

On the dating of sound changes and its implications for language relationship

The case of Proto-Yeniseian *p- > Ket h-, Yugh f-

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This article seeks to demonstrate how the synopsis of historiographical and lexicographical material allows for the absolute dating of sound changes even in languages with late and imperfect documentation, and how this dating relates to hypotheses concerning the long-range genealogical affiliation of these languages. The languages investigated are Ket and Yugh which belong to the Yeniseian family and have been documented since the 18th century. Two sound changes in these languages will be discussed: Proto-Yeniseian *p- > Ket h-, and Proto-Yeniseian *p- > Yugh f-. It will be argued that the Ket development occurred between 1596/1607 and 1723 AD, and that the Yugh development occurred between 1739 and 1846/1847 AD. The implications of these findings for the Dene-Yeniseian hypothesis linking the Yeniseian family with the Na-Dene family will be discussed. It will be argued that this hypothesis cannot be maintained, and that short-range comparisons are preferable to long-range speculations.

Keywords: Comparative Method, long-range comparison, language relationship, Yeniseian, Na-Dene, Dene-Yeniseian, sound change, dating, chronology

1. Introduction

Sound changes, in so far as they affect the fundamental units of which spoken utterances are composed, are the empirically most accessible processes of language change. Consistently applying the Comparative Method to the sounds of speech and establishing sound changes thus leads to reliable and valuable insights into the individual development and genetic affiliation of languages. Sound changes occur at specific points or intervals in time, and thus can be dated,

theoretically or in potentiality, either absolutely or in relation to each other; i.e., their absolute or relative point in space and time can be determined.

While the relative dating of sound changes is often employed in historical linguistics, the absolute dating of sound changes is only rarely encountered (e.g., Jackson 1953 on Brittonic; more recently Kim 1999 on Tocharian, and Waxenberger 2019 on Early Germanic). The main reason for this is that relative dating relies solely on the relative chronology of the phonological developments in a respective language or group of languages so that it does not essentially depend on any external factor and can be determined rather reliably and easily. Absolute dating, on the other hand, rests in large part on language-external factors, namely records of various shapes and forms (written/spoken, analogue/digital). Given that these records need to be subject to an absolute dating themselves and such a dating is often at best possible in an approximate form, the absolute dating of sound changes is by nature a rather complicated matter. In fact, such a dating is only possible where the history of a language/group of languages is documented sufficiently well. Unfortunately, this is not the case with most languages, either because they are documented for a very short time only, or their documentation is fragmentary. There can, however, be no doubt that the dating, both absolute and relative, of a sound change does have major historical implications, because it essentially determines when and how a given change is most likely to have occurred.

In this article we demonstrate how the analysis of historiographical and lexicographical material may allow for the absolute dating of sound changes, even in languages with a relatively late and imperfect documentation, and how this dating relates to the assessment of hypotheses concerning the long-range genealogical relations of these languages. The languages we will look at are Ket and Yugh. Both are first documented in 18th century lexicographical resources (collected and published in Werner 2005) and have been studied more extensively since the middle of the 19th century, when a grammar with a comprehensive glossary of both languages was first published (Castrén 1858). Since then, our knowledge of the two languages has considerably grown, thanks to the descriptive work of scholars like Andreas Dulson (1964, 1966, 1968, 1970, 1971, 1972), Heinrich Werner (1972, 1974, 1994, 1996, 1997a, 1997b, 2002, 2005) and Stefan Georg (2007), based on their fieldwork conducted in the course of the 20th century and the early 21st century (see also Kotorova & Nefedov 2015 as well as Vajda & Werner 2022, which are partly based on more recent fieldwork; see furthermore Vajda 2000, 2004).

Ket and Yugh belong to the Yeniseian language family once spoken in a vast area around the eponymous Yenisei River in Siberia but now, with Ket and Yugh both practically extinct, the language family too is on the verge of extinction.

Apart from Ket, which is the only language of the family still spoken today (but severely endangered), and Yugh, which has recently become extinct, the family once had four other members: Pumpokol, Arin, Kott and Assan (the latter two are most probably two dialects of the same language).¹ All of these had died out by the close of the 19th century and are only accessible through 18th and 19th century lexicographical material or grammatical sketches. There is scholarly consensus that within the Yeniseian language family Ket and Yugh together constitute a Northern branch and are thus phylogenetically closer to each other than to the other languages (cf. Georg 2007:16 and Werner 1997a:1–8; the further sub-branching of the Yeniseian family remains unclear, cf. Werner 2005:14–15; Georg 2007:16–19; Vajda 2022:250–255).² In fact, Ket and Yugh were even treated as dialects of one language until the close of the 20th century (e.g., by Dulson 1968 and Castrén 1858); Werner (1997a, 1997b) was the first scholar who studied the two languages in their own right (cf. esp. Werner 1997a:1–4 on earlier suggestions that Ket and Yugh could be separate languages). However, the further genealogical affiliation of the Yeniseian language family as such is disputed, and numerous theories linking it with other language families have been proposed. We will address this point in §3 below.

The sound changes examined in this paper pertain to the development of word-initial Proto-Yeniseian (PY) *p- in the two Northern Yeniseian languages: (a) PY *p- > Ket *h*-, and (b) PY *p- > Yugh *f*-. Section 2 discusses and provides an absolute dating for these two developments. On the basis of relevant historiographical and lexicographical material, it will be demonstrated that the Ket development likely took place between 1596/1607 and 1723, and that the Yugh development most probably occurred between 1739 and 1846/1847, i.e., later than the Ket development. The implications of these findings for a hypothesis currently debated that concerns the long-range genealogical relationship of the Yeniseian language family with another language family – namely the Na-Dene-Yeniseian hypothesis – will be discussed in §3. We will show that this hypothesis, in so far as it relies on cognate sets based on evidence relating to the change of PY *p- > Ket *h*-, Yugh *f*-, cannot be maintained in the form in which it is currently advocated, and that a short-range

1. There are three additional Yeniseian languages that are hypothesised to have died out in the 17th century: Yastin, Yarin and Baikot. It is assumed that they might have belonged to the same group as Kott and Assan, but due to a lack of written records this remains unclear (cf. Werner 2005:14–15, 89).

2. It is scholarly consensus that there are three Ket dialects: Southern, Northern and Central (cf. Werner 1997b:1–2; Georg 2007:20–22). Furthermore, it is usually assumed that some of the 18th century Ket material discussed below reflects an additional dialect called the Eed-šeš dialect (cf. Werner 1997b:2, 2005:21–22). It remains an open question to what extent we have to reckon with different Yugh dialects (cf. Werner 1997a:4–8).

diachronic investigation is preferable to an empirically unfounded long-range investigation.

2. The dating of PY *p- > Ket *h*- and PY *p- > Yugh *f*-

2.1 The reflex of PY *p- in the Yeniseian languages

When systematically comparing the word-initial consonants of the Yeniseian languages as they are attested in 18th through 20th century sources, one cannot but notice some interesting variation and a number of striking correspondence sets, especially in the domains of the vowels, plosives and fricatives (cf. Werner 2005: 19–22, 61–62, 91–92 on some of the Ket, Yugh and Kott evidence; Bonmann et al. 2023). However, due to the scarce attestation, imperfect documentation and ambiguous character of the relevant evidence it remains unclear in many cases whether we are dealing with historical variation or allophonic/graphic variation, i.e., whether an observed variation really reflects diachronic developments. For instance, it cannot be established on the basis of the evidence currently available if the variation *g*- ~ *x*- ~ *χ*- in Yugh, shown by words such as 18th century *gou* ~ 19th century *xû* ~ 20th century *ʰχou* ‘mouth’, really reflects a change from a velar plosive *g*- to a fricative *x*-/*χ*-, or if *g*-, *x*- and *χ*- are allophonic/graphic variants of the same sound (cf. Werner 2005: 61; the latter scenario is more probable given the recent findings presented by Bonmann et al. 2023).³ The clarification of this and other cases would demand a much more profound linguistic as well as philological analysis and refining of the 18th and 19th century material than Werner’s (2002, 2003, 2005), Helimski’s (1986) and Dulson’s (1961) pioneering works can provide. For the time being, they remain a task for future research.

