Mother Tongue

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In Memory of Vladimir Antonovič Dybo (1931–2023)

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In Memoriam

Memories of Vladimir Antonovič Dybo (1931–2023)

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Vladimir Antonovič Dybo died at the impressive age of 92 years old on May 7, 2023. Since his academic career has already been well-described,[1] I will mainly concentrate on his younger years and on his ancestry. I would also like to add several personal memories of this exceptional man.

Vladimir A. Dybo was born on April 30, 1931 in the village of Pyrohivka (Пирогівка = Russian Пироговка) on the Desna River in the Sumskaja Region in the northernmost part of Ukraine. His father, Anton Timofeevič Dybo, was an employee of the railroad system, and during the Russian Civil War worked as an anti-communist political activist. Vladimir Dybo's ancestors in his father's line were Cossacks from Zaporižžja. His maternal grandmother originated from the Cossack community in the region of the Don, and his maternal grandfather was Polish.

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[1] <https://en.wikipedia.org/wiki/Vladimir_Dybo>.

When Vladimir Dybo was one-year-old, his family left Ukraine and moved from one small city to another. Dybo finished high school in the city of Pavlovo in the Region of Nižnegorodskaja, approximately 80 km from Nižnyj Novgorod (then called Gorkij). In 1949 he begun to study philology at the State University of Gorkij, but he was so disappointed by the dogmatic application of Marrism[2] in linguistics there that he seriously considered changing his major to physics. Fortunately, in 1950, Marrism was rejected by Stalin himself (thanks to the arguments of another Georgian, Arno Čikobava), and a standard linguistics curriculum could again be taught in the Soviet Union.

Dybo graduated from the Department of Russian language and Literature of the Faculty of History and Philology of the State University of Gorkij in 1954. He then found employment as a teacher of Russian language and literature at a school for working youth in the city of Krasnogorsk, in the Zvenigovskij District of the Mari Autonomous Soviet Socialist Republic. For him it was a welcome opportunity to learn the Mari and Mordva languages.

During that period he independently recognized a relationship between the Indo-European and Uralic languages, though he was not yet familiar with the Nostratic hypothesis. Even in the remote region of Krasnogorsk, thanks to an inter-library service, Vladimir Dybo could study the most recent publications in the field of comparative linguistics. He became very interested in the laryngeal theory, which by then had been formulated by scholars in several different versions and applied to the Indo-European protolanguage.

Because he did not personally know anyone with whom he could discuss these subjects, he eventually wrote a letter describing his observations to Vjačeslav Vsevolodovič Ivanov[3] in Moscow, a new authority in the field of linguistics as it had been resuscitated after the fall of Marrism. After their intensive correspondence V.V. Ivanov invited Dybo to enroll in a postgraduate program at the Department of Common and Comparative Linguistics of the Faculty of Philology of Moscow State University in 1955.

In 1958 he was employed at the Institute for Slavic Studies of the USSR Academy of Sciences. In this position he was joined by his younger colleague, the slavicist Vladislav Markovič Illič-Svityč, who was also a native of Ukraine (born in Kyev, Sept 12, 1934). In his paternal line, Illič-Svityč was the descendant of Polish aristocracy, and of Polish Jewish intellectuals in the maternal line.

Dybo´s wife Valeria Čurganova (1931-1998) was also a linguist. When their daughter Anna Dybo was born in 1959, it became necessary to solve the critical problem of finding housing for the growing family. Since neither were residents of Moscow, and lacking any support from the Communist Party, they could not get a flat anywhere in the capital. Consequently, Vladimir Dybo and his friend Vladislav Illič-Svityč became members of the Flat-building cooperative (Жилищно-строительный кооператив) newly introduced by Nikita Xruščev in the USSR. They began to build their individual flats in the satellite city of Mytišči, situated about 20 km from Moscow.

By then the two were already close collaborators, their common focus being Slavic and Baltic accentology. Vladimir A. Dybo defended his Ph.D. thesis 'The problem of correlation of two

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Balto-Slavic series of accentual correspondences in a verb'[4] on May 10, 1962. Vladislav M. Illič-Svityč published his first monograph *Именная акцентуация в балтийском и славянском. Судьба акцентуационных парадигм* in 1963.[5] This monograph developed into the dissertation that he defended in January 1964, which was then published in 1979 under the English translation, 'Nominal Accentuation in Baltic and Slavic.'[6]

Already in 1961 Dybo had published one brilliant study, explaining the phenomenon of the shortening of expected long vowels in Germanic, Celtic and Italic in a wider context of Indo-European accentology. Illič-Svityč (1962) supported his solution, offering some small modifications. Vladimir A. Dybo and Vladislav M. Illič-Svityč became co-founders of the modern Moscow accentological school. It is important to stress that their results became known in the West especially thanks to Frederik Kortlandt (1975).

In the first half of the 1960's Illič-Svityč drew his attention to the so-called Nostratic hypothesis, first intuitively formulated (and named) in 1903 by the Danish scholar Holger Pedersen. Illič-Svityč was convinced that there existed a distant genetic relationship between six language families of the Old World: Afroasiatic, Kartvelian, Indo-European, Uralic, Dravidian and Altaic. Today Afroasiatic and Altaic would be considered macrofamilies.

In order to reconstruct the common protolanguage of these six language families, he applied the classical comparative method. This involved the formulation of regular phonetic correspondences between the already reconstructed daughter protolanguages. His larger ambition was to reconstruct the Nostratic protolanguage, not only in its phonetic inventory but also in its morphology and lexicon. Illič-Svityč began mapping the phonetic correspondences between the languages and, in parallel, collecting the lexical comparanda and formulating Proto-Nostratic reconstructions. On all important questions he consulted with his colleague and neighbor Vladimir Dybo. After 1964 these consultations also included a new member of the Nostratic club, the (originally) romanist, Aaron Borisovič Dolgopoľskij[7].

When Vladislav M. Illič-Svityč tragically died on August 22, 1966, he was not yet 32 years old and was several months short of finishing the construction of his flat in Mytišči. He had more or less completed his formulations of the phonetic correspondences between the reconstructed daughter protolanguages and a determination of the Proto-Nostratic phonetic inventory (Illič-Svityč 1968). These were established on the basis of more than 600 lexical correspondences, as those were described in an article published posthumously in a very abbreviated form (Illič-Svityč 1967).

After the death of Illič-Svityč, Vladimir Dybo dropped his accentological research and decided to finish *Nostratic Comparative Dictionary*, the *magnum opus* of his deceased friend. Over the course of five years, based on data from within a partial manuscript listing a number of individual entries, and from vast comparative material found in numerous files, Dybo was able to

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[4] *Проблема соотношения двух балто-славянских рядов акцентных соответствий в глаголе.*
[5] Moskva: Izdateľstvo Akademii nauk SSSR, 1963.
[6] Translated by R. L. Leed and R. F. Feldstein. Cambridge (MA.) – London: MIT Press, 1979.
[7] See Blažek 2009. Hereinafter, only the form Dolgopolsky will be used.

prepare the first volume (Illič-Svityč 1971) for publication. This consisted of an introduction and a listing of 245 reconstructed Nostratic lexemes or morphemes with full documentation and references. As far as I know, the physical publication of this first volume of the *Nostratic Comparative Dictionary* was possible only thanks to the significant financial support of Vladimir Dybo himself from his personal family budget.

Having closely colaborated with Illič-Svityč when he was preparing the manuscript of his Nostratic Dictionary, Vladimir Dybo had the full right to be an acknowledged co-author of this monograph. With one exception where he reveals his authorship (the tables of phonetic correspondences on pp. 146-171), he remains hidden under the designation *redactor*.

The second volume, published five years later (Illič-Svityč 1976), consists of 108 new entries that were prepared by Illič-Svityč. Some of them were more or less in a definitive form, others only in the form of notes. Although the main editorial work was made again by Vladimir Dybo, now he could cooperate with other colleagues. First among these was Aaron Dolgopolsky, who had originally collaborated with Illič-Svityč himself.

After the death of Illič-Svityč, Vladimir Dybo and Aaron Dolgopolsky founded an informal discussion group called the Nostratic Seminar. There they presented ideas related to distant relationships between language families and discussed the possibilities of applying the classical comparative method to such research. Over the span of several years the Nostratic Seminar became very popular and generated a new direction in comparative linguistics called the Moscow school of comparative linguistics. Among this group appear representatives of a younger generation including: Evgenij Xelimskij (Eugene Helimski), Sergej Starostin, Alexander Militarev, Olga Stolbova, Viktor Porxomovskij, Vladimir Orel, Ilja Pejros, Oleg Mudrak, Anna Dybo, Jakov Testelec and many others. Most of them cooperated with Vladimir Dybo on the preparation of the second volume (Illič-Svityč 1976), and especially the third volume (Illič-Svityč 1984), which proposed 25 new Nostratic lexemes reconstructed on the basis of the notes and files of Illič-Svityč.

