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Sino-Tibetan *kolo “*Wheel*”

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SINO-TIBETAN *KOLO "WHEEL"¹

Robert S. Bauer

Introduction

That the horse-drawn chariot appeared suddenly in China in the Shang Dynasty (ca. 1500 - 1066 BC) has led some Western scholars to believe that it was not independently invented by the Chinese but was introduced there by Western invaders. This paper is based on the premise that there is a connection between the transmission of the horse-drawn chariot from the West into China and the origin of some words meaning "wheel" and "wheeled-vehicle" in Sino-Tibetan languages. In particular, the paper proposes that words for "wheel" in some northern Chinese dialects and Bodic (Tibetan) languages are ultimately derived from an Indo-European source. On the basis of the comparison of words for "wheel" from various Sinitic and Bodic languages, the author has reconstructed the Proto-Sino-Tibetan root *kolo "wheel" which is itself an Indo-European contact loanword.

Indo-European *k^wolo "wheel" and Sino-Tibetan *kolo

Sino-Tibetan *kolo "wheel" has been reconstructed on the basis of forms with the meanings "a wheel; to roll, revolve; to be round" found in Northern Chinese dialects and Bodic languages and dialects. The striking resemblance between Sino-Tibetan *kolo and Proto-Indo-European *k^wolo-s, *k^welo-s "wheel" (Buck 1949:724) which is derived from *(s)ker "roll, turn" (Pokorny 1959:935) or *k^wel "revolve, round" (Kaiser, Shevoroshkin 1988:320) raises interesting questions about an early connection between these two language families.

Shafer (1965:466) based his claim that Indo-European and Sino-Tibetan were genetically-related on a lengthy list of comparisons which included Indo-European *qer- (*sic*, equivalent to *ker), the source of *Greek* kirkos and *Latin* circus "circle", and *West Bodish* kyir-kyir "round, circular, (a round thing), disk". A more credible explanation is that early cultural contacts between peoples speaking Proto-Indo-European and Proto-Sino-Tibetan languages resulted in the exchange of material items and their names. In the course of developing his etymology of Old Sinitic *mYag "magician", Mair (1990) sketched in some detail possible routes of cultural exchange between China and its Western neighbors during the second millennium BCE. He (1990:45) also connected Old Sinitic

¹This paper is a revised version of the one originally presented at the 26th International Conference on Sino-Tibetan Languages and Linguistics, National Museum of Ethnology, Osaka, Japan on September 14, 1993. It was first published in *La Trobe University Working Papers in Linguistics* (6), 1994. My special thanks to Prof. Bill Baxter for his encouraging suggestions to improve the paper given during the conference and to Prof. Victor Mair for enthusiastically supporting my line of research.

*klYag 車 "wheeled vehicle" to the Indo-European roots meaning "wheel" and suggested that an Iranian language was the donor source of the loanword into Old Sinitic. However, to the best knowledge of this author the following discussion marks the first time that a connection has been proposed between modern Sino-Tibetan forms for "wheel", the reconstructed Sino-Tibetan root *kolo, and the Indo-European root *k^wolo. Although its identity has not been pinpointed, the author believes that the modern Sino-Tibetan forms are ultimately descended from an Indo-European source language.

"Vehicle" and "Wheel" in Standard Chinese and Chinese Dialects

Let us begin our discussion with modern standard written Chinese in which 車 tshə¹ and 車子 tshə¹ tsi are the usual character-words for "vehicle", while 輪 lun² and 輪子 lun² tsi are the usual character-words for "wheel" (Wu 1985:81, 448)². The combination 車輪 tshə¹ lun² means "wheel (of a vehicle)" in modern standard written Chinese (Wu 1985:81). In addition, the combination 車軚 tshə¹ ku¹ lu "wheel (of a vehicle)" (Wu 1985:81) and the bisyllabic form ku¹ lu 軚 "wheel; to revolve, turn" (Wu 1983:242; Liang 1972:1079) occur in colloquial Beijing dialect and various northern Mandarin dialects (see appendix for examples of forms from other northern Mandarin dialects). Other related lexical items from Beijing dialect include the following: 軚儿 ku¹ lu² "section, piece shaped like a cylinder; something shaped like a revolving axle"; 圓軚 jyan² ku¹ lu "very round"; 骨瘤瘤儿 ku³ liu² liu² "round-shaped, puffed-up"; 軚 ku⁵ lu "to curl, coil, twist" (Chen 1985:101-102). As will be shown below, the distribution of ku¹ lu (and similar forms) is widespread among the northern Mandarin dialects but appears to be restricted to this dialect family. Various Chinese characters have been associated with ku¹ lu, 軚, 軚, 骨碌, 轂軚 (Chen 1985:102; Liang 1972:1084).