In spite of these shortcomings, there are nonetheless correspondence sets that allow for reliable historical insights, because they rest on relatively comprehensive and substantial evidence. One of the most straightforward correspondence sets is

3. Throughout the paper we cite Yeniseian word-forms exactly as they are given by the authors in our sources, i.e., in the form in which they are provided by Werner (1997a, 1997b, 2002, 2005), Castrén (1858) and Messerschmidt (1964). Werner’s transcription of monosyllabic word-forms differentiates between four syllable tones that are indicated by superscript numbers prefixed to each word-form and additional diacritics following the vowel of a respective word-form: cf. Ket *ʰhu*-, Yugh *ʰfu* ‘heart’ for the first tone, Ket *²ha²j*, Yugh *²fa²j* ‘cedar’ for the second, Ket, Yugh *³ba*:- ‘shank (genus *Tringa*)’ for the third, and Ket *⁴kal*, Yugh *⁴kaʰ:r* ‘war’ for the fourth tone. In polysyllabic word-forms, an acute accent designates a high tone and a grave accent designates a low tone (cf. Werner 1997a: 20–24; 1997b: 20–25). On the forms cited from Vajda (2022) in § 3, cf. fn. 15 below.

that given in Table 1 (based on data provided by Werner 2002, 2005) which, due to the quality and quantity of the relevant evidence, is especially suitable for comparison and thus allows for reliable diachronic inferences:

Table 1. The reflex of word-initial Proto-Yeniseian *p in 18th and 19th/20th century Yeniseian

Century	Kott	Assan	Pumpokol	Arin	Yugh	Ket*	Meaning
18th cent.		<i>puj</i>				<i>xij/b-hu:n</i>	'stomach, intestines'
	<i>p'hej</i>	<i>pej</i>	<i>py</i>		<i>paj</i>	<i>haj</i>	'cedar'
	<i>šita-pu/šita-bu</i>	<i>šitá-bu</i>	<i>pfu</i>	<i>šene-bo</i>		<i>hu</i>	'heart'
			<i>paj</i>	<i>p'hajd'a</i>	<i>poóje</i>	<i>hojokse</i>	'silver fir'
	<i>pun</i>			<i>pen</i>		<i>höögn</i>	'net'
	<i>pak-šulpi</i>			<i>p'a</i>		<i>hi</i>	'bird cherry'
	<i>pup</i>	<i>pup</i>			<i>pivo</i> (vocative)	<i>b-hi:p/</i> <i>b-hip</i>	'son'
	<i>pfun/</i> <i>pfeum/</i> <i>pun'a</i>	<i>pun</i>			<i>punna</i>	<i>b-hu:n</i>	'daughter'
	<i>fui/</i> <i>fûi/p^hui</i>				¹ <i>fij</i>	¹ <i>hi:j</i>	'stomach, intestines'
	<i>fei</i>				² <i>fa[?]j</i>	² <i>ha[?]j</i>	'cedar'
19th cent. and later					¹ <i>fu</i>	¹ <i>hu·</i>	'heart'
					<i>fǝjoksi</i>	<i>hǝjoks'</i>	'silver fir'
	<i>fuj</i>				² <i>fɹ[?]ɨ</i>	² <i>hɹ[?]ɨ</i>	'net'
	<i>fɨ/p^hi</i>				¹ <i>fɨ</i>	¹ <i>hi·</i>	'bird cherry'
	<i>fup</i>				² <i>fɨ[?]p</i>	² <i>hi[?]p</i>	'son'
	<i>fun</i>				² <i>fɨ[?]n</i>	² <i>hu[?]n</i>	'daughter'

* Prefixed *b-* signifies the first person possessive in Ket (cf. Werner 1997b: 117–119).

All the 18th century languages apart from Ket agree in that word-initial *p*- sometimes alternates with *pf-* or *ph-* (rarely secondary *-b-* from *-p-* in word-medial position), while Ket features *h-*. This picture is considerably different from the 19th century onwards: both Kott and Yugh, which originally featured word-initial *p-*, now have *f-* (alternating with *p^h-* in Kott), while Ket has retained *h-*. The most straightforward conclusion that one can draw from these findings is that

Proto-Yeniseian had a word-initial *p- that later developed into Ket *h-* and Yugh *f-*, Kott *f-* so that we have to reckon with the two developments PY *p- > *h-* in Ket and PY *p- > *f-* in Yugh and Kott (cf. Bonmann et al. 2023: 62–63, 64–75; Hill 2008 and the references therein).

Both changes find typological parallels in the historical development of other languages. The development of *p- to *h-* in Ket finds a parallel in the areally rather close Samoyedic (Uralic) languages Nganasan (on the verge of extinction) now spoken in the Taymyr Peninsula, and Mator (extinct since the middle of the 19th century) that was once spoken in a large area around the Sayan Mountains in Southern Siberia (cf. Helimski 1997: 13–17; Dolgix 1960). Judging from toponymic evidence, the Yeniseian languages most probably originated here as well (cf. Dulson 1959a, 1959b; Maloletko 1992, 2000). In these languages, Proto-Samoyedic *p- becomes *h-*, as illustrated by the examples of Nganasan *hüä* and Mator *hā* ‘year’ vs. Nenets *pō*, Yurats *pu* (Yurats may be a dialect of Nenets; cf. Siegel 2013: 35; Helimski 2000: 50–55), Enets *poa/pua*, Selkup *po* ‘year’ (Helimski 1997: 71–73; Janhunen 1977: 127; Wagner-Nagy 2019: 22, 38 and *passim*). The change of *p-* to *h-* is therefore not uncommon or unexpected in Siberia around the Yenisei and may well reflect an areal feature.

Similarly, the development of *p- to Yugh *f-* finds a parallel in older dialect records of another Samoyedic language, namely Enets (now on the verge of extinction), which is now also spoken in the Taymyr Peninsula: 19th century sources attest *f-*, where the other Samoyedic languages and the modern varieties of Enets continue Proto-Samoyedic *p-; thus, e.g., *fua* ‘year’ for usual *pua/poa*, Nenets *pō*, Yurats *pu*, Selkup *po* ‘year’ (cf. Mikola 1995: 96 and *passim*; Janhunen 1977: 127 and *passim*; Kümmel 2007: 57). Such a change of *p to *f* is also known from other languages (cf. Kümmel 2007: 57), especially Germanic: in the scope of Grimm’s Law plain Proto-Indo-European *p- became Proto-Germanic *f- as continued in Gothic *fadar*, Old High German *fater*, Old Norse *faðir* ‘father’ as opposed to Vedic Sanskrit *pitá*, Greek *πατήρ* (*patér*), Latin *pater* ‘father’. In a very similar fashion, Proto-Germanic *p (from Proto-Indo-European *b and *p in specific clusters) became *f* in High German as exemplified by Old High German *werfan* ‘throw’ as against Old English *weorpan*, Old Norse *verpa*, Gothic *waírpan* ‘throw’ (on both developments, cf. Braune & Heidemanns 2018: 114–132 and references therein).

Quite interestingly, the latter development most probably led through intermediate stages with an aspirated plosive and an affricate: e.g., Old High German °-*worphan*⁴ > °-*worpfan* > °-*worfan* ‘thrown’ (in compounds, cf. Seebold

4. The symbol ° indicates that something occurs as the element of a compound. It designates where the rest of the compound either precedes or follows the element under consideration.

2009:931–933 on the forms; Braune 1874:47–50 and Braune & Heidermanns 2018:120–128, 169–174 with references therein on the development). It is conceivable that the same evolutionary path is reflected in the alternation of *p-* with *pf-* and *ph-* attested in the 18th century Yeniseian sources and the alternation of *f-/p^h-* in 19th century Kott as illustrated in Table 1. Given these typological findings and the rather uniform attestation of *p-* in the 18th century Yeniseian – especially Yugh – sources apart from Ket, it is thus the most probable scenario that a Proto-Yeniseian voiceless bilabial plosive *p- developed into Ket *h-* and Yugh *f-* (cf. Bonmann et al. 2023; Hill 2008; Starostin 1982:145, 1995:176–177). There is no need to assume that this plosive was originally an aspirate *p^h (pace Werner 2005:204–224, *passim*).

It is, of course, a striking observation that PY *p- must have developed into Ket *h-* before it developed into Yugh *f-*: while Ket *h-* is already attested in the 18th century, Yugh *f-* is encountered from the 19th century onwards, having developed from original Yugh *p-* found in 18th century sources, as cases like 18th century Ket *haj*, Yugh *paj* ‘cedar’ as against 19th/20th century Ket ²*haʔj*, Yugh ²*faʔj* ‘cedar’ illustrate. This raises the question of the dating of the two developments. Hill (2008:64) roughly estimates that the Ket development took place before the 18th century, while the Yugh development took place between the 1730s and the 1840s, when the 18th and 19th century Yugh material was collected. While these estimations are certainly correct, we hold that a more fine-grained dating with considerable probability is possible when historiographical and lexicographical evidence is taken more comprehensively into consideration. In the following two sections, we will demonstrate this for each of the developments separately, starting with Ket.