Meanwhile, one important change occurred: In 1976 Aaron Dolgopolsky legally emigrated from the USSR to Israel. But thanks to the efforts of Vladimir A. Dybo[8] the Nostratic Seminar would continue to persue its main subject of interest: the discovery of the details concerning the distant relationships among language families. This investigation became supported thanks to a diplomatic masterpiece acheived by Vjačeslav V. Ivanov, who convinced the academic and political organs that without this study it was impossible to develop a system of artificial intelligence. The seminar continued (and continues up to the present time, now under a leadership of Mixail Živlov), most frequently meeting in the flats of its members. The reason for this was that academic institutions had to be closed at 9:00 PM, but participants of the seminar at that time were frequently in the middle of very vigorous discussions, and they did not want to stop early.

In March, 1985, I visited Moscow for the first time, as a member of an organized group of tourists. Already by that time I had been in correspondence with Alexander Militarev. I informed

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[8] It should be mentioned that Vladimir Dybo, although apolitical, had some sins from the point of view of the Communist party of the USSR: he openly supported dissidents or expressed his protest against the Soviet occupation of Czechoslovakia in August 1968.

him about my visit and he invited me for a personal meeting with him and Sergej Starostin in the building of the Oriental Institute where they both were employed at that time. It was a short, but very hearty meeting, and it turned out to be the prelude to another much more important meeting: For later that evening Alexander and Sergej invited me and my wife to participate in the Nostratic Seminar.

At that time the meetings were held in the flat of Anna Dybo, the daughter of Vladimir Dybo, and her then husband, Sergej Krylov. It should be noted that Anna and Sergej, although divorced a long time ago, still actively colaborate in matters of comparative linguistics. I still remember quite clearly that Sergej Starostin gave a lecture that evening about one sub-group of the Sino-Tibetan languages (Khaling?). Also attending were: Alexander Militarev, Evgenij Xelimskij (Eugene Helimski), Ilja Pejros, Olga Stolbova, Sergej Nikolaev, Oleg Mudrak, and, naturally the pair of hosts, Anna Dybo and Sergej Krylov.

Among all the others was the founder of the Nostratic Seminar, Anna's father, Vladimir A. Dybo. Although he was only 54 in 1985, he had the look of a biblical patriarch: long white hair and a long white beard, somewhat resembling the novelist Lev Nikolaevič Tolstoj.

I subsequently saw Vladimir Dybo during one accentological conference[9] held in Opava (Czech Republic) in 2009. But the last time we met was during a conference (held via Zoom[10]) that was organized to celebrate his 90th birthday (April 2021) where his appearance was exactly the same. In the second half of the 1980's, when the process of thawing in the Cold War increased, I had an occasion to visit Moscow every year during the period 1985-1990. I had met with Vladimir Dybo every year during that time.

But for me the most important meeting was realized during the conference[11] organized by Vitaly Shevoroshkin, a former student of Vladimir Dybo, at Michigan University at Ann Arbor in November 1988. The reason for this was that Vladimir Dybo gave me the first volume of the Nostratic Comparative Dictionary (Illič-Svityč 1971). This volume was absolutely unavailable, unlike the following volumes, which I had a chance to buy in Moscow in 1985 or later. Naturally, without the first volume it was impossible to work in the field of distant relationships of language families. My solution was that in 1973 I borrowed the book from the University Library in Prague and rewrote the whole comparative lexicon, approximately 200 pages, by hand into a big excercise book. The hand-written copy of the second volume followed in 1977. It was in this form that I used the second volume up until 1985 and the first volume even until 1988, when I could finally replace them with the published books.

When Anna Dybo divorced, she returned to her father´s home in Mytišči. She invited me for a dinner two or three times (2000, 2004, 2008?). It was always a good occasion for linguistic discussion not only with her, but also with her father, Vladimir A. Dybo, on the place with its

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[9] The Fifth International Workshop on Balto-Slavic Accentology.
[10] Simpozium „Balto-slavjanskaja komparatistika. Akcentologija. Daľnee rodstvo jazykov", posvjaščennyj 90-letnemu jubileju akademika RAN Vladimiru Antonoviču Dybo (Apr 27-28, 2021).
[11] First International Interdisciplinary Symposium on Language and Prehistory (Nov 8-12, 1988).

genius loci, where the Nostratic hypothesis was resuscitated and had evolved into a regular scientific discipline.

<div align="right">Authorised by Anna Dybo on Aug 26, 2023</div>

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MEMORIES OF RAIMO AULIS ANTTILA (1935–2023)

ANGELA DELLA VOLPE

Raimo Aulis Anttila (1935-2023) Professor Emeritus of Indo-European Linguistics at the University of California, Los Angeles (UCLA) was an internationally recognized authority in the field of Historical Comparative Linguistics for both Finno-Ugric and Indo-European Languages.

A PhD from Yale University (1966), prior to joining UCLA (1976), he had held a teaching post in Comparative Linguistics at the University of Helsinki (1971-76), and at various times, was Visiting Professor in that field at other European Universities. Along with two other notable colleagues, Professor Anttila was co-founder of *The Journal of Indo-European Studies*, and served on the editorial board of several other Linguistics Journals.

Professor Anttila was a meticulous scholar with broad expertise of multiple languages and their historical development into their present-day status. He was a meticulous scholar with an in-depth grasp of the complexities of grammars and a profound command of the mechanisms of language change such as the interrelationship between languages and cultures, the mechanisms at play in the processes of Borrowing, particularly through language contact, and the influence of Analogy. He was particularly cognizant of the effect of analogical factors on the linguistic sign and its subsequent evolution (*Analogy*. The Hague: Mouton de Gruyter. 1977.)

Beyond Semiotics, Professor Anttila was a first-rate philologist who firmly believed in the primacy of the historical context while pursuing studies in Comparative Historical Linguistics (see his article entitled "Change and metatheory at the beginning of the 1990s: the primacy of history." In Charles Jones, ed., *Historical linguistics: perspectives and problems*, pp. 43-73. London. Longman. 1993.

Professor Anttila's depth and breadth of knowledge was further coupled with a keen interest in philosophy and cognition as these areas transpired through the mechanisms of language change and internal reconstruction methods; (witness his article entitled "Field theory of meaning and semantic change." In G. Kellermann and M. Morrissey, eds., *Diachrony within synchrony: language history and cognition*, pp. 23-83. Duisburger Arbeiten zur Sprach- und Kulturwissenschaft 14. Frankfurt. Peter Lang. 1992.)

His broad interest in various academic areas is further clearly seen in numerous additional publications. But perhaps, at least for me, his most impactful publication, and arguably most widespread publication, was that of *An Introduction to Historical and Comparative Linguistics 1972*.

As a student in Linguistics at California State University, Fullerton I took the Historical and Comparative Linguistics course that required as its main textbook *An Introduction to Historical and Comparative Linguistics 1972 by Raimo Anttila*. I was hooked. I applied to UCLA's doctoral program in Indo-European Studies and in the fall of 1980, and also for the first time, I came face to face with the author of the notorious "black book."

During my tenure as a PhD student at UCLA, and later on as a colleague, Professor Anttila was the perfect mentor. He was a teacher, counselor, and advisor. For instance, he worked with

me on several drafts of my first paper to make it a publishable work in a peer-reviewed journal. He was always available for consultation, whether it was about which materials to access for a project, a paper, or a lesson, or it was about which hacks would have helped a student memorize Proto-Indo-European noun and verb classes or the lengthy list of Proto-Indo-European personal pronouns.

He was always very generous with his time. On one occasion, when the aftermath of winter flooding impelled the other three students in the class to drop out, Professor Anttila continued to hold class with me as the sole student rather than cancel it, knowing that a cancellation would have caused undue hardship on my strict timeline towards graduation. Additionally, during that same winter, those rains often made me late for class. Yet, Professor Anttila continued undeterred to hold class, often waiting more than several minutes for me to get to the classroom located across campus. When I entered, he would get up from behind the desk and start his lecture, filling the blackboard with many examples aimed at reinforcing the outline I had found placed by him on my desk. Those handouts were the same ones I used in my subsequent 40 years plus of teaching Comparative Historical Linguistics.

Professor Anttila had also a great but sometime quirky sense of humor, often regaling a gathering of students with a joke that invariably held a linguistics underpinning to the punch line. He was patient, supportive and inspiring. He had a passion for pushing the boundaries of learning but above all, he had a great love for his hometown in Finland. That love was superseded only by his loyalty towards his students as when he gave up his usual summer vacation in his beloved Turku to help me prepare for my Greek final exam. He was always demanding but always fair and always, always gracious.

Requiescat in pace Professor Anttila. You are greatly missed.

