Indo-Aryan 'six'
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1. The onset of the Middle Indic word for ‘six’ and its family is a well-known crux of Indo-Aryan historical phonology. Whereas the Sanskrit forms always begin with s-, Pāli and the major Prākrits have ch- in the words for ‘six’ and ‘sixth’, and s- elsewhere. The Middle Indic forms are conveniently listed in NORMAN 1992, the most important of which are given in the table below:

<table>
<thead>
<tr>
<th></th>
<th>Sanskrit</th>
<th>Pāli + major Prākrits</th>
<th>Northern Prākrits</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘six’</td>
<td>sāt</td>
<td>cha</td>
<td>Niya sō, Aš. sātu</td>
</tr>
<tr>
<td>‘six’ (in cmp.)</td>
<td>sātō</td>
<td>cha(t)ō, except sālāyataṇa ‘six sense facilities’ AMg. sadamga ‘6 const. parts’ Inscr. (W) sānuvīsa ‘26’</td>
<td>Aš. sāt(ā)</td>
</tr>
<tr>
<td>‘sixth’</td>
<td>saṣṭhā-</td>
<td>chaṭṭha( ma)²</td>
<td>Niya sōdhama</td>
</tr>
<tr>
<td>‘sixteen’</td>
<td>sōḍaśa</td>
<td>sōlasa, sōrāsa, sōlasa³</td>
<td>Gāndhāri sōḍaśa</td>
</tr>
<tr>
<td>‘sixteenth’</td>
<td>sōḍaśā-</td>
<td>sōlasa( ma), sōlasama</td>
<td>Khar. sōḍaśa</td>
</tr>
<tr>
<td>‘sixty’</td>
<td>saṭṭhī-</td>
<td>saṭṭhī( m)³</td>
<td>Khar. saṭṭhīa</td>
</tr>
<tr>
<td>‘sixtieth’</td>
<td>saṭṭhitama-</td>
<td>saṭṭhitama, JM saṭṭhīma</td>
<td>Khar. saṭṭhīa</td>
</tr>
</tbody>
</table>

The difference between the Northern Prākrits and the rest is also reflected in Modern Indo-Aryan languages, where the Dardic languages (Shina [Kohistan] sva, Gawar-Bati s̪̄ā, sōā”) and the Nuristani languages (Ashkun su) continue the Northern form, whereas Hindi, Sindhi cha ‘six’, etc. continue the form of the other Prākrits.

Initial ch- in the MI word for ‘six’ is incompatible with s- of Skt. sāt. Therefore, scholars generally assume a deviating proto-form for MI ch-, viz. *kš(v)- (e.g. HIERSCHE 1964:98f., TURNER CDIAL:12803, HAMP 1978, VON HINÜBER 1986:167, NORMAN 1992:204, BERGER 1992:247, EMMERICK 1992:169), but this reconstruction can hardly be called a solution. First of all, it does not account for the difference in anlaut between cha ‘six’ and sōlasa ‘sixteen’, saṭṭhī( m) ‘sixty’, a problem which has never been discussed in the literature. If cha goes back to *kš( v)-, why don’t we find initial ch- in the words for ‘sixteen’ and ‘sixty’? Secondly, the reflex of

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2 The variant saṭṭha given by NORMAN, is “nicht zu belegen” (VON HINÜBER 1986:171).  
3 The forms chaddasa ‘sixteen’, chaddasaḥā ‘sixteen times’, quoted by SHETH 1963, are clearly based on cha ‘six’.  
4 Saur. chaṭṭī is “either a wrong reading, or by analogy with cha ‘six’” (NORMAN 1992:213).
*ks in Middle Indic is different in the Eastern dialects, where it becomes kkh, and the Western dialects, where we find cch. There was a subsequent exchange of the forms between the dialects, mostly in favor of the kkh-forms, but in our word family all Middle Indic dialects show chh- (or s-), and it is not very probable that the numeral was borrowed. Furthermore, in the North-Western dialects, the reflex of ks is represented by a special sign chh (e.g. Niya υ̣έτra < Skt. kṣetra, BURROW 1937:18f.), but as we can see from the table, the word for ‘six’ in Niya is so.