2.2 The dating of PY *p- > Ket *h-*

The material presented in Table 1, and the discussion so far, has shown that the development PY *p- > Ket *h-* must have taken place before the first Ket material was collected at the beginning of the 18th century, as Ket already features *h-* instead of *p- in the earliest records. We can thus determine the *terminus ante quem* of this development on the basis of the dating of the earliest Ket sources that feature *h-* from PY *p-. In this regard, we are in the rather favourable position of knowing the exact date of the earliest Ket record that attests *h-*: June 10, 1723. The great explorer Daniel Gottlieb Messerschmidt (1685–1735), who travelled through Siberia between 1720 and 1727 on behalf of Tsar Peter the Great, had already met “Ostyaks”, as the Ket and Yugh people were called back then, on June 9, 1723, when he journeyed down the middle course of the Yenisei River, where the Bakhta River meets the Yenisei, and had recorded a list of a few word-forms with Latin and/or

German translations in his diary (cf. Messerschmidt 1964: 63–64); but this list did not feature lexemes with word-initial *h*-.

Lexemes that did have word-initial *h*- were first recorded by Messerschmidt in another list on June 10, when he met Ket speakers further down the middle course of the Yenisei, where the Yeloguy River feeds into it:⁵ *Hujahuy* ‘Bubo, eine Horneule’ (eagle owl) and *Hóschech* ‘Turdi genus, Drossel’ (thrush) (cf. Messerschmidt 1964: 64–65; Georg 2007: 33–35 for a complete list of Messerschmidt’s collected material). It seems that *Hujahuy* is a compound consisting of two elements: a first (and unfortunately unclear) element *Huja*-° and a second element °-*huy* that corresponds to 18th century Yugh *píj* ‘eagle owl’, Arin *p’híe* ‘owl’ and 20th century Ket ²*hi’j*, Yugh ²*fí’j* ‘eagle owl’ (cf. Werner 2002: vol. 1, 348; 2005: 51, 62, 163, 236). Although strictly speaking *Hujahuy* features *-h*- in word-internal rather than word-initial position, the comparative evidence from Yugh, Arin and later Ket indicates that °-*huy* predates the compound and reflects an originally independent lexeme **huy*⁶ ‘eagle owl’ that features word-initial *h*- from **p*-. This is also indicated by the second word-form displaying word-initial *h*-. *Hóschech* undoubtedly corresponds to 20th century Ket *hós’ej*, Yugh *f’śa* ‘thrush’ (cf. Werner 2002: vol. 1, 326) and thus clearly reflects word-initial *h*- from **p*-. We may therefore conclude that by June 10, 1723, word-initial PY **p*- had already become *h*- in Ket, thus setting the strict *terminus ante quem* of this development for this day. In reality, the sound change had presumably taken place sometime prior to the documentation of its reflexes on June 10, 1723, and we can assume that PY **p*- had probably become Ket *h*- by 1723 at the latest.⁷

The next step is to determine the *terminus post quem* of the development. This, of course, is a rather challenging endeavour, given the fact that the change

5. The material was first recorded on June 10 from speakers living in the vicinity of the “Öst-schösch” or Eed-šeš River (cf. fn. 2). Its exact location is unknown today, but we know that the “Öst-schösch” must have been close to the spot where the Yeloguy meets the Yenisei for the first time. On June 11, Messerschmidt travelled further down the Yenisei and checked and revised the vocabulary recorded on the day before with the help of speakers living in the vicinity of the “Pyjah” River. This must have been close to the second and third spot where the Yeloguy feeds into the Yenisei (cf. Messerschmidt 1964: 64–66).

6. We use the asterisk for reconstructed forms and a superscript dagger (†) for unattested transposed forms.

7. Werner (2005: 45) lists four Imbat/Ket word-forms from another (presumably later) 18th century source that feature *g*- for *h*-.: *gogóm* ‘(it is) deep’ ~ 20th century Ket *hórám*, *gánko-kúric* ‘female chicken’ ~ *hánga*-° ‘female’, *gitáman* ‘low’ ~ ¹*hi-tim*, *gu* ‘heart’ ~ ¹*hu*. Werner (pers. comm.) informs us that these word-forms are taken from Dulson (1961) so that *g*- most probably renders Cyrillic *z*- for original *h*- (which is especially probable in light of the introductory remarks in Dulson 1961: 152–158).

of PY *p- to Ket *h-* is prehistorical, i.e., it must predate the written documentation of Ket, because it is already reflected in the earliest records of the language. In our view, however, the dating of the *terminus post quem* is still possible with sufficient probability when additional linguistic and historiographical evidence is taken into account, for it seems that Russian loanwords in Ket may allow for determining the earliest possible point in time at which PY *p- > Ket *h-* can have occurred.

Nowadays, word-initial *p-* in Russian loanwords is usually retained as such in Ket, as the examples in Table 2 (compiled from Werner 2002) illustrate (on loanwords in Ket in general cf. also Vajda 2009: esp. 478–479 on contact with Russian; and Khabtagaeva 2019 on loanwords from Turkic, Mongolic and Tungusic).

Table 2. Russian loanwords in Ket starting with *p-*

Russian source	Ket loanword	Meaning
спасать (<i>spasát'</i>)	<i>pasát</i>	'to save'
пахать (<i>paxát'</i>)	<i>paχát</i> (cf. Yugh <i>paχát</i>)	'to plough'
песец (<i>peséts</i>)	<i>pésta</i>	'Arctic fox'
пятна, пятнистый (<i>pjátna, pjatnístyj</i>)	<i>pétnajs'</i> (cf. Yugh <i>pétnajsi</i>)	'spotted'
пёстрый (<i>pěstryj</i>)	<i>péts'aran</i>	'dappled'
печать (<i>pečát'</i>)	<i>pičát</i>	'seal'
плеть (<i>plet'</i>)	<i>píl'at</i>	'whip'
плясать (<i>pljasát'</i>)	<i>píl'is'tet</i>	'to dance'
почта (<i>póčta</i>)	<i>pós'ita</i> (cf. Yugh <i>póčíta</i>)	'post/mail'
на-пóлнить (<i>na-pólnit'</i>)	<i>pólons'in'</i> (cf. Yugh <i>pólons'in'</i>)	'to fill'
плот (<i>plot</i>)	<i>pólót</i>	'raft'
помогать (<i>pomogát'</i>)	<i>pomogát</i>	'to help'
пароход (<i>paroxód</i>)	<i>parqót</i> (cf. Yugh <i>parχót</i>)	'ship'
пособить, пособлять (<i>posobít', posoblját'</i>)	<i>pósbat</i>	'to help'
стóпка (<i>stópka</i>) 'shot glass'	<i>pòstóp</i>	'bottle'

It is obvious that these words must have been borrowed from Russian after the change of *p- to *h-* had already taken place, because otherwise they should reflect word-initial *h-*, i.e., we should expect forms like ^hhólót 'raft' instead of *pólót* from Russian плот (*plot*) or ^hhaχát 'to plough' for *paχát* from Russian пахать (*pakhát'*). Based on these findings, one may be tempted to date the *terminus ante quem* even further back to the time when language contact between Russian and Ket was established, because one may assume that the change PY *p- > Ket *h-* must have

taken place before Russian loanwords entered the Ket lexicon. However, a closer look at the relevant evidence indicates the exact opposite: there are a few Russian borrowings in Ket that are rendered with *h-* for more original *p-* and partly find exact cognates in Yugh rendering Russian *p-* as *f-*; see Table 3 (compiled from Werner 2002 and Castrén 1858):⁸

Table 3. Russian loanwords in Ket starting with *h-*

Russian source	Ket	Yugh	Meaning
пóлог (<i>pólog</i>)	<i>hólak</i>	<i>fólak</i>	'bed curtain'
пóрох (<i>pórox</i>)	<i>hólak</i> , C <i>hâlak</i>	<i>fórax/fôrax</i> , C <i>fôrak</i>	'gun powder'
пáрыс (<i>párus</i>)	<i>hál'es</i> , C <i>hâles/hâlas</i>	<i>fárus/fáris</i>	'sail/canvas'
пóдпол (<i>pódpol</i>)	<i>hótpel'</i>	–	'cavity beneath the floor'
поп (<i>pop</i>)	² <i>hɔʔp</i>	–	'priest'

The comparison of the Ket word-forms with their Yugh counterparts suggests that they were borrowed from Russian at a very early stage in the development of the two languages – possibly as early as in Proto-North-Yeniseian times, when Ket and Yugh had not yet developed into different languages: Ket *hólak* ~ Yugh *fólak* 'bed curtain' from Russian пóлог (*pólog*); Ket *hólak* (19th cent. *hâlak*) ~ Yugh *fórax/fôrax* (19th cent. *fôrak*) 'gun powder' from Russian пóрох (*pórox*); and Ket *hál'es* (19th cent. *hâles/hâlas*) ~ Yugh *fárus/fáris* from Russian пáрыс (*párus*) 'sail' all show the development of original **p-* to Ket *h-*, Yugh *f-*. This strongly indicates that the words had already entered the lexica of the two languages or their common ancestor before **p-* changed into *h-* in Ket and *f-* in Yugh, since otherwise we should expect a reflex of *p-* in both languages, i.e., forms like Ket [†]*pólak* ~ Yugh [†]*fórax/fôrax* 'gun powder' as they are featured in Table 2 above.