In the southern Chinese dialects the word for "wheel" is usually a morphosyllable associated etymologically either with 輪 lun² or 軚 lu⁷; for example, *Min-Xiamen* 輪 lun²; *Min-Putian* 輪 lǝ² "wheel; (for wheel) to roll, turn round and round"; *Min-Fuzhou* 輪輪 lun² nu²; *Min-Chaozhou* 車輪 tshia¹ lun²; *Kejia-Meixian* 輪 lun² ε, 車輪 tsha¹ lun² (Hashimoto 1972:43); *Yue-Guangzhou* 車軚 tshə¹ luk⁷ "wheel" (Beijing Daxue 1964:164). *Yue-Guangzhou* luk⁷ also means "wheel; classifier for cylindrical object; to roll" (Rao et al 1981:136).

Reconstruction of Sino-Tibetan *kolo

With regard to the phonetic structure of Sino-Tibetan *kolo, the initial consonant was a velar stop which was typically voiceless and unaspirated, but it may also have had variants which had voiceless aspirated stop or voiced stop initial consonants that coexisted with it. The vowels were back rounded, i.e., -o-

²The raised number at the end of a morphosyllable indicates the tone category to which the morphosyllable belongs; the absence of a raised number indicates that the morphosyllable has a neutral tone.

but there may have been variants with -u- as well. The second consonant was most likely the lateral approximant -l-. The reconstruction of Sino-Tibetan *kolo "wheel" has been based on the following forms from Northern Chinese dialects and Bodic languages and dialects:

Sinitic: *Chinese-Beijing* ku¹ lu "wheel; to revolve, roll, turn", tʂə¹ ku¹ lu "wheel (of a vehicle)", ku¹ lou "something shaped like a revolving axle", ku⁵ lu "to curl, coil, twist", kou² lou "curved, crooked"; *Chinese-Jinan* ku¹ luē² tsi "wheel"; *Chinese-Shenyang* ku² lu "wheel"; *Chinese-Loyang* ku lu ʁ "wheel"; *Chinese-Yenshan* ku lu "round, flat container; tree trunk"; *Chinese-Xuzhou* ku¹ louɿ "to have a cylindrical shape like a tree trunk; classifier for sections or pieces cut from something with a round shape like a sweet potato", ku³ louɿ² ti "very round"; *Chinese-Hefei* ku¹ nu tsə "wheel"; *Chinese-Tianjin* ku² lu ma³ "tipcart"; *Chinese-Jiaxing* khu¹ lu⁵ tʂhyø¹ "circle"; *Chinese-Changli* tʂhy¹ ku¹ lu¹ "wheel (of a vehicle)" (Hebei 1984:181); *Chinese-Xining* tʂhɛ¹ ky¹ ly "wheel (of a vehicle)"; *Chinese-Hebei* ku lu "wheel; to roll, turn round", ku luŋ "to roll, turn round"; *Chinese-Shanxi* ku⁷ luŋ "to roll (oneself)"; *Chinese-Shanghai* kuə⁷ lo⁸ lo⁸ "to revolve, rotate, spin".

Bodic: *Tibetan-Written* khor lo "wheel, circle, disk, roll", fikor lo "wheel"; *Tibetan-Lhasa* kho:² lo³ "wheel"; *Tibetan-Zangskar* khor lo "wheel, ring"; *Tibetan-Xiahe* kho lo "wheel"; *Tibetan-Batang* kho⁵⁵ lu⁵⁵ "wheel"; *Cuona Menba-Mama* khor¹ lo¹ "wheel"; *Pumi-Lanping* khu⁵⁵ lo⁵⁵ "wheel"; *Pumi-Jiulong* khu⁵⁵ lu⁵⁵ "wheel"; *Tibetan-Alike* mkhorlo "wheel"; *Jiarong* ŋkor lo "wheel"; *Luoba* kolo "wheel"; *Manang-Gyaru* kho³ lo² "wheel"; *Yi-Xide* ku⁵⁵ lu⁵⁵ "wheel".