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IN MEMORY OF RAIMO AULIS ANTTILA (1935–2023)

SHEILA EMBLETON

Raimo Aulis Anttila was born in Lieto, near Turku, Finland, on April 21, 1935. He was born in the sauna on his mother's family's farm, and took pride in his strong roots in southwestern Finland. Apart from spending some time as a war child in Swedish Lapland, where he became comfortable speaking Swedish and witnessed Saami culture and reindeer-herding practice first-hand, he grew up in Turku, attending school and then the University of Turku. There he studied English, German, Latin, and Greek, writing a thesis on the Towneley mystery plays of the late Middle Ages.

The next stop on his academic journey was a year at the University of Toronto, studying English and Linguistics, and then to Yale University in New Haven, to study Linguistics (under such luminaries as Bernard Bloch and Isidore Dyen) and Indo-European under Warren Cowgill, who supervised his 1966 dissertation on *Proto-Indo-European Schwebeablaut*. In 1965, Anttila moved to the Linguistics Department at UCLA, also participating in the interdepartmental program in Indo-European.

Apart from a brief period as inaugural Professor of General Linguistics at the University of Helsinki from 1972-74, he remained at UCLA until his retirement over 40 years later. He became a member of the Academy of Finland in 1995. In 2018, he moved permanently back to Turku, after many years of typically spending part of the year in Finland and part in California. He died in Turku on January 27, 2023, after a period of declining health. Many times he told me that if he ever wrote his autobiography, he would call it "From Tintown to Tinseltown", since the part of Turku where he grew up (and later retired to) was Pläkkikaupunki "tin town" and Hollywood, not far from Santa Monica where he lived, is popularly known as Tinseltown.

In such a short note, it is impossible to do justice to the full range of his research and publications. He covered so many areas – Indo-European, Finno-Ugric, morphology (especially analogy), historical linguistics, etymology, Peircean semiotics – and had good command of many languages (sometimes dialectal knowledge too) – Finnish, Swedish, German, English, Russian, French, Spanish, Italian, Estonian, some Modern Greek, besides ancient languages Latin, Ancient Greek, and Sanskrit. He was well read in cultural history, archaeology, philosophy, literature, and the humanities more generally, so that he often could draw connections where others couldn't. His analyses and use of evidence were rigorous.

He always had an open-mind, open to the evidence and working hypotheses, which probably was why he was more open than most linguists to "long distance relationships", and his relationship with numerous then-Soviet linguists from the late 1980s meant he was knowledgeable about their work. As but some examples of the broad range of his published research outside of his core areas, he published on Finnish affective vocabulary, the origin of the name *Suomi* (with me), Saami dialects, the Finnish outer local cases (with Eeva Uotila), spoonerisms, Cockney Rhyming Slang (with me), and the translation of names in *Astérix* (with Wolfgang Ahrens and myself). At least initially, many people (including me) learned their historical linguistics from his 1972 *Introduction*

to Historical and Comparative Linguistics (Macmillan) or its updated 1989 version, *Historical and Comparative Linguistics* (John Benjamins). He wrote this textbook/handbook at a fairly young age, which (as he told it) meant that many people who later met him, having only encountered his book, were surprised to find out he was still alive.

Anttila was modest, unassuming, principled, enjoyed reading, classical music, a good bottle of wine, and was most at home in nature—whether in California, Canada, Finland, or many of the other countries he visited. He will be missed by dear friends and colleagues, including those he mentored, around the world. Rest in peace, Raimo!

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IN MEMORY OF VICTOR GOLLA (1939–2021)

JOHN D. BENGTSON

Victor Golla (1939–2021) was widely acknowledged as a leading authority on Native American languages, in particular those currently or formerly spoken in California and Oregon, including languages of the Athabaskan family. He earned his PhD degree at UC Berkeley in 1970 under the supervision of the distinguished Mary R. Haas. Golla wrote numerous journal articles and book chapters, authored a practical grammar (1986) and dictionary (2nd ed. 1996) of Hupa, as well as the book *California Indian Languages* (2011), and edited or co-edited *Northern California Text*s (1978). He also made an important historical contribution with his (1984) book *The Sapir-Kroeber Correspondence. Letters between Edward Sapir and A. L. Kroeber, 1905-1925*.

It may seem peculiar to some MT readers that we are eulogizing Golla, whom some have seen as an opponent of long-range historical linguistics, and specifically of Joseph H. Greenberg's Amerind hypothesis and book *Language in the Americas* (LIA: 1987). Golla's first review of LIA (1987) was quite positive, but his second review (1988) was much more negative.[12]

One important motivation for this memorial is the role Golla played in the development of my thinking about the "Sino-Dene" hypothesis, originally proposed by Edward Sapir in 1920. As reported by Golla (1984: 350), Sapir wrote to Kroeber "Do not think me an ass if I am seriously entertaining the idea of an old Indo-Chinese offshoot into N.W. America." Sapir, however, never published any grammatical or lexical evidence for this hypothesis. Another scholar, Sino-Tibetanist Robert Shafer (1952, 1957, 1969) did later publish several articles linking Athabaskan and Sino-Tibetan.

ACT I: Being curious about these circumstances, I decided to investigate the reasons why Sapir did not publish the evidence. Kaye (1992: 280) tried to claim that Sapir had been "led astray" into Sino-Dene because he did not know how to deal with the probability of accidental resemblances. Krauss (1973: 963–964) likewise considered Sino-Dene (as well as other hypotheses for the remote relations of Na-Dene) "purely speculative," and claimed that "Sapir was in fact clearly

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[12] "Victor Golla, after first endorsing the accuracy and usefulness of Greenberg's book, changed his mind a year later, for reasons unknown. In a thoroughly negative review Golla concluded that '[v]ery little of this [Greenberg's classification] will be taken seriously by most scholars in the field …primarily because Greenberg's proposed etymologies do not observe regular phonological correspondences" (Ruhlen 1994: 115).

carried far beyond any objectively justifiable conclusions by his enthusiasm for the idea." These and other claims are rebutted in great detail in my 1994 article (pp. 210–214). Nevertheless, Kaye was probably right about the supposition that Sapir's mentor, Franz Boas, "who did not even accept Na-Dene, would have been 'angered and shocked' to see Sino-Dene in print." The conclusions from this investigation of mine were published in my 1994 article in Anthropological Science, in which I quoted Golla's opinion (1991: 138) that "the [Sino-Dene] connection is ... a plausible one, both on linguistic and anthropological grounds."

ACT II: George Starostin and I attended the Athabaskan Languages Conference at UC Berkeley in 2009. Both of us presented papers in which we expressed our common agreement that "Dene-Yeniseian" was not a taxonomically valid family or sub-family, because the Yeniseian family is more closely related to the small Burushic family (Hunza, Nager, Yasin dialects) and Na-Dene is more closely related to the large Sino-Tibetan (or Tibeto-Burman) family, than either component of "Dene-Yeniseian" is to the other. Thus, in our taxonomy the components are as follows (Bengtson & Starostin 2015: 5):

A. 'Sino-Dene' or 'Eastern Dene-Sino-Caucasian'
A.1. Sino-Tibetan (= Tibeto-Burman)
A.2. Na-Dene (Tlingit-Eyak-Athabaskan)[13]
B. 'Western Dene-Sino-Caucasian'
B.1. Yeniseian + Burushaski (Burusho-Yeniseian)
B.2. North Caucasian + Basque (Euskaro-Caucasian or Vasco-Caucasian)

My presentation was in the form of a PowerPoint, "Dene-Yeniseian" and "Dene-Caucasian," currently available at Academia.edu. Again, it cited Golla's opinion that "the [Sino-Dene] connection is ... a plausible one, both on linguistic and anthropological grounds." Golla was in the audience for my presentation (July 11, 2009).

ACT III: My presentation and its discussion time were followed by dinner. When I sat down I was pleasantly surprised that Victor Golla sat with me. His manner was very cordial, and he began with a narrative about the Pueblo Revolt of 1680. This was the only successful Native uprising against a colonizing power in North America. It kept the Spanish out of New Mexico for 12 years and established a different power dynamic upon their return. Victor stressed that the Athabaskan languages, and specifically the Apachean languages, are remarkably resistant to borrowing from European and other surrounding languages. This was so even though, in the case of the Pueblo Revolt, there was significant genetic admixture between Apachean and Amerind groups when the Pueblo populations took refuge with neighboring tribes.

Historic records document that during the formation of the historic Navajo population, large numbers of Pueblo refugees were absorbed into Navajo populations during the Pueblo Revolt of the 1680s ... the significant difference in haplogroup frequencies between the Apache and Navajo is the result of a large amount of admixture with different Southwest groups. Specifically, the

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[13] For some, like Jürgen Pinnow and Dell Hymes, also including Haida.