We are thus most probably dealing with two different chronological layers of Russian loanwords in Ket and Yugh: one older layer of words predating the development **p-* > Ket *h-*, Yugh *f-* which is illustrated by the examples in Table 3, and one younger layer postdating the development illustrated by the examples in Table 2. On the basis of these findings, we may conclude that the development **p-* > Ket *h-* probably postdates the borrowing of the earlier layer of Russian loanwords into Ket or the common ancestor of Ket and Yugh. This allows for dating the *terminus ante quem* of this development to the time when language contact between Russian and the Yeniseian languages was established for the first time.

8. In Table 3, C preceding a respective word-form signifies that this is taken from Castrén (1858); all the other word-forms are taken from Werner (2002).

Historiographical evidence enables us to determine the timeframe in which contact between Russian and the Yeniseian languages was most probably established: between 1596 and 1607. The first Russian speakers who came into contact with Yeniseian speakers were the Cossacks, known to have explored and conquered Siberia at the close of the 16th century (cf. also Vajda 2009: 478–479). The first fortified settlement (острѣ, *ostróg*) built by the Cossacks in the greater surroundings west of the Yenisei was Narym (today a village in Tomsk Oblast), located on the banks of the Ob River, where it meets the Ket River that feeds into the Yenisei. The settlement was most probably founded in 1596 to subjugate the Selkup Skewbald Horde (Dolgix 1960: 87; Müller 1762: 493), but it is quite probable that contact with the nomadic Yeniseians – including the Kets and Yughs – living and travelling in a vast area around the Yenisei, including the banks of the Ket and Ob Rivers (cf. Maloletko 2000), was already established by then (cf. Werner 2005: 1–5). Shortly after the foundation of Narym, the Cossacks built another settlement, Ketskij Ostrog, on the banks of the upper course of the Ket River (presumably in 1602); this settlement was moved along the course of the Ket several times during the 17th century (Dolgix 1960: 91). Finally, from 1607 onwards Yenisei “Ostyaks” – i.e., Kets and Yughs – are mentioned as tributaries in Russian tax registers (Dolgix 1960: 143–150; Müller 1763: 42–44), so by this time regular contact between the Russian-speaking population and the Ket-speaking population must have been established (cf. also Müller 1762: 493–502). Given these findings, we may conclude that linguistic contact between Russian and Ket was established between 1596 and 1607, and that consequently Russian loanwords were borrowed into Ket no earlier than 1596 or, perhaps more probably, 1607. The *terminus post quem* of the development *p- > Ket h- can thus be determined as 1596/1607.⁹

The synopsis of our findings so far now allows for a rather exact dating of the process by which PY *p- became h- in Ket: as the *terminus post quem* can

9. A reviewer hints at the possibility that the Russian loanwords in Table 3 might not actually stem from an early Ket or Proto-North-Yeniseian layer predating the change *p- > h-, but that one could resort to different individual phonological explanations. The reviewer especially doubts that Ket ²hɔʔp ‘priest’ could have been borrowed early on, because before the 18th century there were allegedly too few priests in central Siberia. We hold that the account presented here is preferable to all its alternatives because it is the simplest one and provides a regular, uniform explanation of all the evidence. With regard to Ket ²hɔʔp ‘priest’ it is worth noting that the first Orthodox churches were founded in Siberia shortly after the arrival of the Cossacks and the first Russian settlers: in 1600/1601 two churches were established in Tobolsk, and in 1603 a church was founded in Mangazeya (itself established in 1601), where Yenisei “Ostyaks” paid their tribute (cf. Müller 1763: 33–34, 41–42). Therefore, it is very likely that sporadic contact between the Yeniseians and Russian Orthodoxy was established back then as well. We know that the Yenisei “Ostyaks” were largely baptised by the 1730s at the latest (Müller 2003: 88v–89v).

be determined as 1596/1607, and the *terminus ante quem* can be set for 1723, the process must most probably have taken place between 1596/1607 and 1723, i.e., in the course of the 17th century. A similarly exact dating can be established for the second development examined in this paper, namely PY *p- > Yugh f-.

2.3 The dating of PY *p- > Yugh f-

We have already seen above that PY *p- is still retained in 18th century Yugh, illustrated in cases like 18th century Yugh *paj* ~ Ket *haj* ‘cedar’ as against 20th century Yugh ²*fa’j* (19th cent. *fai*) ~ Ket ²*ha’j* (19th cent. *hai*) given in Table 1. The development PY *p- > Yugh f- must therefore postdate the earliest records of Yugh so that its *terminus post quem* can be determined on the basis of the dating of the earliest records. Similarly, the *terminus ante quem* of the development can be established on the basis of the dating of the earliest Yugh sources that feature f- from more original *p-.

The first Yugh material was collected (alongside Ket, Kott, Assan, Arin and Pumpokol material) by the famous explorer and scholar Gerhard Friedrich Müller (1705–1783), who travelled around Siberia between 1733 and 1743 as part of the Second Kamchatka Expedition (cf. Werner 2005: 8–9; Èlert 1990; Büsching 1785: 23–44). Müller’s records have only partly been made available to the public (cf. Müller 1750, 1937–2005, 2003, 2009, 2010–2018), but an essential portion of the linguistic material has been published by Dulson (1961), and especially Helimski (1986) and Werner (2005).

There can be no serious doubt that Müller’s 18th century material classified as Yugh by Werner (2002, 2005) and provided in Table 1 and throughout this paper really stems from an earlier layer of the Yugh language: when Müller collected his Yeniseian language material, he kept the lists with the word-forms from each Yeniseian idiom distinct so that the list with “Ostyak” (“Ostjakisch” in Müller’s terminology) material classified by Werner as Yugh is different from the respective lists featuring “Imbat” (= Ket, “Imbaskisch” in Müller’s terminology), Pumpokol or other material.¹⁰ Apart from this, linguistic features typical of later Yugh are

10. There are of course a few cases in which items were assigned to the wrong language by Müller. However, it is usually the case that Yugh (“Ostyak”) material was wrongly interpreted as belonging to another language – especially Pumpokol – than the other way round (cf. Werner 2005: 79 and the respective assessments given by Werner 2005: *passim*, esp. in 40–58, 80–88, 179–187). It is therefore expected that, while Yugh material may be featured in other word lists, no material from other languages should be featured in the “Ostyak” list. Anyway, there is, as far as we can see, no probable or secure case of this. Genuine Yugh origin of the material in Müller’s “Ostyak” list is further suggested by the fact that in most respects it is phonetically and semantically parallel to the later Yugh material, as the data in Table 4 illustrate.

already displayed by words on Müller's "Ostyak" list (on the details cf. Werner 2005: 59–80), e.g., *-r* for *-l* in *ur* 'water' which corresponds to 19th century Yugh *ur* (Castrén 1858) and 20th century Yugh *'ur* (Werner 2002, 2005) as against 18th century Ket *Uhl* 'water / fluvius maior, ein Strom' (Messerschmidt 1964)/*ul* (Müller *apud* Werner 2005, Helimski 1986), 19th century Ket *ut/uot* (Castrén 1858), 20th century Ket *'u'l* (Werner 2002, 2005; on this correspondence in particular cf. Fries & Bonmann 2023). The *terminus post quem* of the development PY *p- > Yugh *f*- can therefore be determined on the basis of the dating of Müller's records.¹¹

More than a century after Müller, the well-known linguist and ethnographer Matthias Alexander Castrén (1813–1852) travelled and explored Siberia between 1845 and 1848. Although his chief interest was in the Uralic (Finno-Ugric and Samoyedic) languages, he also studied the Yeniseian languages and compiled a grammatical sketch and glossary of Kott, Ket and Yugh (Castrén 1858) which was edited and published posthumously by Anton Schiefner (1817–1879). The two Northern Yeniseian languages were regarded by Castrén as dialects of the same language, which he called "Yenisei Ostyak" ("Jenissej-Ostjakisch"), with Ket being termed the "Imbat dialect" ("Imbazkisch") and Yugh being termed the "Sym dialect" ("Symsch") according to the places where the respective speakers lived at the time (cf. Castrén 1858: vii–viii). Castrén's Yugh material generally features *f*- from more original *p*- for the first time so that through a dating of Castrén's records we can determine the *terminus ante quem* of PY *p- > Yugh *f*-. Table 4 presents an overview of the change of more original *p*- to *f*- as it is documented through Müller's and Castrén's material (we give Müller's material according to Werner 2005: 84–85, and Castrén's material according to Castrén 1858).