Archaic Chinese Reconstructions of Characters for "wheel" and "chariot"

The morphology of Proto-Sino-Tibetan has been reconstructed with monosyllabic lexical roots to which prefixes and suffixes could be affixed (Benedict 1972:92). In contrast, the reconstructed form *kolo is a bisyllabic root which cannot be analyzed into a prefix plus root or a root plus suffix. As for the Sinitic side of Sino-Tibetan, Sinologists believe that Chinese was an isolating, monosyllabic language and base their reconstructions of Archaic and Ancient Chinese on individual Chinese characters without regard to their combinations; as a consequence, they have not reconstructed an overtly bisyllabic root which could be associated with one Chinese character meaning "wheel". Nonetheless, some Sinologists have reconstructed roots with consonant clusters made up of an initial velar stop plus lateral approximant. However, even more interestingly, one scholar has indicated that the vowel schwa separated the initial velar stop from the lateral and final; his reconstruction with two vocalic elements could thus easily be interpreted as bisyllabic. Therefore, it should be worth our while to consider individual Chinese characters which mean "wheel, carriage, cart, etc." from the early period and attempt to link them and their Archaic Chinese reconstructions with S-T *kolo.

The pronunciations of both 車 *tshə*¹ and 輪 *lun*² and several other Chinese characters associated with the meanings "wheel" and "chariot" have been reconstructed for Archaic Chinese by various Sinologists. Table 1, *Comparison of Archaic Reconstructions for "wheel" and "chariot"*, lists the Archaic Chinese reconstructions for several Chinese characters as presented in Karlgren 1966; Yang 1968; Schuessler 1987; Baxter 1992; and Chou 1982. Abbreviations are as follows: Chin. Char. = Chinese character; Mod. Man. = pronunciation in Modern Mandarin as transcribed in IPA; Eng. Gloss = equivalent English gloss.

Table 1. Comparison of Archaic Chinese Reconstructions for Chinese Characters Meaning "wheel" and "chariot".

Chin. Char.	Mod. Man.	English Gloss	Archaic Chinese Reconstructions:					
			Karlgren	Yang	Schuessler	Li F-K.	Baxter	Chou
車	<i>tshə</i> ¹	<i>chariot</i>	* <i>kjo</i> , * <i>t'jâ</i> GS#74a	*-----	* <i>kəlja</i> , * <i>khlja</i>	* <i>khriag</i> , * <i>kjag</i>	* <i>k(r)ja</i>	* <i>kjay</i> * <i>tjiay</i>
輪	<i>lun</i> ²	<i>wheel</i>	* <i>liwən</i> GS#470f	* <i>gliwən</i>	* <i>rjuən</i>	* <i>ljən</i>	* <i>C-rjun</i>	* <i>liwən</i>
輅	<i>lu</i> ⁶	<i>big chariot</i>	* <i>glag</i> , * <i>gläk</i> , * <i>ngläg</i> GS#766n'	*-----	* <i>mrakh</i>	* <i>glagh</i>	*-----	* <i>lay</i> , * <i>grak</i> , * <i>ngray</i> ,
轂	<i>ku</i> ³	<i>nave of wheel</i>	* <i>kuk</i> GS#1226j	* <i>kluk</i>	* <i>kuk</i>	* <i>kuk</i>	* <i>kok</i>	* <i>kewk</i>
輜	<i>hua</i> ⁵ , <i>kuo</i> ³	<i>turn round as wheel</i>	* <i>g'lwär</i> , * <i>g'lwər</i> , * <i>g'lwân</i> (GS#351l)	* <i>klwən</i> , * <i>klwet</i> (<i>turn round</i> , <i>roll; a wheel</i>)	*-----	*-----	*-----	* <i>grwa</i> * <i>glwər</i> * <i>g'wan</i>

