Reuleaux, the exhibitor, regarding this highly interesting piece, is as follows:

The name of the staff is Ashadah, after the month of the same name — from middle of June to middle of July — during which the pilgrimages to Benares are chiefly commenced.'

About the source of the column dial, the Professor merely states that it 'was purchased from a pilgrim on the road leading through the Himalayas to Benares'. He does not say whether he bought it himself in India or acquired it in Germany from a dealer in antiques. The latter is probably the case, because the Professor does not appear to have been to northern India. For he asserts as follows:

'It is very noteworthy that the engraved names of the months are in the language and characters of Sanscrit (with a few little orthographic errors). This speaks for the great age of the article; if it were of more recent origin the Hindoostanee characters and Hindoostanee names, greatly different from the Sanscrit names, would have been used.'

By Hindoostanee, he means apparently Urdu written in Persian script. But in northern India several dialects of Hindi, with a large vocabulary of words derived from Sanskrit and written in Sanskrit characters (i.e. Nagari script), prevailed side by side with Urdu in the nineteenth century as also



at present. If the Professor had been to northern India, he would not have made the above statement. Obviously he acquired the stick from a dealer in Germany. Besides this, the Professor made other erroneous statements. We shall examine the veracity of these one by one.

### 1. Ashadha is the month of pilgrimages to Benares

There is no specific time as such for pilgrimages to Benares; but it is a matter of common-sense that pilgrimages covering long distances were undertaken in autumn, when the rains have ceased and the temperature is somewhat moderate, and certainly not in the month of *Ashadha* (June-July) when summer is at its severest in the Gangetic plains.

### 2. The staffs are made from the timber of the Palasha tree

The Professor may have learnt from Sanskrit lexica that the *Palasha* tree is also called *Ashadha* in Sanskrit and therefore thought that it would be quite appropriate that the time-sticks called *Ashadha*, used by pilgrims in the month of *Ashadha*, were made from the timber of the *Ashadha*. This tree, commonly known as the 'Flame of the Forest' (*Butea Monosperma* Taub.) displays spectacular blossoms in spring, but its timber is not hard enough for making time-sticks.

On the other hand, two Sanskrit writers, Hema in his *Kasha-yantra* (second half of the 15<sup>th</sup> century) and Ganesa Daivajna in his *Pratoda-yantra* (16<sup>th</sup> century), recommend for this purpose the timber of *Shimshupa*, commonly known as 'Shisham' (*Dalbergia Sissoo* Roxb.). Its timber is very hard, close-grained, and of a purple black colour. It takes a beautiful polish and is reckoned the best furniture wood. I have seen ten specimens in the UK and two more in private collections elsewhere (see Fig. 7); all these appear to have been made of the hard Shisham timber.

### 3. The specimen exhibited at Berlin is 2000 years old

One of the Sanskrit month names is *Ashvina*, which corresponds to mid-October to mid-November. The Professor thought that this name was engraved on the time stick as 'Arimana' and concluded as follows:

'The deviation of 'Arimana', instead of 'Aacvinah' (wind month in the fall), wherein the name of the old-Persian evil spirit occurs (Ahriman), indicates that the old Persian-Indian influences have been expressed in the text.

The age of this peculiar and exceedingly well-preserved sun-dial is estimated at about two thousand years.'

Old Persian is the language in which the

आश्विन अरिमान

Fig. 3 The terms *Ashvina* and *Arimana* in Nagari script.

*Avesta*, the holy scripture of the Zarathustra religion, is composed. That it is cognate with the Old Sanskrit or Vedic Sanskrit is one of the basic assumptions of Indo-European linguistics.

But the plain fact here is that due to the hardness of the wood, the carved letters look slightly different from the printed or handwritten letters. Because of this, the terms *Ashvina* and *Arimana* look almost alike (Fig. 3).

The Professor misread *Ashvina* as *Arimana* and jumped to the absurd conclusion that the time-stick emanates from the time when the Old Persian and the Vedic Sanskrit co-existed, which time he placed around two thousand years before his own time. But even in the Old Persian, Ahriman did not represent a solar month. Moreover, two thousand years ago, the script in which Sanskrit was written was totally different. A smattering of Indo-European linguistics caused the Professor to make this huge chronological jump of two thousand years.

### 4. Ashadha is the name of the time-stick

Aside from the Professor's statement, there is no other evidence that this time-stick was ever called *Ashadha*. In British pronunciation, the name became 'Ashadar' with an 'r' added at the end and the instrument is labelled as 'Ashadar-stick'.