It is for these observations that Hill (2008: 64) rightly suggests a rough dating of PY *p- > Yugh *f*- between the 1730s and the 1840s because the relevant material was collected at that time. Through their own testimonies and other contemporary historiographical sources we are surprisingly well informed about the routes

11. Some word-forms recorded by Müller indicate that *f*- was already featured in a Yugh idiom in the 18th century (cf. Müller 2003: 88r–88v; the words are not listed in Werner 2002, 2005): *Fâs* 'Shaman drum' ~ 20th century Yugh *'fâs*; *Fadbal* 'Shaman drum stick' ~ 20th century Yugh *fâdbil/fâdbul*; *Fânga* 'fly agaric' ~ 20th century Ket *hângo* 'fly agaric.' However, it is unclear whether *f*- in these forms reflects PY *p-, as they are probably loanwords from Uralic (cf. Bouda 1957: 70; Helimski 1982: 245). The further occurrence of *f*- in *figget* 'chin' ~ Pumpokol *pinét*, 20th century Yugh *fi-at*, Ket *hiyat* 'chin' featured in Müller's "Ostyak" list could, however, indicate that the change PY *p- > Yugh *f*- had already begun unfolding in Müller's time, but the evidence is too fragmentary to allow for a definitive conclusion on this. The other two words with *f*- that Müller's list features, *fîjnhân* 'Tungus' and *filim* 'circle', are inconclusive in this regard due to a lack of instructive comparanda.

Table 4. The development of Yugh words with *f- < p-* between the 18th and 19th century

Müller (18th cent.)	Castrén (19th cent.)	Meaning
<i>paj</i>	<i>fai</i>	‘cedar’
<i>pígge-dilb</i>	<i>figdyl</i>	‘boy’
<i>pij-</i> (cf. <i>pij-útem</i> ‘full after a meal’)	<i>fÿ</i>	‘stomach’
<i>poániŋ</i>	<i>feäneŋ</i>	‘sand’
<i>poóje</i>	<i>fojoks</i>	‘silver fir’
<i>punna</i>	<i>fun</i>	‘daughter’
<i>pij</i>	<i>fyei</i>	‘eagle owl’

that Müller and Castrén took during their journeys, and when and where they collected their Yugh material can be reconstructed in detail with some confidence.

It seems that during the first half of his journey between 1733 and 1738 Müller had no occasion to record substantial Yugh material, because he first travelled along the upper course of the Yenisei in the winter of 1734/1735: departing from Tomsk, he first visited Yeniseysk in December 1734, arrived in Krasnoyarsk in February 1735 and travelled further south to Irkutsk, where he arrived in March and explored the surroundings (including Lake Baikal). In January 1736, he turned eastward, journeying along the Lena River to Yakutsk, where he arrived in August. He stayed there until July 1737, when he headed westward again, arriving in Irkutsk in March 1738. From there he journeyed back north to Yeniseysk, where he arrived in August and stayed until the end of May in 1739.

Departing from Yeniseysk on 27 May, Müller then finally travelled further north down the Yenisei, where the Yughs and Kets lived, until he arrived in Turukhansk on June 6, where he stayed until July 6, finally returning to Yeniseysk (cf. Büsching 1785: 29–38; Ékert 1990: 149–151; Werner 2005: 8–9). As Werner (2005: 9) rightly observes, it can be assumed that Müller collected his Yugh and Ket material on this trip. In our view, he probably recorded it in Turukhansk between June 6 and July 6 because his stay there provided him with an occasion to do so: during the ice-free months, the nomadic peoples of Siberia – including the Yughs – regularly visited market places in greater settlements (сүглánnиe мeстá, *suglánnije mestá*) like Turukhansk, Yeniseysk or Krasnoyarsk to pay their taxes (ясáк, *jasák*) and organise fairs for trading and engaging in festive and religious activities (cf. Müller 1760: *passim*, 416–479, esp. 448–455; Castrén 1856: 235–236, 258–259).

It is reported that in June 1739, during Müller’s stay in Turukhansk, such a fair took place that attracted “Leute von vielerley Nationen, als Ostjaken, Samojuden

u. s. w. [...], deren Sitten und Sprachen Müller beobachtete und untersuchte” – “people from sundry sorts of nations such as Ostyaks, Samoyeds etc. [...] whose customs and languages Müller observed and studied” (Büsching 1785:38). It is quite probable that the Yugh informants from whom Müller collected his Yugh language material were among the visitors to the fair. This is also indicated by the fact that a hundred years later, when Matthias Alexander Castrén came to Turukhansk at the same time of the year when the fair took place, he met numerous Yughs and Kets (“Yenisei Ostyaks”) there as well (cf. Castrén 1856:235–237). Thus, we hold that it was during the time of the fair that Müller recorded his Yugh (and other) material, which sets the *terminus post quem* of the development PY *p- > Yugh f- for June/July 1739.

When Matthias Alexander Castrén explored Siberia more than a century after Müller, between 1845 and 1848, his chief interest was in the Uralic languages. From his *Reiseberichte und Briefe* (“travel reports and letters”) we learn that he would have wished for his assistant Johan Reinhold Bergstadi (1820–1850) to study the language of the “Yenisei Ostyaks” – i.e., the Kets and Yughs – on his own, but that his instructions required himself to at least acquire “einige Kenntnisse in der Sache” – “some familiarity with the matter” (Castrén 1856:212, 255–256, 505–514; cf. also Werner 2003:2).

It was most probably for this reason that, when Castrén and Bergstadi arrived in Yeniseysk in early 1846, Castrén instructed Bergstadi to travel down the Yenisei to visit the Yenisei Ostyaks and study their language, while he himself would go westward to study Samoyedic: we are informed that in early April Bergstadi and Castrén had left for their respective destinations, and that by April 14 Bergstadi had reached the village Antsiferovo (“Anziferowa” in Castrén’s writing), where he studied the language of the Yenisei Ostyaks for several weeks, before he and Castrén both returned to Yeniseysk at the end of May to travel down the Yenisei towards Turukhansk and then further north towards Dudinka (cf. Castrén 1856:197–198, 206–209, 211–212). It seems that the first Yugh material that Castrén later used for his grammatical sketch and glossary of Ket and Yugh was recorded during Bergstadi’s trip to Antsiferovo, as Castrén remarks that Bergstadi dealt with the language of the Yenisei Ostyaks “theils allein, theils in Gesellschaft mit mir” – “partly on his own, partly together with me” (Castrén 1856:212).

However, the bulk of the Yugh material was certainly collected by Castrén himself in the first weeks of March in 1847, when he travelled in the area between Turukhansk and Yeniseysk with the explicit aim to study the language of the “Yenisei Ostyaks”. On January 23 Castrén returned to Turukhansk from the area further north around Dudinka. A few days later he left for Yeniseysk, where he arrived in the last week of March (cf. Castrén 1856:277–296). It was certainly on this journey that Castrén visited the settlements of the Kets and Yughs to collect

most of the language material that he would later use for his glossary and grammatical sketch: it seems that between January and February Castrén mainly collected Ket material in the vicinity of Turukhansk, and that, following his arrival in the settlement Nasimovo (“Nasimowa” in Castrén’s writing) between Yeniseysk and Turukhansk in early March, he focussed on collecting Yugh material for a few weeks, before he returned to Yeniseysk at the end of the month (cf. Castrén 1856: 286–296; Werner 1997a: 6–8). Given all these findings, we can conclude rather confidently that Castrén’s Yugh material was not recorded before April 1846 or after March 1847. This sets the *terminus ante quem* of the development PY *p- > Yugh f- for 1846/1847, most probably 1846.

The comprehensive survey of sources on Müller’s and Castrén’s travels has thus led to a rather exact dating of the process by which PY *p- became Yugh f-: the *terminus post quem* can be set for 1739, and the *terminus ante quem* can be determined as 1846/1847 so that the process would most probably have taken place between 1739 and 1846/1847.

Through an analysis of relevant lexicographical and historiographical material we have thus been able to provide a rather exact dating of both the development PY *p- > Ket h- to between 1596/1607 and 1723, and the development PY *p- > Yugh f- to between 1739 and 1846/1847. It would, of course, be desirable to know how these two developments unfolded and what evolutionary steps they took before PY *p- ultimately surfaced as h- in Ket and f- in Yugh. In our discussion above we have already hinted at the possibility that the variation p- ~ pf- ~ ph- attested in 18th century Yeniseian sources and the alternation f- ~ p^h- in 19th century Kott could reflect intermediary stages of the development from *p- to f- and h- that may also be assumed for the evolution of Ket h-, Yugh f- (cf. also fn. 12 on the possible beginnings of the Yugh development). Unfortunately, our evidence does currently not allow for more profound inferences; for the time being we will have to content ourselves with these tentative observations.

