Wheel and chariot in early IE: What exactly can we conclude from the linguistic data?

Babies, bathwaters, wheels, and chariots:
Assessing the impact of David Anthony’s work on European and Eurasian steppe prehistory
EAA Bern 2019
1. Preliminaries and Introduction

Protolanguages = ancestors of language families
    reconstructed from daughter languages
PIE = Proto-Indo-European = ancestor of all branches except Anatolian
PIA = Proto-Indo-Anatolian = ancestor of Proto-Anatolian and PIE
PIIr. = Proto-Indo-Iranic
    etc.
Family tree with first split of Anatolian taken for granted
    (even if not completely undisputed)
Notational differences for sounds: esp. $^\chi = h_2$
1. Preliminaries and Introduction

“Linguistic Archaeology” (or “Archaeological linguistics”?)
“Linguistic palaeontology” / “Wörter und Sachen”

Linguistic reconstruction > words of reconstructed (proto-)languages
Words = reference to things
Existence of words = knowledge of things referred to

Mallory 1989; Mallory & Adams 1997; Anthony 2007; Anthony & Ringe 2015
Skeptical: Renfrew 1987; Clackson 2013; Heggarty & Renfrew 2014; Heggarty 2015
2. Linguistic reconstruction

Formal reconstruction
   rigorous, based on established sound correspondences ("sound laws")
   and grammatical rules
   matching items in two related languages must go back to common ancestor = protolanguage and can be reconstructed for it

E.g., Skt. áśva-s = Latin equo-s = Gothic aihva- = Tocharian B yakwe ...
   < PIE *hékwo-s ‘horse’

Skt. yugá-m = Greek zugó-n = Latin iugu-m = Gothic juk ...
   < PIE *jugó-m / *jugʷó-m ‘yoke’
2. Linguistic reconstruction

Semantic reconstruction
   Much less rigorous (no “laws”)  

Trivial changes (= parallel change)
   e.g., wild > domesticated, common metaphors
   PIE *hékwo- (PIA *héku-) ‘wild horse’ > ‘domesticated horse’
   (or even other equids, cf. Armenian ēš ‘donkey’)

Spread of semantic innovations (borrowing, contact)
   very easy within a communicative network
   (words still identifiable as cognate)
3. Data: Early IE words for ‘wheel’

1) PIA *χweg- ‘to turn (around)’
   → *χwr-g-i- > Hittite hurki- c. ‘wheel’
   no other words from this root
   words in other Anatolian languages unknown
   → PToch. *wære-k-wənt- > Toch. wärkänt ‘wheel’
   → *wɐrkwənto > Byerkwanto ‘wheel’ (cf. also yerter ‘wheelrim, felloe’)
   verb still exists in Tocharian

Independent formations
No words for ‘wheel’ from this root in other branches
Distribution of *χwrg-i- / *χwrg-(w)nt- ‘wheel’
Distribution of $\chi wrg-i- / \chi wrg-(w)nt- \text{‘wheel’}$

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3. Data: 3.1 Early IE words for ‘wheel’

2) PIA *kʷel(h)- ‘to turn around, roll; walk around, graze’
   → PIE *kʷé-kʷlo- ~ *kʷ(e)-kʷló- ‘turning (repeatedly)’ m./n.
   probably originally *kʷé-kʷlo- m. with collective *kʷə-kʷláχ- n.

Indo-Iranic *kʷekʷló- > *kekló- > *kekró- > PIIr. *kákrá- >
   Skt. cakrá- m. n. ‘wheel; circle, cycle’, pl. also ‘wheeled vehicle’;
   Avestan caxra- ‘wheel’, later Iranian also ‘circle; sphere, sky; bow’ etc.

Greek *kʷάkʷlo- > kúklos m. ‘circle, wheel’, kúkla n. pl. ‘wheeled vehicle’

   > ON hiól ~ hvél; OE hweohhol/hwēol/hweogol; OF *hwial / hwēl
3.1 Early IE words for ‘wheel’

Tocharian *kʷəkʷlo- > PT *kʷəkʷ(ə)læ m. ‘wagon’ > A kukāl, B kok(a)le
Cf. also *kʷokʷló- (?) ‘turner’ > Lithuanian kãklas m. ‘neck’

Archaic, non-productive word-formation with reduplication
‘turning again and again’ = ‘rolling’

Cf. PIE (PIA?) *bʱebʱr-(o/u)- ‘beaver’ (‘bearing around’?)
*te-tr- ‘capercaillie; grouse’
3.1 Early IE words for ‘wheel’