The column dial is described in five Sanskrit texts, belonging to the fifteenth, sixteenth and seventeenth centuries. These texts do not mention the name *Ashadha* at all. The names they use are *Chabuka*, *Kasha*, or *Pratoda*. Of these, *Chabuka* is a loan-word from Persian *Chabuk* and denotes a horse-whip; the other two terms *Kasha* and *Pratoda* are Sanskrit renderings of the Persian *Chabuk*. This fact suggests that the instrument may have been borrowed from the Islamic world about the fifteenth century or earlier.

In the Islamic world itself, the column dial was known since the twelfth century. One of the earliest known column dials was made for Sultan Nur al-Din of Aleppo by Abu'l Faraz Isa in 1159-60. It has twelve columns and the hours on these are divided by continuous curves.<sup>3</sup> In the thirteenth century, Abu'l Hasan Ali, generally known as al-Marrakusi, composed the voluminous treatise *Comprehensive Collection of the Principles and Objectives in the Science of Timekeeping*, where he dis-

cussed the column dial among several other types of sundials. He too envisages that the staff be divided into twelve columns, one for each of the zodiac

signs, and that the hours in these columns are divided by continuous curves.<sup>4</sup> But neither source mentions that the column dial was ever called *Chabuk*, or by any other terms denoting a horse-whip. In Ottoman Turkey, it was called *Asa-yi Musa* (the Staff of Moses).<sup>5</sup>

The column dial was known in Europe since the eleventh century when Hermann of Reichenau composed a small work on it. In the subsequent centuries, several works appeared on this instrument, where it is named *horologium viatorum*. In his *Canterbury Tales*, Chaucer calls it 'chilindre' (cylinder).

The earliest extant specimen in Europe is made of ivory and is dated 1455; it is preserved in the Bavarian National Museum in Munich. Here the scales are assigned to the twelve zodiac signs and the hours in the scales are marked by continuous curves. Similar sundials were used till recently by shepherds in the Pyrenees mountains between France and Spain. Therefore, this type is also called the Shepherds' Time Stick. Several specimens of these can be found in European museums (Fig. 4).

It should be emphasized that both the Islamic and the European pieces are quite different in their construction from the Indian specimens. They are much smaller, with lengths of about 20 cm. They are not octagonal, but cylindrical.

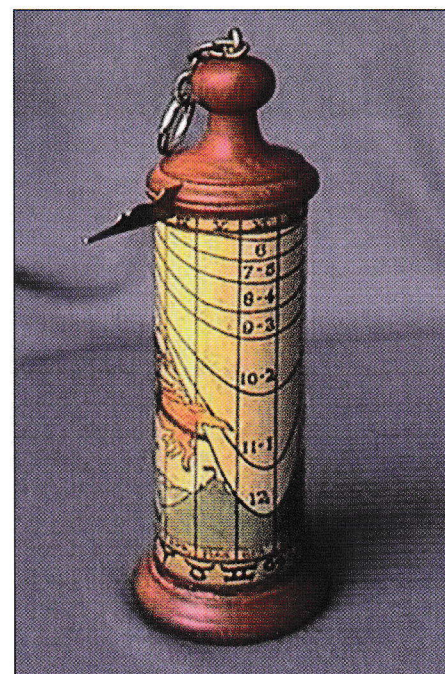


Fig. 4 Shepherd's Time-Stick (Wikimedia commons).





Fig. 5 Column Dial (detail), Horniman Museum, London, 116.6 cm. Maker's name in the upper row: Jemangala; date in the lower row: 23 December 1844. Photo by S. R. Sarma.

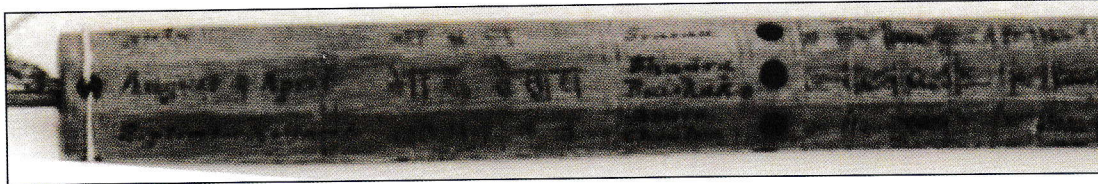


Fig. 6 Column Dial (detail), Edinburgh, Royal Scottish Museum (# 1956.97) with additions in English. Photo by S. R. Sarma.