2. To my mind, it is precisely the opposition between chh- in the word for ‘six’ and s- in the word for ‘sixteen’ that provides the key to the solution of the puzzle. In order to understand the nature of the processes which have led to these forms, we have to consider the fate of *z in Indo-Aryan.

2.1. Indo-Iranian *z is of twofold origin, viz. the ‘ruki’-s before voiced stops and PIE palato-velars (k, ǵ, g̥) before dentals (PIE *-kg₃h₁-, *-g̥g₄/-, *-g̥h₃/- > PIR. *-zd₃/-). In Sanskrit, *z normally disappears with compensatory lengthening of the preceding short vowel, cf.:

\*kC > kC  
NIY > m. ‘abode, nest’ < *niḥda- < PIE *ni sd-o-;  
milhā- ‘contest, reward’ < *miṇḍha- < PIE *miṇ-d(h)₁-o-;  
sīkṣa-, desiderative of śaḥ- ‘to conquer’, < *ṣīkṣa- < PIE *ṣi ṣa-s- so₂;  
\*tC > ṭC  
dātalhha- adj. ‘hard to deceive’ < *dus̯-dābha- < PIE *dus-d’eb’o-;  
dālḥhi- adj. ‘malevolent’ < *dus̯-dhiH₁ < PIE *dus-d’iH₁-;  
dūnāsa-, ḍūnāsā- ‘hard to attain’ < *dus̯-dūṣā-;  
tūḥa-, ta-ptr. of vah- ‘to drive’, < *uṣṭha- < PIE *uṣ ṭa-t’o-;  
\*rC > ṛC  
vīmbh- ‘to be merciful’ < *mṛṇd̥- (cf. Av. mṛṇa- ‘id.’);  
dṛṭha-, ta-ptr. of dh- ‘to fasten’, < *dṛṭṭa-;  
tṛṭha-, ta-ptr. of *(s)ṛṭḥ- ‘to crush’, < *ṭṛṭṭa- < PIE *(s)ṛṣ ṭa-t’o-.

2.2. In a similar fashion, we expect short a to be lengthened in this position, but in reality we find three different reflexes, viz. a, o and e (cf. WACKERNAGEL 1896:37ff., 44f.).

5 Note that, for instance, in Kālṣī (an Eastern dialect), where we find the form ṣasu, the reflex of *ks is (kkh: lakha < Skt. ṭrhṣa- < Skt. kkṣusaka- (VON HINÜBER 1986:114).

6 Vs. the desiderative sīkṣa- from śak- ‘to be able’ with a short vowel. Long / in sīkṣa- shows that the loss of ;z with compensatory lengthening of the preceding vowel was anterior to devoicing of *z to ʒ (DEBRUNNER 1957:28). INSLER 1968 argued that desideratives with a monosyllabic stem (like dīps-, dīṣ-, sīkṣ-) have been formed analogically on the basis of the zero grade of the perfect stem, cf. sek-ur : sik-ṣati, deh-ur : dip-ṣati, ap-ur : ipṣati. In his opinion, sik-ṣati was made after sah-vaṃs-, and dīṣ-ṣati after dīṣ-vaṃs-. Even if the mechanism proposed by INSLER was operative at some stage, there must have been a starting point for the long vowel desideratives, where the development was phonetically regular. Such a starting point was probably sikṣati, which is the only such formation attested in the RV. Another regular formation was the desiderative dīkṣa- < *dīkṣe- from the root vedaś- ‘to honour’ (for the development see LUBOTSKY 1994:203f.). The finite forms appear since the Brāhmaṇas, but dīkṣa- and dīkṣā- are found in the AV.