Other derivatives of *kʷel- with productive formation types

→ *kʷél(h)o(s)- ‘turning’ > Old Prussian kelan n.
  ?PGerm. *hʷela- > ON hvel n. (doubtful, Kroonen 2013: 265)
  But Welsh pel ‘ball’

→ *kʷol(h)o- m. ‘turning’ > Dual (?) PCelt. *kʷolū > Old Irish cul ‘chariot’
  x *kʷél(h)os- n. > PSlav. *kolo, koles- ‘wheel; wheeled vehicle’
  But Greek pólos ‘axis, pole, sphere’; Toch. B kele ‘navel; mid, centre’

Derivation from reduplicated *kʷkʷ- has been proposed but remains insecure
3.1 Early IE words for ‘wheel’

Early loans in Western Uralic: not ‘wheel’, but ‘round, curve, circle, ring’

IE/Pre-PIIr. *keklo- → WU *keklä ‘round, ring’ > Saamic *keawlē ‘arch, bow, circle, ring, curved’ (Koivulehto 2000; ↣ Finn. käylä)

Pre-PIIr. *kekro- → WU *kekrä ‘round, ring’ > Saamic *keawrē ‘circle, ring; round thing’ (Koivulehto 2000; ↣ Finn. käyrä)

*kekrä-j > Finn. kekri ‘yearly celebration’ (Koivulehto 2000)

‘Wheel’ > ‘circle, ring’ or vice versa? Depends on basic meaning: ‘turn’ or ‘being round’; word formation with reduplication makes more sense with ‘to turn’; meaning ‘wheel’ replaced by later loans?
Distribution of *\(k^\text{we}k^\text{lo}\)- ‘wheel’ / ‘wheeled vehicle’  
*\(k^\text{wel(h)o}\)-, *\(k^\text{wol(h)o}\)- ‘wheel’ / ‘wheeled vehicle’
3.1 Early IE words for ‘wheel’

3) *ret- ‘to run’ ⇒ *róto- ‘running’,
   (⇒) collective/abstract *rotáχ- (accent?) >
   *róto- > PGerm. *raþa- n. > OF reth, OS rath, OHG rad
   *róto- > Lithuanian rātas, Latvian rats ‘wheel, circle, ring’, pl. ‘wheeled vehicle’; ⇒ Finnic *rataš ‘wheel’
   PCelt. *roto- > Old Irish roth m. ‘wheel, disc’; *rotā- > Middle Welsh rot
   *rotā- > Latin rota f. (⇒ Albanian rrotē f.)
   ⇒ *rótx-o- > IIr. *rátha- m. ‘vehicle?, chariot’ ⇒ *rathi- ‘charioteer’
   *rotx-iH- > Albanian rreth (pl. rrathē) ‘rim, ring’ (Stifter 2008: 283)
### Distribution of *

| *roto-*, *rotax*- ‘wheel’ / *rotx-o- ‘chariot’, *rotx-iH*- ‘rim’ |

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3.1 Early IE words for ‘wheel’

\[ *k^wel^wo- = \text{‘disc wheel’ vs. } *r^oto- = \text{innovative ‘spoked wheel’?} \]

Meringer 1908; Putschke 1980; Holm 2017

Distinction not actually attested anywhere
no common terms for ‘spoke’!

Indo-Iranic \[ *\text{kakr}a- ‘wheel; wheeled vehicle’ \text{vs. } *\text{ratha- ‘chariot’} \]

Germanic: North Frisian Sylt \textit{weel} ‘wheel, spinning wheel, bicycle’
vs. (loanword?) \textit{rad} ‘wheel; bicycle’

East Frisian (Saterland) \textit{jool} ‘wheel (wagon)’ + \textit{wäil} ‘spinning wheel’
vs. \textit{räd} ‘(small) wheel; bicycle’

Dutch \textit{rad} ‘(special) wheel’ + \textit{wiel} ‘wheel (general, vehicle)’
3.1 Early IE words for ‘wheel’

4) Greek *trochós* ‘runner’ > ‘wheel’

5) Armenian *aniw* < *ʰnēbʱo*- ‘having a nave’

No derivatives of *wert*- ‘to turn’, *wel*- ‘to turn’
3.1 Early IE words for ‘wheel’