Apache admixed with Yuman and Piman groups, while the Navajo admixed with Pueblo groups (Malhi, et al. 2003).

Finally, Victor broached the topic of the plausibility of Sino-Dene, and his opinion which I had quoted several times over the past two decades. Victor reiterated that he intuitively felt that Sino-Dene was probably correct but that it may not be 'provable' by traditional historical linguistic methods. So there remains a gulf between linguists who seek absolute 'proof' of a hypothesis, and myself and others who favor a 'best explanation' approach as more compatible with general scientific methodology (Bengtson 2008; Fleming 1994; Ruhlen 1994; Greenberg 1995; Vajda 1999; Newman 2000; Fleming 2008a; etc.).

Nevertheless, it was a pleasure and highlight of the conference for me to have this cordial conversation and settlement, of sorts, with Victor Golla.

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[14] My 1994 article is accessible on ResearchGate and Academia.edu. Thanks to Kenichi Aoki and the late Merritt Ruhlen for their help in preparing the article.

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IN MEMORY OF ROBERT BLUST (1940–2022)

PETER NORQUEST

Robert A. Blust (https://blusthawaii.wixsite.com/blust) passed away on January 5, 2022 in Honolulu, Hawaii at the age of 81 after a 13-year battle with cancer. Born in Cincinnati, Ohio in 1940, he was first and foremost a historical linguist who specialized in the Austronesian language family, which represents nearly 20% of the world's languages and extends more than halfway around the globe. He earned a B.A. in Anthropology followed by a Ph.D. in Linguistics in 1974 at UH Mānoa, after which he held positions at the Australian National University and the University of Leiden. He returned to the UH Mānoa in 1984 where he then spent most of his remaining academic career.

As part of his field work, Blust collected data on 100 Austronesian languages spoken in locations such as Sarawak (1971), the Admiralty Islands (1975), and Taiwan (1994-1999). Building on previous work by scholars such as Isidore Dyen, Otto Dahl, Paul Jen-kuei Li, and Shigeru Tsuchida, Blust proposed the widely-accepted theory that Taiwan was the homeland of the Austronesian family – from where the Austronesian people expanded to such remote places as Madagascar, Hawai'i, and New Zealand.

Soon after his first trip to Taiwan in 1994, Blust began conducting primary fieldwork on Formosan languages such as Thao, Kavalan, Pazeh, Amis, Paiwan, and Saisiyat. His dictionary of the highly-endangered Thao language (2003), at 1,106 pages and with more than 13,000 entries and sub-entries, is one of the most complete ever compiled for a Formosan language. He also worked with the last fluent speaker of Pazeh during the same period and published a series of works on Thao, Pazeh, and the genetic and contact relationships of the Formosan languages.

Blust served as the review editor for *Oceanic Linguistics*, an academic journal focused on the Austronesian languages, until 2018. His comprehensive 9,000-page online *Austronesian Comparative Dictionary* (www.trussel2.com/ACD > acd.clld.org) is the largest research project ever undertaken on Austronesian languages. His well-known 2009/2013 book *The Austronesian Languages* was the first single-authored book to cover all aspects (phonology, morphology, syntax, sound change, classification, etc.) of the Austronesian language family in its entirety and is one of the largest single-authored projects in the history of linguistics. He also published a workbook (2018) on historical linguistics for the general linguistics public. Other publications include over 230 articles, reviews, etc. in anthropology, archaeology, and linguistics journals.

Blust had a strong research interest in both linguistic and cultural aspects of rainbows and dragons; one of his last publications, *The Dragon and the Rainbow* (brill.com/display/title/68234) articulated his theory of the origin of dragons.

Blust made three contributions during the '90s to *Mother Tongue*:

Mother Tongue Newsletter 19 (Spring 1993)
https://www.mother-tongue-journal.org/LR/MTN19.pdf
Robert Blust on Austronesian and Its External Relations (p. 19)

Mother Tongue Journal, Issue 1 (December 1995)

https://www.mother-tongue-journal.org/MT/mt1.pdf

The Emergence of Homo Sapiens and His Languages in Tropical Asia by Wilfried W. Schuhmacher, Juan R. Francisco, and F. Seto - Reviewed by Robert Blust (p. 217-18)

Mother Tongue Journal, Issue V (December 1999)

https://www.mother-tongue-journal.org/MT/mt5.pdf

The Austric Denti-Alveolar Sibilants: Comments by Robert Blust (p. 19-22)

ANDAMANESE LANGUAGES: LEXICOSTATISTIC COMPARISON

VÁCLAV BLAŽEK

MASARYK UNIVERSITY

Dedicated to Michael Witzel on his 80th birthday (18th July, 2023)

The purpose of the present contribution is to study several topics: A. Mutual relations of the individual Andamanese languages. B. The relationship between Onge-Jarawa and Great Andamanese. C. Chronological estimations regarding the disintegration of the various groupings' respective ancestral languages.

Table 1: South Andaman & Middle Andaman languages

gloss	Bea	Bea	Bale	Puchikwar	Juwoi	Kol	Kede
	Portman 1887	**Portman 1898**	**Portman 1898**	**Portman 1898**	**Portman 1898**	**Portman 1898**	**Portman 1887**
1 all₁	*árduru-da*	*ára-dúru-da*	*ár-díri*	*ár-díre-da*		*á-díri-che*	
1 all₂					*ne-chápar-lekíle*		
1 all₃							*nírpól*
2 ashes₁	*ítérí-da*					*át-ter-béak-le*	
2 ashes₂		*ig-búg-da*	*id-búk*	*ír-bé-da*	*ré-péak-lekíle*	*át-ter-béak-le*	
2 ashes₃							*yír pát*
3 bark₁	*ot aij-da*	*ót-āīch-da*	*ót-kāīch*	*āūte-kāīch-da*	*āūto-kāīč-lekíle*	*āūto-kāīch-che*	
3 bark₂							*ot kápo*
4 belly₁	*jódo-da*	*jāūdo*	*jodo*	*chúte-da*	*chúte-lekíle*	*chúte-che*	
4 belly₂							*é píl lu*
5 big₁	*chánag-da*				*cháki-lekíle*		
5 big₂		*dóga-da*		*dúrnga-da*		*durnga-che*	
5 big₃		*bódia*					
5 big₄			*kóchu*				
5 big₅							*ér kuro*
6 bird₁	*chula-da*	*chúla-da*	*chúla*	*chòla-da*		*chúlà-che*	
6 bird₂					*tāūmatàp-lekíle*		*joé tupá*
7 bite₁	*chápíké*	*chápi*					
7 bite₂			*koárop*				
7 bite₃				*pé*	*péakà*	*péaka*	*tóng ab pío*
8 black₁	*putung ája*	*pútungāīj-da*	*pútungāīj*				
8 black₂				*dírak-da*	*dírak-lekíle*	*dírak-che*	*ír dírim*
9 blood₁	*té-da*	*téi-da*	*té*	*téwa-da*	*téwa-lekíle*	*téwa-che*	*té yí*
10 bone₁	*tá-da*	*tá-da*	*tóá*	*tāū-da*	*tāū-lekíle*	*tāū-che*	*é tu wé*
11 breast₁	*ot kuk-da*	*kúk-da*	*kúk*				
11 breast₂		*kám-da*	*koám*	*kāūme-da*	*kāūme-lekíle*	*káme-che*	
11 breast₃				*óte-pá-da*	*pok-lekíle*	*pok-che*	*ot páda bé*
12 burn₁	*jói ké*	*jói-da*	*jói*	*chú*	*chú*	*chú*	*te chuá*