7 Written short in the texts, but being metrically long.
2.2.1. The most frequent reflex is ā (i.e. *aZC > āC):

vi tālhī (RV 10.180.2) 2sg. impv. vākṣi- ‘to fashion’ < *tāqṣi- < PIE *tekt-đi;
sālhar- m. (RV 7.56.23) ‘conqueror’ < *sāxlhar- < PIE *segu-ter;
ā-sālha- adj. ‘unconquerable’ < *sāxdlhar- < PIE *seg-ter-;

bālha- ta- ptc. vānḥh- ‘to be firm’ < *bāxdlha- < PIE *(d)bāxdlha- (cf. Av. dabqāṭti ‘strengthens’).11

2.2.2. The reflex o (*aZC > oC) is found in derivatives of the root √vah- ‘to drive’ (PIE *ueg-) and in derivatives of sās- ‘6’, cf.

vohlha- volhám 2,3 du. impv. root aor. √vah- ‘to drive’ (cf. NARTEN 1964:240, fn. 727);
infinitives vōlhave, anū prāvōlhum < *vačdlvha- u- < PIE *ueg-tu-;
vōlhar- m. ‘driving (horse)’ < *vadhar- < PIE *ueg-ter-;
sōḍasa (TS+) ‘sixteen’ < *svačdaśa (cf. Av. xiuwaś ‘six’, xiuwaś-dasa- ‘sixteenth’), AV+
sōḍasa- ‘the sixteenth’, AV+ sōḍasina- (AVS 11.7.11 = AVP 16.83,1, AVP 17.29,16) adj.
‘the one of sixteen’, sōḍasā-rā- (AVS 19.23.13) adj. ‘consisting of sixteen verses’;
sōlha (RV 3.55.18) adv. ‘sixfold’12.

Since the o reflex of *aZ only occurs after v, it is likely to be conditioned by this sound. For sōḍasa, etc. we can then assume the following chain of developments:

*svačdP > *svodP > soḍP. The loss of -v- is not unexpected considering the Sanskrit tendency to drop post-consonantal v in labial environment, cf. kṣip- ‘to throw, fling’, kṣiprā- ‘quick’ < *kṣvprā- (cf. Av. xiuuaśēṣa- ‘quickly moving’, xiuuaśrā- ‘quick’);

In order to understand the v-coloring from a phonetic point of view, it should be borne in mind that Sanskrit a was a middle vowel, approximately a shwa (HOFFMANN 1976:552f.), which was sensible to the phonetic environment. In the position before r or *t, it was realized as [a], and when it was compensatorily lengthened to [a:], the result merged with long a (cf. also the sandhi rule -ar r- > -a r-). The development *vačC > oC implies that *vačC was pronounced as [vačC]. When *v disappeared, [a] was lengthened to [a:] and later merged with the phoneme /o/. For the sake of completeness, I can add that before *z, the realization of the shwa was more fronted, and the lengthening yielded e ([azD] > [aD] > eD, cf. edhi’bet’ < *azdni1.

2.2.3. The only example of *aZC > eC is 3sg. impv. trneḥdhu from √(s)tr- ‘to crush’ < *trvačdlvha- u- < PIE *(s)tr-n-eq-tu, attested in AVS 8.8.11 = AVP 16.30,1, AVP 9.6.314. As already indicated by MARSH 1941:47 and RENOU 1952:30, e of the impe-

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1 With the assimilation *s- > -s-.
9 The epic and classic forms sōlha- and sōlhar- are secondary, formed by analogy with vōlhar-, etc., for which see below.
10 Attestation in the RV are: ni-bālha- (1.106,6), bālha-sīvan- (1.122,10), bālha adv. ‘strongly’ (1.181,7).
11 MARSH (1941:47) claimed that the normal reflex of *aZC is o, so that he had to explain away all examples of ā.
He did this by positing lengthened grade in tālhi and sādhi- and declaring bālha- of unclear etymology, which is
of course ad hoc.
12 In later texts restored to sādāt (SB), sādtha (PB).
13 I have to admit, however, that I have been unable to find another example of the sound change *Cvo- > Co-.
14 In later Vedic texts we only find a hapax 3sg. trnehhi (JB 2.271). 1sg. trnehmi is a form invented by the grammarians.
From this root, the RV only attests participles trneḥha- (with metrically long r) and trneḥhar-.
rative trmēdhu can be secondary, taken from imperatives like edhi, dehi, dhehi. To be sure, these imperatives are 2sg. and not 3sg., but -e- of the 2sg. imperatives went beyond its original limits, as appears from 2pl. impv. dhetana (RV 8.67.5; 10.37.12) beside the regular dhattana. From the imperative, e-vocalism spread to the other forms (cf. n. 14).