Karlgren (1966:145, GS#74a) has reconstructed 車 *tshə*¹ "carriage, chariot" for Archaic Chinese as **kjo*¹ and *t'jâ* and for Ancient Chinese as **kjwo*¹ and *t's'ia*¹. For Early Zhou Chinese, the language of the Western Zhou dynasty bronze inscriptions (ca. 1050-770 B.C.), Schuessler (1987:64) has two reconstructions, **khlja* and **kəlja*; it is this second one which is the most interesting to our discussion because it could be interpreted as bisyllabic. For the same historical period which he has termed Old Chinese (Baxter 1992:769) has reconstructed **k(r)ja*. Karlgren's Archaic Chinese reconstruction of 輪 *lun*² "wheel" is **liwən* and for Ancient Chinese **liuën*¹ (1966:245, GS#470f) (other meanings of this character for the Ancient Chinese period include "disc, revolve, revolution" [Karlgren 1974:187]). Yang (1968:15) has reconstructed 輪 for Archaic Chinese as **gliwən*. There are a few other Chinese characters which are related to the meanings "wheel" and "chariot". For Archaic Chinese Karlgren

(1966:325, GS#766n') has reconstructed 輅 "big chariot" as *glâg. Schuessler (1987:395-396) has reconstructed it as *mrakh. The character 軻 "wheels on the axle" has been reconstructed by Karlgren (19474:142) for Ancient Chinese as *k'ɑ¹. The character 櫓 "turreted war chariot" has been reconstructed by Karlgren (1974:187) for Ancient Chinese as *luo³. For Archaic Chinese Karlgren (1966:214, GSR#3511) has reconstructed the 果 "to turn round (as a wheel)" as *g'lwār, *g'lwār, *g'lwân and for Ancient Chinese as *ɣwɑ, *ɣwɑi, ɣuân. The above table indicates that only Yang has reconstructed a consonant cluster with the lateral for 轂 "nave of a wheel", i.e. *kluk, while other Sinologists have reconstructed *kuk or *kok.

On the basis of Karlgren's Archaic Chinese reconstructions for 輅 and 輪, lexical forms of the type kolo "to roll; a wheel" widely-distributed in modern northern Chinese dialects, and Written Tibetan khor-lo "wheel, roll, circle, disc", Yang (1968:15) has reconstructed the two variant roots *klwen and *klwet "to turn round (as a wheel), to roll, a wheel" (but these roots were not linked to particular Chinese characters in the 1968 ms.). In comparing Yang's reconstructions *gliwen, *klwen, *klwet with S-T *kolo, we can note two points of similarity: first, the consonant clusters of the reconstructions and the k-l sequence of the Sino-Tibetan root; second, the round glide of the first set of items and the round vowels in the Sino-Tibetan root. However, the consonant finals -n and -t of Yang's reconstructions need an explanation.

Combining Karlgren's Archaic reconstruction of 車 and 輪 yields *kjo-liwân. In comparing this reconstruction with S-T *kolo, we can note that the first syllable *kjo is a close enough match to *ko; and if the final -n of the second syllable of the Archaic Chinese reconstruction can be explained as some kind of separable suffix, then *liwə also matches fairly well with *lo.

Of all the reconstructions which have been reviewed above, Schuessler's *kəlja reconstructed for 車 "chariot" appears to be the one which most closely resembles S-T *kolo. The other Sinologists have reconstructed two roots with quite different initial consonants of velar and dental, in order to account for this character's two modern readings of tɕy¹ and tʂhə¹. The author would like to propose that the modern forms ku¹-lu widely distributed in Mandarin dialects represent the preservation of an old, colloquial oral tradition which had existed prior to the invention of the Chinese character 車 "chariot"; after the creation of the Chinese character a separate, parallel reading tradition arose with variant forms of ku¹-lu which had reduced to monosyllables being associated with the Chinese character as its reading pronunciations.

Indo-Europeans and the Horse-drawn Chariot

According to Piggott (1983), the archaeological record indicates that the wheel and the wheeled-chariot were not independently reinvented in different parts of Europe and the Near East, but rather the technology for their construction