Conclusions:
Common selection of just few roots with appropriate semantics
Non-trivial word formation in $*k^w(e)k^wlo$-
Presupposes at least: intact communicative network
    still very similar language varieties (no formal evidence for borrowings)
PIE, no evidence for PIA date
Distribution of early IE words for ‘wheel’

*χwrg-, *kʷekʷlo-, *kʷel-, *roto-/rotax-
3. Data: Early IE words for ‘axle’

IE words for ‘axle’

*χάκ-s- → *-o- > Skt. ákṣa- m. ‘axle; collar-bone’
→ *-on- > Greek áksōn m.
→ *-αχ- > P Germ. *ahsō- f.; *ahsula- m.
(beside *ahslō- ‘shoulder’)
→ *-(i)- > Lat. axis f.; Middle Irish ais f.; Lith. ašis f., CSLav. *osъ f.

Derivation not transparent, unclear
from *χαγ- ‘to drive’
or from *χακ- ‘sharp, pointed’?
3. Data: Early IE words for ‘axle’

Connection to words for ‘shoulder, armpit’
   cf. Skt. meaning ‘collar-bone’

Cf. Avestan aša- ‘armpit’
Latin āla < *aks(i)lā- ‘armpit, wing’, cf. dimin. axilla ‘armpit’
PGerm. *ahslō- f.
Distribution of *χaks- ‘axle’ / ‘armpit’
3. Data: Early IE words for ‘wheeled vehicle’

1) ‘wheel’ > ‘wagon’ (cf. above)
   *kʷékʷlo-, *kʷ(e)kʷló- > PToch. *kʷəkʷəlæ ‘wheeled vehicle’
   *rót(a)χ- ‘(set of) wheels’ → *rótχ-o- ‘having (a set of) wheels’
   > PIIr. *rátha- ‘(vehicle >) chariot’ > Skt. rátha-, Avestan raθa- ‘chariot’

2) *wegʰ- ‘to transport, drive’ ⇒ some derivative ‘wheeled vehicle’
   *wogʰno- > PGerm. *wagna- (↣ Finnic)
   *wegʰno- > PCelt. *wegno- > fén, gwein
   *wógʰo- > Greek óchos; CSlav. *wozъ
   *wégʰi- > Lat. uehis, uvehiculum
3. Data: Early IE words for ‘wheeled vehicle’

3) Others

*jaχ- ‘to go, drive’ ⇒ Skt. yána- n. ‘vehicle’

*Hénos (*vános-?) ‘burden’ > Skt. ánas- ‘cart’; cf. Latin onus ‘burden’

*wert- ‘to turn’ (?) → Proto-Iranic *wárta-
→ Avestan vāša- ‘wheeled vehicle’, later also *wartana- > Sogd. wrtn etc.

*kers- ‘to run’ ⇒ *kṛso- > (Umbrian →) Lat. currus, Celtic *karso- (→ Arm.)

*(χ)ar-smn̥ ‘fitted together’ > Greek hárma (Myc. a-mo)

Hittite loanword huluganni- ‘chariot’

No general PIE term except collectives of ‘wheel’
3. Data: Pre-wheel traction terminology

‘Yoke’ : PIA *jeugʷ-, *jugʷ(o)- > Hittite iūk, iugan
   PIE *jugʷó- > Skt. yugá-, Greek zugón, Latin iugum etc.

‘Pole, thill, shaft’: PIA *χ(o)jH-(e)s-, *χiHs-áχ- ‘pole’
   *χiHsáχ- > Hittite hissa- ‘pole, thill?’; Skt. īsā- ‘pole, thill?’
   *χojH-(e)s- > Avestan aēš(a)- ‘pole of plough’
   Proto-Slavic *ajes- > Slovenian oje ‘pole, thill’ etc.
   Greek derivative oíāks, oiéion ‘handle’

Attestation includes Anatolian > already PIA
Distribution of *j(e)ugʷ-, jugʷó- ‘yoke’

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Distribution of *χojH-es-, *χiHs-(aχ)- ‘pole, shaft, thill’
4. General conclusions

- IE terminology for wheeled vehicles shows non-trivial common lexicon presupposes either PIE date or persisting post-PIE communicative network (before loss of contact with first branch, viz. Tocharian) with very little difference of dialects
- No such evidence for PIA date supports Anatolian splitoff before invention of wheel
- Good evidence for common traction terminology in pre-wheel stage of development
Thanks for your attention!
References


References

Holm, Hans J. 2017. Steppe homeland of Indo-Europeans favored by a Bayesian approach with revised data and processing. *Glottometrics* 37, 54-81.