2.3. The distribution of the three reflexes of short a before za can be formulated as follows: the normal reflex is ¨a, whereas o is conditioned by the preceding v; e-vocalism of trmēdhu is probably secondary. This distribution is by no means a novel one. Already in the 19th century, BENFÉY, HAVET and BLOOMFIELD (cf. WACKERNAGEL 1896:39) assumed that the o-vocalism is due to the preceding v; but since they combined this observation with the theory that this o directly continues PIE *a, their position was generally ignored. More recently, in 1952, RENOU gave the same distribution in his Grammaire de la langue védique, but even then this view did not find its way into the scholarly literature, where it is commonly held that the normal reflex of a before za is o.

3. Now we can return to the word for ‘six’. The development of the words for ‘sixteen’ and ‘sixfold’, discussed above, suggests that the Proto-Indo-Aryan forms were: *svāt-6, *svāt-6-sā > sōdaśa ‘sixteen’, *svāz-dhā > sōḍhā ‘sixfold’. My contention is that this system perfectly accounts for all attested forms both in Sanskrit and Middle Indic. The only difference is that *svāt was preserved in the dialect which formed the basis of Middle Indic, whereas Sanskrit has analogically removed the -v-. There are various reasons for this analogical development. First of all, in sōdaśa and sōḍhā, -v- was phonetically lost. Further, the ordinal must have played an important role. As was suggested by HOFFMANN (1965:253f. = 1975:189f.), the Indo-Iranian form of the ordinal ‘sixth’ was *sust’a-, which was replaced by sāsthā- in Indo-Aryan on the basis of *pakthā- ‘fifth’. The ordinal sāsthā- is then responsible for the absence of -v- in the word for ‘sixty’ (Skt. sāṣṭi-, Pāli saṭṭhi, see below) and in Skt. sāṭ.

In the Proto-MI, however, the analogical removal of -v- in the word for ‘six’ did not take place. It has been indicated long ago (e.g. TURNER CDIAL:12803) that Niya so and the reflexes in the Nuristani and Dardic languages directly point to *svāt, but it remained unnoticed that this form also directly accounts for initial ch- in Middle Indic. There is important evidence that *sv regularly gives MI ch (cf. BERGER 1955: 81ff.), viz. mātussvāsr-f. ‘mother’s sister’ > Pāli māttucchā-, Pkt. māucc(h)ā- (next to māuss(s)i-, māussia-, māṣiā- with restored anlaut of the word for ‘sister’, CDIAL

Cf. WACKERNAGEL’s conclusion: “für a finden sich e o und ausserdem ä […], ohne dass die Ratio erkennbar wäre” (p. 38).

p. 30: “La forme isolé trmēdhu (...) de TRH atteste un traitement vocalique conforme à celui de edhi dehi, en sorte que voyelhave peut en définitive devoir son timbre radical à la précédence de la consonne v”.

Compare, for instance, THUMB - HAUSCHILDL 1958:300 (“a [wird] zu o, seltem zu ∷”), ALLEN 1962:72 n. 8 (regular reflex of aC is oC; i.e. “svādaśa > sāvdaśa”, and “for two rare cases of simple lengthening of the vowel (sādhī, sādha-) see p.94 n53”, where these two cases are only mentioned without further adstruction), BURROW 1973:95 (“a preceding short a may be either lengthened [exx.], turned to o [exx.], or turned to e [ex.]”), etc.
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10001: *pitruḥvasyarakat- f. 'father's sister' > Pāli *pitucchā-, Pkt. *piucc(h)ā-, *piucchi- (next to *piussiyā-, *piusīā-, CDIAL 8177). The phonetic development of *sv presumably went through *ṭsv > *ṭṣ > *ch. The reflex of *sv thus merged with that of *ks in some dialects, which may explain forms like Khowār ẓhoi, the initial ẓh of which is a normal reflex of *kṣ (von HÜBER 1986:67,167).