was borrowed by different peoples. Because elegantly-constructed horse-drawn chariots suddenly appeared in the Shang Dynasty, some Western scholars have thought the horse-drawn chariot was not independently invented in China but was brought from the West. Pulleyblank (1966:13, 30; 1975:506-507; 1983:458-459) has long believed there is sufficient evidence to support this view. He has observed that Indo-Europeans were present in Xinjiang and Gansu in the second century B.C. (but believes they may have been there much earlier) and that their presence was connected somehow to the introduction of the horse and chariot into China. In particular, he (1966:30) has noted that the words for "chariot" in *Tocharian A* *kukäl* and *Tocharian B* *kokale* were of Indo-European origin and etymologically related to *Sanskrit* *cakra* "wheel". He (1966:30; 1975:507) has suggested that an invasion of ancient China by Indo-Europeans who arrived in horse-drawn chariots may be one possible explanation for the sudden appearance of the horse and chariot in Shang China. Jettmar (1983:228), reviewing Soviet research into the early history of China, has stated that "[the] horse and chariot are an indication -- almost the only one -- of influence from the West during the formative period of statehood in China." According to Shaughnessy (1988:190), the chariot was introduced into China from the northwest around 1200 B.C. On the basis of archaeological remains and their comparison, he has stated that the design of Shang and Western Zhou chariots was identical to those from Central Asia (p. 206) and represented the eastern end of a "technological continuum" that began in Eastern Europe and extended through Siberia and Central Asia (p. 207).

With the introduction of the chariot into China from the West, it is quite possible that the word for it was borrowed from the language spoken by the people who introduced it; this word may have been from an Indo-European language. As pointed out above, Mair (1990:45) proposed that Old Sinitic (=Archaic Chinese) **klyag* "wheeled vehicle" is ultimately derived from Proto-Indo-European **kwékwo-* "wheel". After considering and then rejecting Proto-Tocharian on phonetic grounds as a possible source of the loanword into Chinese, he suggested an early form of Iranian as the source language.

The author believes that sufficient historical-comparative linguistic evidence based on forms for a series of related lexemes for "wheel", "wheeled-vehicle", "to roll", "to turn round", "round", etc., from modern languages of both the Sino-Tibetan and Indo-European families supports the idea that Sino-Tibetan borrowed its word for "wheel" from Indo-European. When chariots were brought into China from the West, then the horses which pulled them may have appeared there for the first time as well: Jettmar (1983:232) has suggested that not only was the horse and certain other domestic animals introduced to China by Westerners but also such cultivated plants as barley and wheat. This raises the possibility that the Chinese word for the horse is also a loanword (but not from an Indo-European language; a more probable source would have been a language of Central Asia, the ancestral home of the horse).

APPENDIX

Distribution of KOLO "Wheel"

INDO-EUROPEAN

Proto-Indo-European	*k ^w elo-s, *k ^w olo-s, *k ^w ek ^w lo-s "wheel" (Buck 1949:724) *k ^w elo-, *k ^w olo- "wheel, turn" *k ^w ek ^w lo-, *k ^w ok ^w lo- "wheel" *(s)ker-, *(s)krek- "roll, turn" (Pokorny 1959:639; 640; 935) *k ^w el- "revolve, round" (Kaiser and Shevoroshkin 1988:320)
Original Teutonic	*χwe(g)ula-, *χweχula-
Germanic	*hwewlaz
Old English	hweogol, hweowol, hwéol
Old Frisian	*hwêl
East Frisian	weel, wêil
North Frisian	well
Middle Low German	wêl
Middle Dutch	wiel
Old Norse	huel, hjól, huēl, huela
Modern English	hwil
Swedish	hjul "wheel" kula "ball" klot "ball, sphere"
Icelandic	hjól "wheel" kúlulaga "ball-shaped, spherical"
Danish	hjul "wheel" kugle "sphere"
Norwegian	kuel "wheel"
Greek	kýklos κυκλοζ "circle" krikos κρικοζ "ring, circle, bracelet" kirkos κερκοζ
Latin	circulus "circle" currus "chariot, car"
Italian	circolo "circle"
Albanian	kjarkut "circle"
Latvian	cikls "circle, cycle"
Zend Avesta	caχrəm [tʃaχrəm]
Sanskrit	cakrá- [tʃakrá, tʃakram] "circle, wheel" golə "round, sphere"