gloss	Bea	Bea	Bale	Puchikwar	Juwoi	Kol	Kede
	Portman 1887	Portman 1898	Portman 1898	Portman 1898	Portman 1898	Portman 1898	Portman 1887
12 burn₂		*púgat*	*púgat*	*bí*	*bíka*	*bík-ak*	
13 claw₁ (fingernail)	*bódo* la	*bāūdo-da*	*bāūdo-da*	*púte-da*	*púte-lekíle*	*ón-púte-che*	
13 claw₂		*pág-da*	*poág*				
13 claw₃				*tāū-da*	*tāūk-lekíle*	*tok*	
13 claw₄							*meil*
14 cloud₁	*tówía-da*	*tówia-da*	*tāūwia-da*	*tāūwia-da*	*tāūwiyà-lekíle*	*tāūwia-chè*	*taó*
15 cold₁	*chókí-da*	*chóki-da*					
15 cold₂			*yélam*		*jelúm-lekíle*		*julum*
15 cold₃				*térem-da*		*t'rem-che*	
16 come₁		*on*	*āūn*	*úne*	*ónè*	*úne*	
16 come!₂	*kaitch* ké	*kāīch*	*kélé*				*kíe* té pal lé
16 come!₃				*í*	*é-í*	*í*	
17 die₁	*óko línga* ké	*óko-lí*	*āūko-lí*				
17 die₂				*óm-píl*	*am-píl*	*óm-píl*	*empíl* kan
18 dog₁	*bíbí-da*	Ø	Ø	Ø	Ø	Ø	*bíbí* ye
19 drink₁	*wélij* ké	*wélij*	*wélij*				
19 drink₂				*pāī*	*pōī*	*pāī*	
19 drink₃							*tó ku*
20 dry₁	*ér ré*	*'á ér-ré*					
20 dry₂			*'óng-kóyo-nga*	*'óng-kór-nga*		*ke-kàr-an*	
20 dry₃					*'āūto-poāī-chíkan*		
20 dry₄							*jéwu*
21 ear₁	*ik-poko-da*	*ik-póko-da*	*id-poku*	*ír-bó-da*	*ré-bāūkāū-lekíle*	*er-bóke-che*	*ér bu*
22 earth₁	*gara-da*	*gara-da*	*goára-da*				
22 earth₂				*pér-da*	*pàkar-lekíle*	*péakar-che*	
22 earth₃							*puáh*
23 eat₁	*mék* ké	*mék*	*mé*	*táme*	*támè*	*támak*	
23 eat₂							*to jó*
24 egg₁	*mólo-da*	*ár-māūlo-da*	*ár-māūlāīch*	*ár-mǔle-da*	*rá-múle-lekíle*	*tá-múle-che*	*mulo*
25 eye₁	*ídál-da*	*í-dal-da*	*í-dal*				*er tól*
25 eye₂				*ír-kāūdek-da*	*ré-kāūdak-lekíle*	*ér-kāūdak-che*	
26 fat₁		*álachír-da*	*jíri-da*				ᴿ*cīru*
26 fat₂				*lóne-da*	*lóne-lekíle*	*lóne-che*	
26 fat₃							*é pór oí*
27 feather₁	*á chátá*						
27 feather₂		*pích-da*	*ót-pích-da*	*pāīch-da*	*pāīch-lekíle*	*pāīch-che*	
27 feather₃							*ír wát*
28 fire₁	*chápa-da*	*chápa-da*	*choápo*				
28 fire₂				*át-da*	*át-lekíle*	*àt-che*	*áht* = ᴹ*at*
29 fish₁	*yát-da*	*yát-da*	*yoákat*				
29 fish₂				*tāīye-da*	*tàkajéu-lekíle*	*tíyé-che*	*tai jéu*
29 fish₃							ᴹ*burto*
30 fly n.	*bumila-da*	*búmila-da*	*búmulá*	*púmis-da*	*púmis-lekíle*	*púmit-che*	*píémo*
31 foot₁	*pág-da*	*pág-da*	*póág-da*				
31 foot₂				*tāū-da*	*tok-lekíle*	*tāūk-che*	*am tāū*
32 full₁ (fill)	*ót tépinga* ké	*tépé-ré*	*tépé-nga*				
32 full₂ (fill)				*tāōka-nga*	*tāūke-chíkan*	*l'óte-tāōke*	jet kam *tá ku*
33 give₁	*éná* ké			*dá*			*íji* taijí
33 give₁/₂		*á*	*óá*		*á*		
33 give₃						*lák*	
34 good₁	*béringa-da*	*béringa-da*					
34 good₂			*dem*	*dem-da*	*dem-lekíle*		
34 good₃						*bílak-che*	
34 good₄							*enálé*
35 green₁	*téla-da*						
35 green₂		*élépāīt-da*	*álépāīt*	*élepich-da*	*lápich-lekíle*	*alàpich-che*	
35 green₃							*í pung*
36 hair₁	*pích-da*	*pích-da*	*pích-da*	*pāīch-da*	*pāīch-lekíle*	*pāīch-che*	*paitch*

gloss	Bea	Bea	Bale	Puchikwar	Juwoi	Kol	Kede
	Portman 1887	**Portman 1898**	**Portman 1898**	**Portman 1898**	**Portman 1898**	**Portman 1898**	**Portman 1887**
37 hand[1]	**kóro**-da	ón-**kāūro**-da	óng-**kāūro**	óng-**kāūra**-da	āūn-**kúrāū**-lekíle	ón-**kāūre**-che	am **kóro**
38 head[1]	**chetta**-da	ót-**chéta**-da	ót-**chektá**				
38 head[2]				āūto-**tá**-da	āūto-**tāū**-lekíle	óte-**tāū**-che	
38 head[3]							**erchu**
39 hear[1]	í **dainga** ké	í-**dāī**	í-**dāī**				
39 hear[2]				é-**bínge**	éak-**bíngè**	lé-**bínge**	tongá **bíngo**
40 heart[1]	Ø	**āūna**-da	**āūna**-da				Ø
40 heart[2]				**éngeche**-da	**éngich**-lekíle	**angéche**-che	
41 horn[1]	ot **wulu tá**-da	Ø	Ø	[R]ot **wulu ta**	Ø	Ø	**wulu tué**
42 I[1]	**dóla**	**dól**-là	**dól**	**túl**-le	**te**-kíle	**tú**-le	**tuí**
43 kill[1]	Ø	ōīyo-óko-**lí**	ójo-óko-**lí**				Ø
43 kill[2]				āūte-óm-**píl**	āūt-am-**píl**	āūte-óm-**píl**	
44 knee[1]	**ló**-da	áb-**ló**-da	áb-**ló**-da	áb-**lú**-da	á-**lú**-lekíle	e-**lú**-che	**élu**
45 know[1]	**gád** ké						
45 know[2]		ig-**nāūli**					
45 know[3]			id-**lómang**				
45 know[4]				ír-**bínge**	ré-**bínge**	er-**bínge**	
45 know[5]							é **kót**
46 leaf[1]	**chéki**-da						
46 leaf[2]		í-**tong**-da	í-**toáng**	ír-**tóng**-da	ré-**tóng**-lekíle	ter-**tóng**-le	
46 leaf[3]							**óbö**
47 lie[1]	át **bálagí** ké	ára-**bálagi**	oáró-**bálégi**				um **bāūl** to
47 lie[2]				āram-**pāūt**	rám-**póat**	ám-**pāūt**	
48 liver	**mug**	**múg**-da	**múg**-da	**mík**-da	**mík**-lekíle	**mík**-che	Ø
49 long[1]	**lápana**	**lápana**-da			**lóbak**-lekíle		
49 long[2]			**pílákmo**				
49 long[3]				**lāūti**-da		**lāūti**-che	**lāū** u
49 long[4]							
50 louse[1]		[R]**peta**-da	[R]**pata**	[R]**pate**-da	[R]**pate**-lekíle	[R]**pate**-che	
50 louse[2]		[R]**kila**-da					[R]**kela**
50 louse[3]							[R]**kɛrbīt**
51 man[1]	á **bula**-da	áb-**búla**-da	áb-**búla**				
51 man[2]				áb-**kāūro**-da	á-**kāūrok**-lekíle	á-**károk**-che	
51 man[3]							é **tairu**
52 many[1]	ot **peggí**						
52 many[2]		ár-**dúru**-da		ár-**díre**-da		á-**díri**-che	
52 many[3]			ár-**púlia**-da				ót **pól** lé
52 many[4]					á-**chápar**-lekíle		
53 meat[1]	**dáma**-da	**dáma**-da	**doámo**	**tóma**-da	**tóme**-lekíle	**tóme**-che	**tómo**
54 moon[1]	**ógar**-da	**ógar**-da	**ógar**-da				
54 moon[2]				**púki**-da	**púkúi**-lekíle	**púki**-che	
54 moon[3]							**chírké** = [M]**cirike**
55 mountain[1]	**boroin**-da	**bāūrōīn**-da	**bāūrōīn**	**búrin**-da	b'**rúin**-lekíle	**búrin**-che	**burin**
56 mouth[1]	áka **báng**-da	**báng**-da	**boáng**	**póng**-da	**póng**-lekíle	**póng**-che	tá **pong**
57 name[1]	ót **ting**-da	**teng**-da	**téng**				
57 name[2]				**yāū**-da		āūte-**yok**-che	
57 name[3]					**líwe**-lekíle		é **líwo**
58 neck[1]	**lóngó** tá	**longo** tá-da	**loánga** toá	**lóngo**-da	**lóngo**-lekíle	**lóngè**-chè	ót **yóngó**
59 new[1]	**goí**-da	**goí**-da		**kúi**	**kúi**	**kúi**-le	**kuí**
59 new[2]			**koálót**				
60 night[1]	**guruk**-da	**gúrug**-da	**gúrug**				
60 night[2]				**dírik**-da	**dírak**-lekíle		
60 night[3]						**pāūti**-che	**yír pát**
61 nose[1]	**chóronga**-da	**chāūronga**-da	**chāūrnga**				
61 nose[2]				**kāūté**-da	**kāūte**-lekíle	**kāūtè**-che	mír **kāūtó**
62 not[1] (no)	**yába**-da	**yába**-da	**yába**				
62 not[2] (no)				**póye**-da	**póye**-lekíle	**póyi**-che	**puíyo**
63 one[1]	**óba** tul	**úba**túl	**úba**túl	**lútúbá**			
63 one[2]					**lúngúi**	**lúngi**-le	**luáh** mó
64 person[1] (people)	**dárlag**	**dárlag**-da					