Be that as it may, our investigation has demonstrated that the comprehensive survey of evidence from a variety of domains may allow for the rather exact dating of sound changes even in languages with a late and fragmentary documentation. That such a dating may also have substantial implications for hypotheses regarding the genealogical affiliation of languages will now be demonstrated in the following section, where we will discuss how the dating of PY *p- > Ket h- and Yugh f- contradicts long-range hypotheses on the genealogical affiliation of the Yeniseian languages that have recently been proposed, especially the Na-Dene connection.

3. The phoneme *p in long-range comparisons with the Yeniseian languages

The two most prominent proposals for long-range language families that include Yeniseian are Dene-Caucasian and Dene-Yeniseian. Dene-Caucasian is a macro-family suggested mostly based on work by S. Starostin (1983) who first postulated a Sino-Caucasian family. Contrary to other attempts, he used lexical cognate sets to establish shared sound correspondences to connect Yeniseian with Trans-Himalayan (Sino-Tibetan) and Caucasian, the latter itself not having been proven to this day. Later, the Na-Dene languages spoken in North America were added to this macrofamily by Merritt Ruhlen (1998), who included not only the Athabaskan languages as well as Tlingit and Eyak, but also Haida, which is not considered to be part of Na-Dene today (on earlier links between Yeniseian and North American languages cf. Bonmann et al. 2023: 42, fn. 4 and references therein). Other languages are sometimes included, notably the isolate Burushaski which G. Starostin (2010) claims is the closest relative to Yeniseian (on all this cf. also Vajda 2022: 240).

The notion that the Na-Dene languages might be related to the Yeniseian languages was hinted at as early as 1708, when Dutch orientalist Adriaan Reland noted that the Kets and no other Siberian group are “ancestral cousins to Native Americans who never left Eurasia” (Vajda 2022: 240). A thorough exploration of this topic has only been carried out recently, with the most important publications authored by Vajda (2010, 2018; cf. also Werner 2004).

Although the evidence discussed in the present article only affects a small part of the reconstruction of Proto-Dene-Yeniseian, it is not the only issue with this theory: Dene-Yeniseian has been controversial from the beginning. Most notably, two reactions to Vajda (2010) provide detailed assessments of its arguments. The first is Campbell (2011), a review of Vajda (2010), where it is pointed out that of the ~100 proposed cognate sets, about 30 are very short forms, which increases the likelihood of the similarity being simply due to chance (Campbell 2011: 447). Furthermore, 27 cases show differences in semantics that Campbell casts doubt on, such as a proposed cognate set of ‘jump’ / ‘(fire) ignites’ and ‘by moonlight’ / ‘flare up’¹² (Campbell 2011: 446). There are six cases suspected to be loan words

12. These include Proto-Athabaskan *də-tłux ~ *də-tłət ‘jump’ (> Koyukon *tluh* ~ *tlət* ‘jump’, also ‘fire ignites, burns, blazes’, *tlaaħ* ‘shine’) and Yeniseian lexemes like Central Ket *liŋteŋej* ‘flare up (said of light)’, Ket *qib-laŋ* ~ *qib-la*: ‘by moonlight’ and Yugh *χefju-ŋuŋ sī* ‘moonlit night’, where only the element *ŋi* ~ *ŋu* ~ *ŋa* is cognate, while *-ŋ* is “probably a suffix of some kind” (Vajda 2010: 93).

and more than ten cases of potential onomatopoeia, which leaves little solid evidence. Further methodological problems mentioned by Campbell are the fact that multiple cognate forms in one family are presented as related to a single form in the other and the fact that most of the proposed correspondences only occur in a few cases.

The morphological evidence, which Vajda finds even more promising than the lexical evidence, is also not convincing enough in Campbell's view. Vajda argues that the prefixing templatic verb morphology of Na-Dene and Yeniseian shares several slots that have cognate morphemes and thus the whole template can be regarded as cognate. First, since complex verb morphology is highly susceptible to change, it would be "astounding if both Yeniseian and Na-Dene had managed to retain so much of the original morphology [...] over such a long time span" (Campbell 2011: 448). Still, this could theoretically be a case of a rare extreme archaism. But, as Campbell (2011: 448) points out, "[t]he biggest problem in the morphological evidence is the recognition that a number of the affixes and their slots are not original but came about through grammaticalization of formerly independent items." He quotes Kibrik (2010: 318) who states that if the morphemes are originally auxiliary stems, "their cognacy does not tell anything about the relatedness of the verb template *per se*".

Further criticism pertains to the fact that the affix that immediately precedes the stem in Na-Dene verbs, a kind of "classifier", is lacking a clear cognate in Yeniseian languages. If one assumes a series of grammaticalisation processes as the origin of the verbal template, the direct adjacency of this morpheme to the verbal root must mean that it is older than all the other prefix slots (Campbell 2011: 449–450; Kibrik 2010: 317). The fact that it is missing in Yeniseian is highly problematic for the Dene-Yeniseian theory. Campbell thus concludes that the hypothesis "cannot be embraced at present" (Campbell 2011: 450).

Interestingly, George Starostin (2012), himself a supporter of long-range comparison for the macrofamily of Dene-Caucasian, also provides a critical assessment of the data put forward in Vajda (2010)¹³ and states that of all the lexical

13. He views the proposed correspondence sets as "not yet properly 'regular' in the classic comparative-historical sense of the word. Most of them seem to be based around one 'psychologically impressive' example, which is then backed up by 1–2 supporting comparanda that are usually weaker from either the semantic, or the phonetic, or the distributional points of view, but still manage to produce an aura of 'regularity'. The same could be extended to his treatment of the verbal morphology, where a tiny handful of intriguing isomorphisms are surrounded by an impenetrable sea of assumptions and highly controversial internal reconstructions that create an illusion of systemic reconstruction where there really is none" (Starostin 2012: 137). Although this sounds extremely critical, he views Vajda's work as a step in the right direction, albeit not a very big one. But he accepts the relationship of Yeniseian and Na-Dene in the larger framework of Dene-Caucasian.

evidence, eleven cognate sets at most can be accepted as sound proof (Starostin 2012: 134). A third critical assessment by Kibrik (2010) was published in the same volume as Vajda's initial proposal. Kibrik finds that the lexical data are overall convincing, although he admits that this assessment is "purely subjective" and that he is not familiar with the objective criteria that would be used to evaluate the hypothesis. He is more critical of the morphological parts of the argument (see above). It would be worthwhile, but beyond the scope of this paper, to examine whether all the criticism mentioned above still applies to the most recent treatment of Dene-Yeniseian in Vajda (2022).

The most recent inventory of alleged Dene-Yeniseian cognates is presented by Vajda (2022) with some lexemes that had hitherto not been presented anywhere else and some already published cognate sets for which new insights are provided. Of these, Table 5 shows those cognate sets that involve our correspondence of Ket *h*- and Yugh *f*-:

Table 5. Alleged Proto-Dene-Yeniseian and Proto-Yeniseian cognate sets with cognate number from Vajda (2022) and the Ket, Yugh and other Yeniseian forms they are based on*

No.	Ket	Yugh	Kott	Proto-Yeniseian	PDY**
84	<i>hũ'n</i> , pl. <i>huutneŋ</i>	<i>fũ'n</i> , pl. <i>fuutmunŋ</i>		*xewnt > *fewnt 'wart'	~*xewnč
85	<i>ha's</i>	<i>feus</i>		*xewts > *fewts 'pile', 'hill', 'mound'	~*xewts 'pile', 'hill'
86	<i>hu's</i>	<i>fu's</i>		*xuws > *fuws 'mold'	~*xiws 'mold'
120	<i>-pi</i> 'pick berries'	<i>-fi</i> 'pick berries'	<i>-pî</i> 'pick berries'	*-pex 'pick' (in compounds)	~*pex 'pick / gather (for food)'
121	<i>-han</i> 'animate stands'	<i>-fun</i> 'animate stands'	<i>tîni(e)</i> 'standing' (prefix <i>t-</i> 'up' + action nominal suffix <i>-i(e)</i>)	*-pejn 'animate stands'	~*pejn 'animate stands'
122	<i>hũ'j</i>	<i>fũ'j</i>		*wujd() [sic] 'lower front abdomen'	~*wujd 'stomach', 'lower abdomen'

Table 5. (continued)

No.	Ket	Yugh	Kott	Proto-Yeniseian	PDY**
126	verb prefix <i>es-</i> ~ <i>us-</i> 'stretched', 'into open space', 'in many directions' <i>huussej</i> 'deep forest' (< *wes 'wild' + *sej 'place')		<i>fěštap</i> ~ <i>feštap</i> 'wolverine' (< <i>feš</i> 'wild' + <i>tap</i> 'dog')	*wes 'open space', 'spread wide', also 'sky', 'wild' (in the sense of 'beyond human habitation')	~*wes 'open space', 'spread'

* We give Vajda's items in their original transcription. A macron with a following $\cdot$ denotes the first tone, while an apostrophe marks the second tone. The third tone is unmarked except for the vowel being doubled and the fourth tone is marked by a grave accent on the vowel (Vajda 2022: 253, fn. 1). The vowel *u* equals *i*, and the vowel *x* equals *a* in Werner's transcription (cf. fn. 3 above).