Prakrit	golaḥlam "circle"
Pali	gōla- "ball"
Khowar	go[aka- "ball"
Bengali	golī "ball"
Maithili	golā "ball"
Hindi	gol "round"
Gujarati	gol "anything round"
Marathi	gol "round"
Nepali	gol "round"
Tocharian A	kukäl "chariot, wagon"
Tocharian B	kokale "chariot, wagon"
Old Prussian	kelan "wheel"
Church Slavonic	kolo "wheel"
Serbo-Croatian	kolo "wheel"
Czech	kolo "wheel, bicycle"
	koule "sphere"
Polish	koto "wheel, circle"
	kula "sphere"
Russian	koleso "wheel"
Persian	korre "sphere, globe"
	golule "bullet"
	farx "wheel, cart"
SINO-TIBETAN	
Proto-Sino-Tibetan	*k ^w (r)eṭ "roll, wind" (Starostin n.d.:19, #70)
SINITIC	
Chinese-Beijing	ku ¹ lu "wheel; to revolve, roll" tṣə ¹ ku ¹ lu "wheel (of a vehicle)" ku ¹ luʧ "section, piece shaped like cylinder; something shaped like a revolving axle" jyan ² ku ¹ lu "very round" ku ¹ liu ² liuʧ "round-shaped, puffed-up" ku ⁵ lu "to curl, coil, twist" kou ² lou "curved, curved"
Chinese-Changli	tṣhɿ ¹ ku ¹ lu ¹ "wheel (of a vehicle)"
Chinese-Xining	tṣhɛ ¹ kɿ ¹ lɿ "wheel (of a vehicle)"
Chinese-Hebei	ku lu "wheel; to roll, turn round"
Chinese-Yenshan	ku lu "round, flat container; tree trunk"
Chinese-Shenyang	ku ² lu "wheel"
Chinese-Jinan	ku ¹ luē ² tsi "wheel"

Chinese-Loyang	ku lu m̩ "wheel"
Chinese-Kunming	ku ¹ lu ¹ "wheel"
Chinese-Hefei	ku ¹ nu tsə "wheel"
Chinese-Tianjin	ku ² lu ma ³ "railroad tipcart"
Chinese-Jiaxing	khu ¹ lu t̩p̩hyø ¹ "circle"
Chinese-Xuzhou	ku ¹ louŋ "to have a cylindrical shape like a tree trunk; classifier for sections or pieces cut off something round like a sweet potato"
from	ku ³ louŋ ² ti "very round"
Chinese-Shanghai	kuə ⁷ lo ⁸ hyø ⁶ "very round"
	kuə ⁷ lo ⁸ lo ⁸ "revolve, spin, rotate"
	kuə ⁷ liŋ ¹ liŋ ¹ "revolve, spin, rotate"
Chinese-Hebei	ku luŋ "roll, turn round"
Chinese-Shanxi	ku ⁷ luŋ "roll (oneself)"
 BODIC	
Tibetan-Written	khor lo "circle, disk, roll, wheel"
	fikor lo "wheel"
Tibetan-Lhasa	khɔ: ² lo ³ "wheel"
Tibetan-Zangskar	khor lo "wheel, ring"
Tibetan-Zeku	fikhor "rotate, revolv, gyrate, spin"
Tibetan-Xiahe	kho lo "wheel"
Cuona Menba-Mama	khor ¹ lo ² "wheel"
Tibetan-Batang	kho ⁵⁵ lu ⁵⁵ "wheel"
Tibetan-Alike	mkhor lo "wheel"
Menba-Motuo (Sun et al)	khorlo "wheel"
Luoba	kolo "wheel"
Luoba-Bogaer	kolo "wheel"
Pumi-Lanping	khu ⁵⁵ lo ⁵⁵ "wheel"
Pumi-Jiulong	khu ⁵⁵ lu ⁵⁵ "wheel"
Jiarong	ŋkor lo "wheel"
Daofu	nkhu rlu "wheel"
Qieyu	qha ⁵⁵ rlo ⁵⁵ "wheel"
Zhaba	kho ⁵⁵ lu ⁵⁵ "wheel"
Muya	khø ⁵⁵ lø ⁵⁵ "wheel"
Guiqiong	khu ⁵⁵ lu ⁵⁵ "wheel"
Shixing	khu ⁵⁵ lu ⁵⁵ "wheel"
Luoba	kolo "wheel"
Dulong	ku ⁵⁵ lu ⁵⁵ "wheel"
Manang-Gyaru	kho ³ lo ² "wheel"
Manang-Prakaa	kho ³ lē "wheel, ring"
Yi-Xide	ku ⁵⁵ lu ⁵⁵ "wheel"

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