4. A final detail to be taken care of is the initial s- in some Middle Indic words of the 'six' family. The Aśokan forms (loc.pl.) sasu, sāsu (= sasu), sa(d)- in saṇuvisati '26', sapamppā '56', āsamppāsika- 'up to six months' and Inschr. (W) sanuvīsa '26' must be due to a different treatment of *sv- (e.g. *ṣv- > *s- > s-). Pāli salāyatana (next to chalāyatana) 'six sense facilities' and AMg. sadamga 'six constituent parts' (vs. Pāli chalaṅga-) are borrowings from an Eastern dialect.

More problematic is Pāli sāṣṭhi, AMg. sāṭṭhi(m), etc. 'sixty', which cannot be separated from Sanskrit saṣṭi-. How can we account for the fact that there is no *sv- in this word? Let us compare the “paradigms” of ‘6’ in Sanskrit and the proto-form of Middle Indic:

<table>
<thead>
<tr>
<th></th>
<th>Sanskrit</th>
<th>Proto-Middle-Indic</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘6’</td>
<td>sāṭ</td>
<td>*svat</td>
</tr>
<tr>
<td>‘6th’</td>
<td>saṣṭhā-</td>
<td>*svastha-</td>
</tr>
<tr>
<td>‘16’</td>
<td>ṣoḍaṣa</td>
<td>*ṣodaṣa</td>
</tr>
<tr>
<td>‘60’</td>
<td>saṣṭi-</td>
<td>*saṣṭi</td>
</tr>
</tbody>
</table>

The most likely scenario which would explain both systems seems to be the following:

Proto-Indo-Iranian *ṣuacī ‘6’ - *ṣuṣṭHa- ‘6th’ - *ṣuṣṭi ‘60’

*ṣvaṭṣ - *ṣuṣṭha- - *ṣuṣṭi

*ṣvaṭ - *ṣuṣṭha- (cf. §3) - *ṣuṣṭi

Proto-Indo-Aryan *ṣvaṭ - *ṣuṣṭha- - *ṣuṣṭi

Skt. sāṭ - saṣṭhā- - saṣṭi - Proto-MI *ṣvaṭ - *ṣvaṣṭha- - *ṣaṣṭi.

18 The difference in the treatment of *sv between Niya and the other Prākrits is in line with the usual behaviour of Sv clusters: they are normally preserved in Niya (BURROW 1937:21) and some other inscrptional Prākrits, while in other Middle Indic dialects they become a geminate ss, simplified in anlaut (cf. SAKAMOTO-GOTO 1988:95 for the evidence).

In other words, Sanskrit has removed the -v- in the word for ‘six’ by analogy with the ordinal ‘6th’, whereas Proto-MI has levelled the paradigm in the opposite direction.

5. The explanation of Middle Indic cha proposed above is of some importance for the reconstruction of the Proto-Indo-European word for ‘six’. Since the Indo-Aryan reflexes can be accounted for without recourse to the initial cluster *kṣ-, there is no reason for reconstructing it for the proto-language. Avestan xšuûaš and other Iranian forms show the regular development of initial *ṣ- to xš- (cf. PIE *gnehy- > PPIr. *znā- > Ir. *śnā- > Av. xšnā- ‘to know’), so that we can reconstruct Proto-Indo-Iranian *šuaš. The assimilation of the initial *s- to *ṣ- must then be dated at least to the common Indo-Iranian stage

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20 The relationship between Skt. sūṣa, Middle Indic cha(t) and Avestan xšuûaš is reminiscent of that between Skt. sēpa- ‘tail, penis’, Prākrit and Pāli cheppa ‘tail’ (< *pyā-, cf. AV sēpāyavant- ‘tailed’) and Av. xšuûašpā. (Yt. 19.40) ‘tail’, which is likely to be cognate (for a discussion of this word see HINTZE 1994:216f.). The Iranian and Middle Indic words point to *ṣuapā-, whereas y may have been lost in Sanskrit due to dissimilation. In order to combine this form with Skt. sēpa-, we can either reconstruct PPIr. *pćuapa- or assume that the word for ‘tail’ is a loan word (cf. also AitB sēpha- m. ‘scrotum’).
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