Fig. 7 Column Dial (detail), private collection in Brussels; the scale facing the reader is filled with carved Nagari numerals from 1-14. The names of the months are written above the scales. Photo by S. R. Sarma.

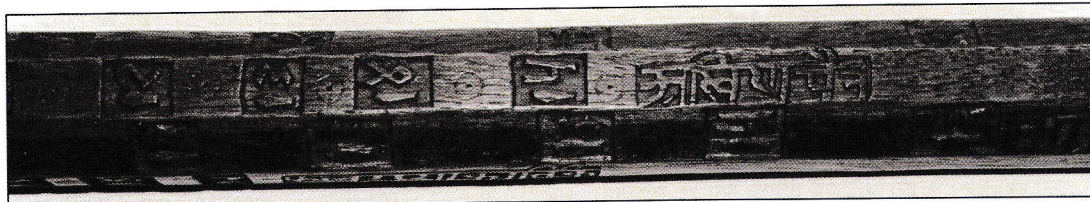


Fig. 8. Column Dial (detail), Science Museum, London (# 1952-442). Here the names of the months are written below the scales. The column facing the reader is designed for two months Ashvina (September-October) and Chaitra (March-April). Photo by S. R. Sarma.



Fig. 9 Steel Column Dial (detail), Museum of the History of Science, Oxford (# 50041), length 95.6 cm. Photo by S. R. Sarma.

cal, where the scales are divided by continuous curves. There is a fixed gnomon at the top which can be rotated so that it rests at the top of column of the desired zodiac sign or solar month.

Compared to these, the Indian versions are much longer, ranging between 110 to 150 cm. The scales are separate for each month and the gnomon must be inserted into a separate hole for each month. The scales are not divided by continuous curves; the divisions are marked by straight lines unconnected with those on the adjacent facet. In other words, these are crude imitations of those produced in the Islamic world and in Europe.

#### Tibetan Priest's Time-stick

Now we come to the name 'Tibetan Priest's

Time-Stick'. The German professor did not actually use this expression. Apparently somebody in the UK thought that the 'pilgrim on the road leading through the Himalayas to Benares' must be a Tibetan pilgrim and so named it 'Tibetan Priest's Time-stick'. But Tibetans, being Buddhists, do not make pilgrimages to Benares, which is famous for its temple of the Hindu god Shiva. On the other hand, the Tibetan and other Buddhists now make pilgrimage to Sarnath, which is adjacent to Benares, where the Buddha delivered his first sermon.

But Sarnath was forgotten and lay in ruins for a long time until the archaeological excavations in the nineteenth century began to unravel its significance for the history of Buddhism; however, it did not develop into a

centre of Buddhist pilgrimage until the twentieth century. Even if it is assumed that the Tibetan Buddhists have heard of the archaeological excavations and began visiting Sarnath around 1898, why would they from their colder regions travel to Sarnath in the hottest of all seasons?

#### The Correct Designation of the Column Dial

In the light of the above discussion, the correct designation of this time-measuring device should be 'Indian Wooden Column Dial' or 'Sanskrit Wooden Column Dial'. It is latitude-specific and can be used only at the latitude for which it is designed. There is no question of pilgrims using it as a walking stick and time-measurer in their long journeys across many latitudes.





Fig. 10 Professor Franz Reuleaux (1829-1905) (Wikimedia commons).

The time-stick exhibited in 1898 in Berlin cannot be traced any more. But the fifteen specimens extant today are all made in the 19<sup>th</sup> century in the Himalayan foothills in the region of Darjeeling and are designed for the latitude of Darjeeling roughly at 27°. Two specimens even carry dates. One of these in the Pitt Rivers Museum of Ethnology at Oxford; here a digit in the date is undecipherable; therefore, the date corresponds to some day between 30 October and 4 November 1869. Another specimen in the Horniman Museum, London; it is engraved with the maker's name as well as the date: the maker is Jemangala and the date corresponds to 23 December 1884 (Fig. 5).

Apparently, these were acquired by British colonial officers in the late nineteenth or early twentieth century and brought directly to England. The two column dials in the Pitt Rivers Museum of Ethnology were presented by Lady Westland and Major R. C. Temple respectively. Some may even have been made to order; for example, in the specimen with the Royal Scottish Museum at Edinburgh, the maker left much space above each scale so that the month names could be written there in Roman transliteration (Fig. 6). Two other specimens are shown in Figs 7 and 8.