** Vajda marks all Proto-Dene-Yeniseian reconstructions as approximations using ~.

A look at the table already suggests what the following discussion will show: that the Dene-Yeniseian hypothesis rests on *ad hoc* assumptions and complicated phonetic developments that meet a great – and in our view insurmountable – difficulty when attempting to reconcile them with the actual evidence and our observations regarding PY *p-. For instance, with regard to the plural forms of set 84, Vajda (2022: 367) assumes an unmotivated metathesis of *pūrnt and the plural suffix. Moreover, the relative chronology of *p as opposed to *x and later *f that is presupposed by the development PY *xewnt > *fewnt remains obscure. Either way, 84 is a problematic set since Werner (2002: vol. 1, 349) classifies the words as loanwords from Selkup *pen/pi:ni* 'wart', which makes it unlikely that they belong to the inherited vocabulary of a hypothetical Dene-Yeniseian proto-language.

Set 85 is hypothesised by Vajda to be featured in words for types of hills or piles as a final combining form, e.g., Ket *sizs*, Yugh *sifēs* 'small pile' (< *sig 'small particles' and *fews 'pile'). However, it seems that direct evidence for this set is indeed lacking: we have not been able to find the alleged Ket *hā's* and Yugh *feus* in any of the available dictionaries (Werner 2002; Kotorova & Nefedov 2015; Vajda & Werner 2022), so their existence is doubtful, and their projection onto words like Ket *sizs*, Yugh *sifēs* (on which cf. Werner 2002: vol. 2, 168, 205) remains problematic. Out of sets 84–86, this only leaves 86 which finds direct evidence in Ket and Yugh (cf. Werner 2002: vol. 1, 331) and seems unproblematic in as far as only the North Yeniseian languages are concerned. However, it lacks evidence from outside North Yeniseian (e.g., from Kott), so it can have no bearing on the reconstruction of Proto-Yeniseian. In light of these findings, it seems questionable for

Vajda (2022: 367) to assume a complex conditioned sound change of Proto-Dene-Yeniseian *xVw > PY *fVw to account for sets 84–86.

Set 120, which together with set 121 pertains to PY *p in word-internal position, shows a different reconstruction for a sound correspondence that is essentially the same as in the other examples. It is rather problematic that in this set Yugh *f* is alleged to correspond not to Ket *h* but to Ket *p*. Moreover, we were unable to locate either form in any of the dictionaries (Werner 2002; Kotorova & Nefedov 2015; Vajda & Werner 2022). The only words related to ‘picking’ that we could find were Ket *hítij* ‘Faulbaumbeeren sammeln’ (to collect alder buckthorn berries), *dahítijavet* ‘sie sammelt Faulbaumbeeren’ (she collects alder buckthorn berries) and Yugh *fícej* ‘Faulbaumbeeren sammeln’ (to collect alder buckthorn berries), *dafícejáget* ‘sie sammelt Faulbaumbeeren’ (she collects alder buckthorn berries; Werner 2002: vol. 1, 317; in light of Ket *ʼhi-*, Yugh *ʼfi* ‘bird cherry’, Ket *hítij*, Yugh *fícej* are perhaps better translated as ‘picking bird cherries’ as pointed out by one of the reviewers).

In theory, it is possible that the *p* in the Ket form is simply a mistake in Vajda’s (2022) publication, but it would be a rather striking one given the clear correspondence of Yugh *f* ~ Ket *h-*. Another word is mentioned together with set 120, namely Southern Ket *ëm* ‘flying squirrel’, which in the 18th century was recorded as *eemhi* by Müller. It is assumed that this is a compound consisting of *ĩm ‘pine nuts’ and *pex ‘picking’ and an additional head noun meaning ‘squirrel’ that was then elided (Vajda 2022: 384). Here, there is no *p* in the Ket form, which supports the assumption that the *p* in *-pi* is a mistake.

Finally, sets 122 and 126 are reconstructed with an initial *w even though they are very similar to the other sets. Set 126 shows two different reflexes of this hypothetical *w in Ket, one with initial *h-*, which is expected from this sound correspondence, and one without any initial consonant. It remains unclear how the two reflexes relate to each other.

Unfortunately, the older Yeniseian languages Arin, Pumpokol, Assan and Kott and the earlier records of Ket and Yugh have not consistently been consulted by Vajda (2022). For three of the seven sets, cognates in Kott are discussed, but sometimes there is evidence available from the 18th century sources that is missing in Vajda’s account, e.g., Assan *puj* ‘stomach’ and especially early Yugh *pij-* ‘stomach’, *pij-útem* ‘full after a meal’ for ‘abdomen’ in set 122 (cf. Tables 1 and 4 above; Werner 2002: vol. 1, 348). Without sufficient acknowledgement of all the relevant comparative evidence – especially from the oldest sources documenting the history of the Yeniseian language family – and mostly taking into account only the younger Ket and Yugh evidence, reconstructions such as the one in set 122 remain dubious. It is worth noting in this context that Vajda’s reconstructions are sometimes incoherent: the Proto-Yeniseian reconstruction featured in set 122 is once

given as *wujd() [sic] ‘lower front abdomen’ with *w- (Vajda 2022: 385) and once given as *pujd ‘lower front abdomen’ with the expected *p- (Vajda 2022: 269), and it remains unclear which of the alternatives Vajda prefers or how they relate to each other.¹⁴

As can be seen from Table 5, the PY reconstruction by Vajda (2022) assumes three different phonemes for the sound correspondence Ket *h-* ~ Yugh *f-*: PY *x (*xVw > *fVw), *p and *w. Leaving aside the correspondence based on non-initial sounds, we are still left with two possibilities, namely PY *x and *w. The situation is complicated further by the fact that forms with initial *w as well as *p are also reconstructed on the basis of proposed cognate sets involving forms with an initial *b-* or vowel in Ket, e.g., number 119 *pajn ‘water’, which is based on Ket *ba:nej* ‘sound of water splashing’, where *χej ‘sound’ has been added to ‘water’. It is then assumed that the voiceless onset of the word-element designating ‘sound’ caused “voicing rather than elision of anlaut *p” (Vajda 2022: 384). Further assumed cognates like Southern Ket *anbok* ~ *onbak* ‘wave’ (< *pajn ‘water’ + *bewgw ‘pull’), *oněj* ‘ebb tide’ [= ‘waves’] (< *pajn ‘wave’ + *Vŋ ‘plural suffix’) or Northern Ket *bajan*, 18th century Ket *bajeñ* ‘wave’ (< *bej ‘wind’ + *pajn ‘water’) show loss of *p. Another example is set 127, *wejs ‘moor to riverbank’, which is very similar to 126 from Table 5. This one is also based on a form with *b*, the Ket verb base *-bes* ‘moor to riverbank’, as well as forms without an initial consonant, namely the action nominal *ĩs* ‘mooring to shore’. The alleged difference here is that the form consists of *wejs ‘moor’ and the action nominal suffix *Vŋw, which is absorbed into the root. This leads to secondary first tone and elision of the original onset *w (Vajda 2022: 387).