gloss	Bea	Bea	Bale	Puchikwar	Juwoi	Kol	Kede
	Portman 1887	Portman 1898	Portman 1898	Portman 1898	Portman 1898	Portman 1898	Portman 1887
64 person$_2$ (people)			*āūlōīchit*				
64 person$_3$ (people)				*nule*	*ne* *ne-kíle*	*le-nu-le*	
64 person$_4$ (people)							*kódíá ténye*
65 rain$_1$	*yum-da*	*yúm-da*	*yúm*				
65 rain$_2$				*léke-da*	*léke-lekíle*	*léke-che*	
65 rain$_3$							*toierá*
66 red$_1$	*chérama-da*	*chérama-da*	*chérama*				
66 red$_2$				*chétà-da*	*chétak-lekíle*	*chétok-che*	
66 red$_3$							*bí yé*
67 road$_1$	*lóg-da*						*luk*
67 road$_2$		*tinga-da*	*ténga*	*tāīeng-da*	*tāīen-lekíle*	*tāīeng-che*	
68 root$_1$	*ár chág-da*	*ár-chág-da*	*ár-chág*	*ár-chok-da*	*rá-chok-lekíle*	*tá-chok-le*	*jerá cháng*
69 round$_1$	*ár kór-da*						*?rók tór*
69 round$_2$		*ót-língriya-da*	*ót-lingriya*		*āūtāū-lingrí-lekíle*		
69 round$_3$		*ót-bana-da*	*ót-bana-nga*				
69 round$_4$				*āūto-nélokma-da*	*āūtāū-nàlokma-lekíle*	*tāūte-nélakmá-le*	
70 sand$_1$	*tára-da*	*tára-da*	*toāōwar*	*tāōwer-da*	*tāōwer-lekíle*	*tāōwer-che*	*tóro*
71 say$_1$	*áka yáb ké*	*yáb*	*yoáb*				
71 say$_2$				*wár*	*yár*	*wár*	*ír wár*
72 see$_1$	*ig bádí ké*	*ig-bádig*	*id-bádi*				
72 see$_2$				*ír-tílu*	*ré-t'líu*	*er-tílu*	*ír tédé*
73 seed$_1$	*ig bán-da*	*ban-da*	*bán*				
73 seed$_2$		*í-dal-da*	*í-dal*				*ír tól*
73 seed$_3$				*úle-da*	*óle-lekíle*	*ulè-che*	
73 seed$_4$				*ír-kāūdak-da*	*ré-kāūdak-lekíle*	*er-kāūdak-che*	
74 sit$_1$	*áká dóí ké*	*áka-doi*	*áka-doi*				
74 sit$_2$				*āūto-líti*		*āūter-líti*	
74 sit$_3$					*āūkāū-kírak*		
74 sit$_4$							*áká wuanó*
75 skin$_1$	*aij-da*	*ót-āīch-da*	*ót-kāīch*				
75 skin$_2$				*tāīlap*	*t'làp*	*t'lep*	*taílap*
76 sleep$_1$	*mámí ké*	*mámi*	*mámi*				
76 sleep$_2$		*bármi*	*boándri*				
76 sleep$_3$				*móli*		*móli*	
76 sleep$_4$				*pāūt*	*poāūt*	*pāūt*	
76 sleep$_5$							*tír bénó*
77 small$_1$	*kétiá-da*	*kétia-da*	*kétámá*	*kétawa-da*	*chóté-lekíle*	*kétawa*	
77 small$_2$							*lāō*
78 smoke$_1$ n.	*molla-da*	*māūla-da*	*māūlāīch*				
78 smoke$_2$ n.				*lep-da*	*lep-lekíle*	*lep-che*	*jéb*
79 stand$_1$	*kápí ké*	*kápi*	*kápi*				
79 stand$_2$				*chè*	*chéaka*	*chéaka*	
79 stand$_3$							*ó toi á*
80 star	*cháto-da*	*cháto-da*	*chálami*	*kāīchan-da*	*kāīchan-lekíle*	*kāīchan-le*	*kátain*
81 stone$_1$	*tailí-da*	*tāīli-da*	*tāīli*				
81 stone$_2$				*mé-da*	*màka-lekíle*	*méaka-che*	*mió*
82 sun$_1$	*bódó-da*	*bódo-da*	*bāūdo*	*púte-da*	*púte-lekíle*	*pútè-che*	
82 sun$_2$							*díe*
83 swim$_1$	*píd-ké*	*pít*	*pít*				
83 swim$_2$				*ngáte*	*ngāūtāū*	*ó-ngáte*	*ó ngāūtó*
84 tail$_1$	*ár písam-da*	*píchàm-da*	*pícham*	*pāīcham-da*	*pichàkam-lekíle*		
84 tail$_2$						*ó-chálam-che*	
84 tail$_3$							*rá kucho*
85 that$_1$	*kátó-da*	*ká*	*koá*			*kúte*	*kuá*
85 that$_2$				*íte*	*éte*		
86 this$_1$	*ká-da*	*ká-da*	*koá*				*kíté*

gloss	Bea	Bea	Bale	Puchikwar	Juwoi	Kol	Kede
	Portman 1887	**Portman 1898**	**Portman 1898**	**Portman 1898**	**Portman 1898**	**Portman 1898**	**Portman 1887**
86 this$_2$				*íte-da*	*éte-ákíle*	*íte-déle*	
87 thou	***ngól***	***ngól**-la*	***ngól***	***ngúle***	***ngúle***	*lá-**ngúl**-le*	***nguí***
88 tongue	*áká **étel**-da*	*aka-**étal**-da*	*áka-**átal***	*ó-**tátal**-da*	*āūkāū-**tátal**-lekíle*	*tàtal-che*	*ákátát*
89 tooth$_1$	*í **tug**-da*	***tóg**-da*	***tóg***	***tékì**-da*	*t'**kí**-lekíle*	***téki**-che*	
89 tooth$_2$							*mír **pílé***
90 tree$_1$	*ákátáng-da*	*áka-**táng**-da*	*áka-**toáng***	*ó-**tong**-da*	*āūkāū-**tong**-lekíle = åkå-tong*	*tāū-**táng**-le tå-tang-le*	*kátóng*
91 two$_1$	*ik**pāūr**-da*	*ik-**pāūr**-da*	*id-**pāūro**-tót*	*ír-**pāūr***	*ré-**pāūr***	*er-**pāūr***	*írpól*
92 walk$_1$	***nāō** ké*	***nāō***	***noāō***				
92 walk$_2$				*chóle*	*chólè*	*chóle*	*óichó*
93 warm$_1$	***uya**-da*	***úya**-da*	***úya***				
93 warm$_2$				*wírawak-da*	*w'**ríwak**-lekíle*	*wir̯iwak-che*	*wíriwá*
94 water	***ína**-da*	***ína**-da*	***ína***	***éna**-da*	***énok**-lekíle*	***énak**-che*	***íne***
95 we	***moloichik***	***molōīchik***	***māūlōichit***	***múle***	***múle***	***múle***	***muí***
96 what$_1$	***míchiba**-da*	***míchíbá***	***míàkat***	***mátāīu***	***míák***	***méak***	
96 what$_2$							*chádé*
97 white$_1$	***uluya**-da*	***ólowia**-da*					***ólóya***
97 white$_2$			*álépāīch*				
97 white$_3$				*pómer-da*	*pómer-lekíle*	*pómer-che*	
98 who$_1$		***míja*** ***míjo**-la*	***míad***	***méchi*** ***méche**-le*	***méchi*** ***méche**-lekíle*	***méche**-le*	
	míjólá						
98 who$_2$							*chále*
99 woman$_1$	***ápail**-da*	*áb-**pāīl**-da*	*áb-**pál***				
99 woman$_2$				*áb-**ób**-da*	*á-**óp**-lekíle*	*é-**óp**-che*	
99 woman$_3$							*ebuku*
100 yellow$_1$	Ø	*térawa-da*	*tárāōlo*				
100 yellow$_2$				*chétá-da*	*chétak-lekíle*	*chétak-che*	Ø