The Museum of the History of Science, Oxford, owns two column dials. One is a carved-wooden dial (# 52782). It is listed as 'Ashadar-Stick' or 'Clock-Spear', North-Indian or Nepal, ?c. 1900." The second one (# 50041) is of an entirely different kind; yet it is also listed in the same way as above. It is an exquisitely crafted column dial made of steel in which all the lines, numbers and decorative patterns are

inlaid with gold (Fig. 9). It is topped with an ornate finial, and the other end terminates in a sharp polished blade. This must have been created for some Maharaja in Rajasthan. The names of the solar months are not written in each column; instead the maximum number of *ghatis* in a solar month is engraved above the scale for that month. It is mentioned in the museum records as 'Ashadar-Stick or Clock-Spear'; North-Indian or Nepali,? c. 1900). This one also should be renamed as 'Indian Column Dial, damascened steel, made probably in Rajasthan'.

### The German Professor

Who is the German Professor who committed all these errors? He is Franz Reuleaux (1829-1905), apparently of Huguenot origin. He was a mechanical engineer and rose to become in 1890-91 the director of the Technische Hochschule at Charlottenburg, which is the forerunner of today's Technical University of Berlin (Fig. 10).

He is said to have raised the profession of engineering from the artisanal practice to a rigorous academic discipline. He is also called the father of kinematics. He created over 800 models to embody his basic machine elements and authorized a German company to manufacture some 300 of these models so that they could be used for demonstration in technical schools. Several of these cast iron and brass models are still preserved at the Cornell University. In short, Reuleaux was a highly distinguished scholar in the field of engineering; but a little acquaintance with Indo-European Linguistics led him to make several grave errors. Indeed, as Alexander Pope said, 'a little learning is a dangerous thing'.

### Notes and References

It is an enlarged version of the paper presented at the XXXVII Scientific Instrument Symposium, Leiden/Haarlem, 3-7 September 2018.

1. Cf. Sreeramula Rajeswara Sarma, *A Descriptive Catalogue of Indian Astronomical Instruments*, available online at: <http://srsarma.in/catalogue.php>; <http://crossasia-repository.ub.uni-heidelberg.de/4090/>; section P. Column Dials.
2. For a full technical description, see the description of a carved wooden column dial preserved in the Gershom Parkington Collection of time-measuring instruments at Bury St. Edmunds by H. J. J. Winter, 'A Shepherd's Time-Stick, Nāgarī inscribed', *Physis*, 6 (1964), pp. 377-384.
3. Cf. Paul Casanova, 'Le montre du sultan Nour ad Din', *Syria*, 4 (1923), pp. 282-299, Pl XLV.
4. Cf. Jean-Jaques Sédillot et Louis-Amélie Sédillot, *Traité des instruments astronomique des Arabes* (Paris, 1834); reprint: Frankfurt 1984, Vol. 2, Book 2, Chapter 3, pp. 433-437, Pl. 71.
5. Gaye Danişan Polat, 'Cylinder dials in Ottoman Turkey: The 'Asâ-yı Musa (The Staff of Moses)', paper presented at the XXXVII Scientific Instrument Symposium, Leiden/Haarlem, 3-7 September 2018.

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### List of Wooden Column Dials in the UK

	Location	Length in cm	Code number in my Catalogue
1	Bury St. Edmunds, Suffolk, John Gershom Parkington Memorial Collection	149.9	P009
2	Edinburgh, Royal Scottish Museum (# 1956.97). Fig. 6.	136	P010
3	Edinburgh, Royal Scottish Museum (on permanent loan from the Royal Observatory).	60 (rest broken)	P011
4	London, Horniman Museum (# 21.2 52/5). Fig. 5.	116.6	P013
5	London, Horniman Museum (# 972.810).	135.5	P014
6	London, Science Museum (# 1952-442). Fig. 8.	103.4	P015
7	London, Science Museum (ex-Wellcome Collection).	133.0	P016
8	London, Science Museum (ex-Wellcome Collection).	150.8	P017
9	Oxford, Museum of the History of Science (# 52782).	127.7	P018
10	Oxford, Pitt Rivers Museum of Ethnology (# 1925.49-1).	131.8	P019
11	Oxford, Pitt Rivers Museum of Ethnology (# 1892.41.56).	154.1	P020