All these examples illustrate that in justifying the Dene-Yeniseian hypothesis Vajda (2022) resorts to a multiplicity of *ad hoc* assumptions and complex conditioned sound changes. The latter, of course, are not suspicious *per se* and may very well be expected in the historical development of languages. However, a reconstruction should ideally suggest itself from the data that are used to establish it. Here, if one simply examines the actual comparative data from the Yeniseian lan-

14. In an earlier publication, Vajda (2010: 75–76) seems to have situated the reconstructed *w at the “Pre-Proto-Yeniseian” rather than at the Proto-Yeniseian level. This could theoretically allow for a better reconciliation of his reconstructions with the attested data, although the sound change Pre-Proto-Yeniseian *w > PY *p that one would have to assume in this case is typologically unusual in that it finds no parallel in other languages aside from contexts with clusters consisting of sibilant + w (cf. Kümmel 2007: 345–421). Pre-Proto-Yeniseian is of course a level that cannot be deduced from Yeniseian data alone but follows from the comparison with Na-Dene. Unless it can be derived from the comparison of Proto-Yeniseian and Proto-Na-Dene reliably and systematically, Pre-Proto-Yeniseian can thus not be used as a reliable tool to explain the Proto-Yeniseian state of affairs.

guages – especially from the older records – systematically, there is no reason to reconstruct more than one phoneme and, more importantly, anything else but PY *p- for correspondences involving Ket *h*- and Yugh *f*-. Our investigation has shown quite unambiguously that both Ket *h*- and Yugh *f*- developed from PY *p- unconditionally at a rather late point in their respective development: in Ket, word-initial *h*- corresponding to Yugh *f*- will not have developed before the 17th century, and in Yugh word-initial *f*- will not have evolved before the 18th century. Hence, there is no reason to reconstruct additional word-initial phonemes such as *x- or *f- to account for the evidence. Incidentally, S. Starostin (1982: 145–146), the advocate of the abovementioned Dene-Caucasian, also draws this obvious conclusion from his examination of the Yeniseian data and simply reconstructs word-initial PY *p-. It seems that the only reason for Vajda (2022) to posit complex conditioned sound changes to account for the Yeniseian evidence is that they make it easier to reconcile the Yeniseian data with the alleged cognates from the Na-Dene languages so that the Dene-Yeniseian hypothesis can be defended.

This is not how the Comparative Method ideally works in historical linguistics. Long-range comparison may, of course, inspire hypotheses on the genealogical affiliation of languages. However, as soon as one intends to go beyond mere hypothesis building and gain more profound, empirically reliable insights one will have to turn to short-range comparison. As the main objective of historical linguistics is to elucidate the diachronic development of individual languages, and the individual languages provide the most immediate and reliable empirical data for diachronic research, the direction of any methodologically sound investigation into the specific diachrony of a language or group of languages will be from a lower time depth to a greater time depth. That is, it will be from the individual languages to the proto-language of a small group of closely related languages first (such as Proto-North-Yeniseian or Proto-Germanic), then to the proto-language of a larger group of more distantly related languages (such as Proto-Yeniseian or Proto-Indo-European) and so forth. Proceeding from the opposite direction is risky since correspondences that might suggest themselves at the first glance can later turn out to be impossible once more is known about the phonological history of the respective languages.

Any serious attempt to elucidate the history of an individual language or group of languages will therefore start with short-range comparisons as presented in §2 above, and will then gradually proceed to longer-range comparisons if the short-range comparisons have led to a sufficiently clear picture of the historical development of the respective language or group of languages. This means that prior to seriously postulating the genetic affiliation of two language families such as Na-Dene and Yeniseian one should have enough – and more importantly empirically reliable – knowledge of the historical development of each of these

language families and their languages so that the respective proto-languages can be reconstructed with enough confidence to allow for the empirical substantiation of hypotheses concerning their connection with each other.

Unfortunately, this is neither the case with Yeniseian nor Na-Dene. While the reconstruction of Proto-Yeniseian has made some progress recently (cf. now Bonmann et al. 2023; earlier Werner 2005:188–224; Starostin 1982, 1995), the reconstruction is still not clear and reliable enough to allow for serious longer-range comparisons with other language families, especially ones that require as great a time depth as Dene-Yeniseian. The reconstruction of Proto-Na-Dene has similarly not advanced far enough. As Vajda (2022:326) notes, “[o]nly a few dozen tentative Proto-Na-Dene reconstructions have actually appeared in previous publications, mostly in Leer (2010)”, and Vajda’s new suggested reconstructions “must be regarded as even more tentative, especially given that some of them reference comparanda from Dene or Eyak alone.”¹⁵

From the point of view of the now established Comparative Method it is highly questionable to attempt a Proto-Dene-Yeniseian reconstruction when there is only a “tentative” reconstruction of one of the involved language families to begin with, especially since very few Na-Dene forms are listed by Vajda (2022) to support this tentative reconstruction. Vajda (2022:244) states that “an increasing body of comparative linguistic data supports the genealogical unity of Na-Dene and Yeniseian, though the totality of this evidence is still insufficient to conclusively demonstrate Dene-Yeniseian as a proven family”. We would tend to especially agree with the second part of this summary and conclude that, for the time being, the Dene-Yeniseian hypothesis cannot be maintained in its current form given the methodological and substantial flaws on which it builds.

In closing this article, we express our hope that future research into the history of Yeniseian, Na-Dene and other language families will focus on empirically reliable short-range investigations and comparisons rather than long-range speculation. Our investigation into the development of Ket *h*- and Yugh *f*- from PY **p*- and the absolute dating of the two processes PY **p*- > Ket *h*- and PY **p*- > Yugh *f*- in §2 has shown that even languages with a late and imperfect documentation such as Ket and Yugh can allow for empirically reliable inferences regarding their short-range historical development, as soon as evidence from a variety

15. With Athabaskan the situation is more fortunate than with Na-Dene. Especially noteworthy are the numerous publications by Jeff Leer, perhaps the most notable one being an etymological dictionary of Proto-Athabaskan available as scans of the original manuscript (Leer 1996). Other scholars who have worked on Athabaskan or Na-Dene in general include Michael E. Krauss (e.g., Krauss 1964, 1965 and Krauss & Leer 1981), Keren Rice (e.g., Rice 2000) and Andrej A. Kibrik (1993, 1996). See also Chapter 3 of Vajda (2022) for the most recent overview of reconstruction attempts in Proto-Na-Dene.

of areas relevant for language history such as historiography and lexicography is taken into account. It is to be expected that further such investigations into the Yeniseian, Na-Dene and other languages will lead to fruitful insights into their history that may some day allow for empirically sound long-range comparisons.

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Abbreviations/glossary

PDY Proto-Dene-Yeniseian

PY Proto-Yeniseian

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Résumé

Cet article vise à montrer comment la synthèse du matériel historiographique et lexicographique permet la datation absolue de changements phonétiques même dans des langues dont la documentation est tardive et imparfaite, et comment cette datation se rapporte aux hypothèses concernant l'appartenance généalogique la plus reculée de ces langues. Les langues étu-

diées ici sont le kète et le yug (yugh), qui appartiennent à la famille ienisseïenne et qui sont documentées depuis le XVIIIème siècle. On examinera deux changements phonétiques dans ces langues : le passage du phonème proto-Ienisseïen *p- à h- en kète, et du phonème proto-Ienisseïen *p- à f- en yug. On soutiendra que le processus en kète s'est accompli entre 1596/1607 et 1723 apr. J.-C., et que le processus en yug s'est accompli entre 1739 et 1846/1847 apr. J.-C. On discutera des implications de ces résultats pour l'hypothèse déné-ienisseïenne, selon laquelle les familles ienisseïenne et na-déné seraient apparentées au niveau génétique. On soutiendra que cette hypothèse est indéfendable et que des comparaisons portant sur des changements ayant eu lieu à date récente sont préférables à des spéculations remontant loin dans le passé.

Zusammenfassung

Der vorliegende Aufsatz versucht zu zeigen, wie die Zusammenschau historiographischen und lexikographischen Materials die absolute Datierung von Lautwandel selbst in Sprachen mit einer späten und unvollkommenen Dokumentation gestattet und wie diese Datierung sich zu Hypothesen über die genetische Verwandtschaft dieser Sprachen in einer großen Zeittiefe verhält. Gegenstand der Untersuchung bilden die beiden Sprachen Ketisch und Jugisch, die zur jenenisejischen Sprachfamilie gehören und seit dem 18. Jahrhundert dokumentiert sind. Es werden zwei Lautwandel in diesen Sprachen erörtert: urjenissejisch *p- > ketisch h- und urjenissejisch *p- > jugisch f-. Dabei wird gezeigt, dass der ketische Lautwandel zwischen 1596/1607 und 1723 n. Chr. und der jugische Lautwandel zwischen 1739 und 1846/1847 n. Chr. erfolgt sein muss. Ferner werden die mit diesen Feststellungen einhergehenden Implikationen für die déné-jenissejische Hypothese erwogen, die eine Urverwandtschaft der Familie der Jenissej-Sprachen mit der Familie der Na-Dené-Sprachen behauptet. Hier wird argumentiert, dass diese Hypothese nicht aufrechterhalten und Sprachvergleichen mit geringer Zeittiefe der Vorzug gegenüber Spekulationen mit großer Zeittiefe eingeräumt werden sollte.

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