Table 2: North Andaman & Little Andaman languages

	Cari	Bo	Kora	Jeru	Great Andaman	Onge	Jarawa
	Portman 1887	**Portman 1887**		**Jeru lists**	**Mayank 2009**	**Portman 1887**	**Senkuttuvan$_{2000}$** [K] **= Kumar$_{2012}$**
1 all$_1$		*árdíré*		Ø		Ø	
1 all$_3$	*nantá töl*						
1 all$_4$			*arak^{h}amo we*		[Y]*arak^{h}amo we*		
1 all$_5$							[K]*ənəhoʈəʈa*
2 ashes$_3$	*yír **bát***	*ong yír**bile***	*bat bitre*		*biʈhe* [Y]*biʈe*		
2 ashes$_{3/4}$	*?yír bát*	*?ong yír-bile*		[J]*yir*			
2 ashes$_5$						*tóngkuté*	
2 ashes$_6$							[K]*h^{w}i:jə*
3 bark$_1$		*óte **kait**-da*					
3 bark$_2$	*ot **kába***			*ethɔbo*	*et kɔbo*		?[K]*ipo*
3 bark$_3$			*it^{h}iyu*		[Y]*it^{h}iyu*		
3 bark$_4$						*gángui (= skin)*	
4 belly$_1$	*échulu*	*chut te*	*trèkotra*		*ʈekotra* stomach		
4 belly$_2$			*ep^{h}ilyu-tark^{h}uro*	*ʈ^{h}εp^{h}ilu* my stomach	*e p^{h}ilu* [Y]*ep^{h}iʈu-tark^{h}uro*		
4 belly$_3$						[B]*ön-a-ŋnane*	
4 belly$_4$					[C]*ŋa-**poi*** [B][*ön-e-na-boi* loins]		*unnifēʈ on'ni'yōm'bu* [C]*napoy*
5 big$_2$		*durnga*		Ø			
5 big$_5$	*mai ér **kura***		*èr-**k^{h}uro***		*k^{h}uro* [Y]*εrk^{h}uro*	*nádé uyé* [B]*i-**kutu***	[K]*(h)uʈ^{h}u*

	Cari	Bo	Kora	Jeru	Great Andaman	Onge	Jarawa
	Portman 1887	Portman 1887		Jeru lists	Mayank 2009	Portman 1887	Senkuttuvan$_{2000}$ ^{K} = Kumar$_{2012}$
5 big$_6$			*bingoye*				
5 big$_7$							*oṭ'kālā* *čan'nāč'cō* *tot'tāŋ'tōlā*
6 bird$_1$				*?lāwɔcoṭe*		Ø	
6 bird$_2$	*jítóbá*	*tám it tép*					
6 bird$_3$			*tajew*		^{Y}*ṭağew* = fish		
6 bird$_4$							*nōgʰāliye*, pl. *nɔ̃gʰā* duck ^{C}*lohe*
7 bite$_3$	*ébiö*	*óng ab pé kan*		Ø	*e-bio*	*öní bágábé*	^{C}*mo-paka-be*
7 bite$_4$			*yibelyèngo*		^{Y}*yibełɛno*		
8 black$_2$	*ér dírim*	*ír dírek*	*dririm*	Ø	*ḍirim*		
8 black$_3$						*bé*	
8 black$_4$							^{C}*chigeu-ge*
8 black$_5$							^{K}*hiṛu*
9 blood$_1$	*été*	*té wa*	*tèye*	*tei, ettay*	*etei* ^{Y}*tɛye*	*gáchéngé* = ^{B}*g'a-čeŋe* its blood	^{C}*co-chengohee* ^{K}*čeŋ*
10 bone$_1$	*é toi í*	*tá-da*	*ètr-tròye*	*idromṭəy ētoe metae*	*e-tɔe* ^{Y}*ɛṭṭɔye*	*íchindángé* = ^{B}*g'i-daŋe* its bone	^{C}*geetongay* = *ŋi-to-ŋe* thy b. *uḷḷetā*
10 bone$_2$							^{K}*ən-ogjag*
11 breast$_1$						*nákágé* = ^{B}*ön-a-gage*	^{K}*ən-aka:g* *gʰāgʰ'* female breast *gāk* male nipple *oṇṇa'kōssa* & *en'nākottā* chest
11 breast$_3$		*óte pá-da*					
11 breast$_4$	*ot char*		*tr-o-car*		^{Y}*ṭokar*		
11 breast$_5$			*mètèyi*	*mɛttəy*	*me-tɛi*		
12 burn$_1$	*tóje chué*	*chu kan*		*issu:ye*	*e sue*	Ø	Ø
12 burn$_2$			*ikhu-bikè*		^{Y}*ikʰubikɛ*		
13 claw$_1$		*pute*					
13 claw$_2$	*kude mu*						
13 claw$_3$			*tr-ung-kara*	*òng-kâra*^{Man} *ṭʰuŋkāra* my nails	^{Y}*ṭuṇkorɔ*		
13 claw$_4$						*móbé dungé*	
13 claw$_5$					^{C}*m-o-bejeda-nga* my nail		^{K}*ən-opetaŋ* *en'nō'pēt'ta* fingernail *eru'vēḍā̃* nail
14 cloud$_1$	*tāō*				*ṭao*		
14 cloud$_2$		*lé mar*					Ø
14 cloud$_3$			*tròtar-bèyic*	*ṭɔ:terbec*	^{Y}*ṭɔtarbɛyiǩ*	*baije*	
15 cold$_2$	*tót julu*			*irulu:c ejulu*	*julu*		
15 cold$_3$		*térem-da*					
15 cold$_4$			*trhòwo*		^{Y}*tʰɔwɔ*	*ugí tébé*	
15 cold$_5$							^{C}*choma*
16 come$_3$		*íye kan*		Ø			
16 come$_4$	*ké ling émét*						
16 come$_5$			*kʰuro*				
16 come$_6$					^{Y}*ṭułiwon*		
16 come$_7$						*ínai öbábé önuquángémé* ^{B}*ön-a-yo-be*	*ayyōvāp'pa vāy'yā*
16 come$_8$							^{K}*allema*

	Cari	Bo	Kora	Jeru	Great Andaman	Onge	Jarawa
	Portman 1887	Portman 1887		Jeru lists	Mayank 2009	Portman 1887	Senkuttuvan$_{2000}$ ^{K} = Kumar$_{2012}$
16 come$_9$							^{K}*jagʈ^{h}ujə*
17 die$_2$	*em **píl***	*óngom **píl** kan*	*è-p^{h}ily*	Ø	*emp^{h}il* ^{Y}*εp^{h}ił*	Ø	
17 die$_3$							*bes'sāmi* ^{K}*pečame*
18 dog$_1$	***bíbí***	***bíbí**-da*					***ve'b'*** & ***vēb***
18 dog$_2$			***cawo***	*ɔ̄**cao***	^{Y}***ǩawo***		
18 dog$_3$			*òtr-**bèyic***		pl. ^{Y}*ɔt**bɛyiǩ***		
18 dog$_4$						^{B}***wöme***	^{K}***wimə*** ^{K}***wəwəmə*** ^{C}[*omay* jackal]
19 drink$_2$		*pai* kan		Ø			
19 drink$_3$	*tó **ku***		*ik^{h}uwe*		*k^{h}u* ^{Y}*ik^{h}uwe*		
19 drink$_4$						^{B}*m'**injo**-be* I drink	^{C}*meengohee* ***īñčō*** = ^{K}***inčo***
20 dry$_3$			*ètp^{h}aya*	Ø	^{Y}*εtp^{h}aya*	Ø	Ø
20 dry$_4$	*tíbí jéwu*						
20 dry$_5$		*kí nérnga*					
21 ear$_1$	*ér **buáh***	*ír **bó**-da*	*tr-èr-**buwo***	*îr-bô*^{Man} *ther**bno*** my ear	*er **buo*** ^{Y}*ʈer**buwo***		
21 ear$_2$						*ík quágé* = ^{B}*(ön-)i-**kwage***	^{C}*quaka onn**īkkuva*** & *en'ni**k'ku'vā*** ^{K}*ən-**ik^{h}wa***
22 earth$_2$		*pér-da*					? ^{K}***pela***
22 earth$_3$	***buáh***		***bowa***	***bowā***	***bua*** = ^{Y}***bowa***	^{B}***gwabe***	
22 earth$_4$			*jeng*				
22 earth$_5$				*kat*			
22 earth$_6$						*tután*ó	^{C}*totanga-ge*
23 eat$_1$		*tá**me***					
23 eat$_2$	*tojíjó*		*ijokè*	*ijōkke*	*iji ~ eji* ^{Y}*iǧokε*		
23 eat$_3$			*ik^{h}uwe* = drink				
23 eat$_4$						*énílöquálébé*	^{C}*ingo-**lolia***
23 eat$_5$					^{B}*ön-i-**da**-be*		*dū'tā* = ^{A}***ita*** = ^{K}***ita***
24 egg$_1$		*mula*	*e-**mulyu***	*īmulu*	*mulu* ^{Y}*emułu*	Ø	Ø
24 egg$_2$	*jo péro*						
25 eye$_2$		*ír **ká** dig*					*ka*
25 eye$_3$	*ér **ulu***		*tr-èr-**ulyu***	*ʈ^{h}erulu:-tatirbui* two eyes	*erulu* ^{Y}*ʈεrułu*		
25 eye$_4$					*uníjé boi* = ^{B}*(ön-)-e-je-boi* = ^{A}*ejebo*		^{K}*ən-**epo*** / ^{K}*ən-**ečepo*** *on'ne'eb'bō* ^{C}*jabay īppō* dog's eye *en'neč'čeʈ'bō*
25 eye$_4$							*on'nē* ***puḍūk'***
26 fat$_2$			*tr-è-**lyòne***		^{Y}*ʈε**łone***	Ø	Ø
26 fat$_3$	*é **pár** ai í*	*ár **pórí***					
27 feather$_1$		*ír **tácha***					Ø
27 feather$_3$	*ér **ét***		*èr-**atr***		^{Y}*era**ʈ***		
27 feather$_4$						*gāū dé*	

