Comments on "The Pleiades and the Bears viewed from inside the Vedic texts"

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Witzel[1] has raised a number of issues directly related to my paper[2] in the same issue of EJVS. I offer the following comments, therefore, "quietly, peacefully and even justifiably."

(i) Isolated sentences

Witzel is right when he comments editorially that one can not just quote an isolated sentence and build a theory on it. Nor should any one, on the basis of some theory, which ignores the cultural context, deny what the passage itself says.

(ii) Sky in Vedic and post-Vedic times

I also agree that the situation in 2900 BCE differs far more from the current situation in 2000 CE, than from the situation in 1000 BCE. However, contrary to his remark, in my paper[3], the sky had been examined over a very long period of time from about 4500 BCE to 2000 CE, as could be seen from the comment there about the circumpolar nature of *saptarṣi maṇḍala*. It had been found that the azimuth of the Pleiades moves towards the north by almost 3° in 500 years. This is also in agreement with Witzel's findings with the Voyager II program. This piece of information is important in establishing the limits to be discussed later.

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1 Witzel, M., "The Pleiades and the Bears viewed from inside the Vedic texts", EJVS, 5-2, 1999.

2 Achar, Narahari B. N., "On Exploring the Vedic Sky with Modern Computer Software", EJVS, 5-2 1999.

3 Ibid.

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(iii) Vedic east

Witzel has argued that the "Vedic east" in fact comprises a very large region spanning from the NE to SE, i.e., the azimuth ranging from 45° (= NE) to 135° (= SE), including 90° (=the true east). While it may be acceptable or even required under certain circumstances, it would be very difficult to accept such a large range in the present context. This can be easily seen as follows: the azimuth for the Sun at sunrise on the summer solstice day would be about 62°, and at sunrise on winter solstice day it would be about 118° at the latitude of Delhi. Both of these values are well within the 'east' marked off by Witzel, and thus the Sun would stay in the 'east' throughout the year! No *uttarAyana*, or *dakSiNAyana*. More appropriate limits for the true east can be estimated from the fact that the Vedic priests were required to establish the east-west line (*prācī*) at the time of Yajña. This could be done with no more sophisticated equipment than a stick and a piece of rope. A skillful priest could draw the east-west line within 1° of the true east-west line, if the conditions were right, but could do no worse than 3°. By far the average margin of error would have been 2°. A 5° deviation from such a line could be detected, and certainly an 8-13° deviation. Note also that there were professional star gazers: *nakṣatra darśa*, VS (XXX.10) Now allowing a 3° margin of error in establishing the true east-west line, (and remembering that a 3° range in azimuth for the Pleiades corresponds to about 500 years), Pleiades could be thought of as not deviating from the east for about 500 years on either side of 3000 BCE, i.e., from 3500 BCE to 2500 BCE.

(iv) Further comments on '*saptarṣi*s' and '*udyanti*'

Finally, Witzel adds these remarks: "The present tense of *ud i, udyanti*, however, which would point, in some scholars' opinion, to c. 3000 BCE, is easily explained, when we actually look at the Big Dipper when it appears in the early evening even today; it moves towards the north pole, surpasses it and sets in the west (see sky maps in Witzel 1996). This observation solves N. Achar's problem of the

Ursa Major "rising" in the North. It actually rises, when it gets dark, in the north (nowadays with its easternmost stars from below the horizon, for late Vedic times cf ŚB 13.8.1.9); Ursa Major then turns upwards, and is, after a few hours actually higher than the north pole (now situated at c. 30° in the southern Punjab/Delhi).. So why can the Vedic texts not speak of '*ud-yanti*', especially so, as the north is also called *ut-tara* ('situated on the side of *ud* 'up'), and as the northern direction includes all regions from 45°=NE to 90°=E and 315°=NW(sic). Generally speaking, the use of the actual term 'to rise' (*ud i*) is not strange at all as the stars close to the north pole move 'upwards' towards the pole (thus northwards)." However, the actual current situation as seen at Delhi is a little more complex in that the Big Dipper when it appears in the sky in the early evening does not always appear near the horizon and move upwards as the night progresses. Some times, when it appears in the early evening, it is already high in the sky and actually moves downwards as the night progresses. Some time it is seen setting at the early evening and rising late in the night. For a short period in the year, it is not seen at all early in the evening, but rises only late in the night. (Of course, one member, alpha Ursa Majoris, which is circumpolar at Delhi, never rises or sets. But is seen at different parts of the sky in the early evening at different times of the year.) All this is caused by the fact that earth's rotation takes only 23 hours and 56 minutes, where as the mean solar day is a full 24 hours. Therefore, a star, which rises at the true east at 8:00 p.m. tonight, will rise at 7:56 p. m. tomorrow. In a month's time it would be rising two hours earlier, therefore would already be high in the sky at 8:00 p.m. Three months from now, it would be seen overhead at 8:00 p.m. Six months from now it would be seen setting at 8:00p.m., and so on. It would indeed be strange to use the term 'to rise', when the Big Dipper is already high in the sky when it first appears in the early evening after sun set, and actually moves downwards as the night progresses. This can be seen for example during the months of May and June. The Big Dipper is already almost overhead at 8:00 p.m., moves downwards and sets in the early morning hours. When it actually comes above the horizon in the daytime, it can not be

seen in the sky. By the time Sun sets, when it can be seen again, it is almost overhead. The situation in 3000 BCE has been described in[4] and the problem of 'to rise' has been discussed. The statement in ŚB appears to be problematic, because, Sāyaṇa, who could not have observed the circumpolar nature of the Big Dipper 500 years ago and at the southern latitude he was located, associated '*udyanti*' with both *saptarṣi*s and *kṛttikā*s. Everybody else just followed him. It is interesting to note that ṚV 1.24.10 makes no reference whatsoever to rising or setting of the *ṛkṣāḥ*.

Abbreviations

ṚV *Ṛgveda*
VS *Vājasaneyi Saṃhitā*
ŚB *Śatapatha Brāhmaṇa*

[4] Ibid.