	Cari	Bo	Kora	Jeru	Great Andaman	Onge	Jarawa
	Portman 1887	Portman 1887		Jeru lists	Mayank 2009	Portman 1887	Senkuttuvan$_{2000}$ ^{K} = Kumar$_{2012}$
28 fire$_2$	*áht*	*áht-da*	*atr*	*āṭ*	*aṭ* = ^{Y}*aṭ*		
28 fire$_3$						*tuké* = ^{B}*tuke*	^{K}*ṭʰuhəb* *duvēv* *dʰū'ha'* ^{P}*tuhawe*
28 fire$_4$						[cf. ^{B}*mone* torch]	^{C}*m-ona* = my fire
29 fish$_2$		*tai í a* ^{M}*burto*	*tajew*		^{Y}*ṭağew* = bird		
29 fish$_3$	*jí*					*chógé* = ^{B}*čoge*	
29 fish$_4$				burto			
29 fish$_5$				tamol			
29 fish$_6$				fɔtɔm			
29 fish$_7$							^{K}*napo* *nā'bo'* / *nāp'pō* / *lāp'pō* = ^{C}*ŋa-bohi* thy fish
30a fly$_1$ n.	*pulímu*	*pumit*	*pʰulyimu*	*(jubu)*	^{Y}*pʰuɫimu*		
						ngönoi	Ø
30b fly v.	*ér ét*	*ír im tai cha*		*(jubu)*			
31 foot$_1$	*óma **tāū***	*óng **tá***					
31 foot$_2$			*tr-**mòtrò***	*ʈʰumɔṭo* my feet	^{Y}*ṭmɔṭɔ*		
31 foot$_3$						*mugé* = ^{B}*g'u-**ge*** its foot	^{C}*gookee* *on'nṹ'k*
31 foot$_4$							^{K}*ən-ipo* leg = *ē'nup'* (: *en'nōp* finger) *onnutted* & *on'nut'tev* leg *on'nīč'či* leg *ḍēt'tā* dog's leg
32 full$_2$ (fill)	*jet **kāūta** ku*	*ot te **tá** ke*		Ø		Ø	Ø
32 full$_3$ (fill)			*ara-**pʰètr***				
32 full$_4$ (fill)			*èr-**kʰuro***		^{Y}*ɛrkʰuro* = big		
33 give$_1$		*endá kan*		Ø		Ø	
33 give$_{1/2}$							$^{A+K}$*iya*
33 give$_4$	*un **jók***		***cè***		^{Y}***kɛ***		
33 give$_5$			*umokè*				
34 good$_1$						^{B}***i-baro***	
34 good$_2$		*ab dém*					^{K}***ḍomo***
34 good$_4$	*ér chok **nol***		*èr-**nòly***	^{J}*e-**nol***	*enɔl* ^{Y}*ɛr**noɫ***		
34 good$_5$						*íwádó*	
34 good$_6$							^{K}*tapo*
34 good$_7$							^{K}*če:w*
35 green$_2$		*?**loit**-da*		Ø			
35 green$_3$	*ja **pung***						
35 green$_4$			*eka**lyawo***		^{Y}*eka**ɫawo***		
35 green$_5$						*tótán**dángé***	*dʰun'na'*
36 hair$_1$	*paitch*	*óto **paitch**-da*	*tr-òt-**bèyic***	*îr-**bê***^{Man} *ʈʰutʰ**beic*** my hair	^{Y}*ṭotbɛyiǩ*		

	Cari	Bo	Kora	Jeru	Great Andaman	Onge	Jarawa
	Portman 1887	Portman 1887		Jeru lists	Mayank 2009	Portman 1887	Senkuttuvan[2000] K = Kumar[2012]
36 hair2						*māūdé* = B*ö(n)-o-de*	K*ən-oɖə* C*ottee* *en'nōɖu* *gō'ʈu'* = C*ot-ti*
37 hand1		an **kóro**-da	tr-ung-**korò**	òng-**kōra**^Man *kōn***kuro** full hand	ɔŋ **korə** = Y*ʈuŋ***korə** palm		
37 hand1/2	am **kudímo**						
37 hand3						mó**mé** hand B*m'o-me* my finger *g'o-me* his finger	C*mo***nie** & C*gonie* = my & thy hand
37 hand4							K*ən-ipil* *en'nip'pīt*
38 head2		óte **tá**-da				önö tó**lá**jíbé man's head B*(ön-)o-***tabe**	K*ən-ot*ʰ*a:p* C*tabay*
38 head3	**échu**		**èr-co**	*îr-***chô**^Man J*ot-***cho**	ɛr-**co** Y*er***ǩo**		
38 head4			tr-èr-**mine**				
39 hear2	áka **bíngu**	é **bínga** kan		Ø	áka **binge**	Ø	Ø
39 hear3			**mudrewe**		Y*mu***ɖewe**		
40 heart3	Ø	Ø	tròtrwo-**tudre-lyò**	ʈutbɔr-**tudilo** my heart	Y*ʈɔʈwo***tuɖeɫi**	Ø	Ø
41 horn1		ót **wulu tá**	Ø	it**olotoe**	Ø	Ø	Ø
41 horn1/2	un **tái** í						
42 I1	**tío**	**tula**	**tr-iyo**	**ti** / **ʈi** / **tiyɔ̄wbe**	Y*ʈiyo*		
42 I2						**mí** = B**m'** = A**mi**	**mī** = A**mi/ma** = K**mi**
43 kill3	Ø	Ø	**truwebu-war-tròly**	Ø	Y*ʈuwebuwarʈiɫ*	Ø	
43 kill4							aik*ʰ*wa
44 knee1		**lu**-da				mó**lágé** = B*(ön-)o-***lage**	K*ən-o*ɭ*aj* C*ingo***lay** *en'ni'ñan'bo* *en'nō***lu** / *on'nō***lō**
44 knee2	é **churāū**		tr-èr-**chòròk**	*t*ʰ*ɛɔərɔk*	Y*ʈer***ǩɔrɔk**		
45 know1	ót **kót**	ab **kód** kan	Ø	Ø	Ø	Ø	K*o*ʈ*ʰa inijəla*
46 leaf1		chai					
46 leaf3						**bébé**	K*pipə* *b*^(h)*ē'b*^(h)*e* *vēɖ'bō*
46 leaf4	ngyo						
46 leaf5			**tèyic**	sōya**tec**, pl. bireit**ɛcə**	Y*t***ɛyiǩ**		
47 lie1	árat **ból** to	óng **bálagá** kan	Ø				Ø
47 lie3				ərām**bino**	Y*ʈaram***beno** I am lying on the ground		
47 lie4						gain yíbé	
48 liver1	Ø	**mik**		ɛmɛycca; ʈʰe**meca** my liver		Ø	Ø
48 liver2			tr-e-**chudru**		Y*ʈe***ǩhuɖa**		
49 long1	**lóbung**			J*e-***lobun** J*lobung*	i-**loboŋ**		
49 long3		**lāūtí**					

	Cari	Bo	Kora	Jeru	Great Andaman	Onge	Jarawa
	Portman 1887	Portman 1887		Jeru lists	Mayank 2009	Portman 1887	Senkuttuvan$_{2000}$ K = Kumar$_{2012}$
49 long$_4$			èr-tròyelywum		^{Y}εrʈɔyełwum		
49 long$_5$						^{B}oi-jagai	
49 long$_6$							^{K}talu
50 louse$_2$	Ø	Ø	Ø	Ø	^{Y}kεła dog-flies	Ø	Ø
51 man$_2$		ab **kára**-da					
51 man$_3$	é **táru**		è-**tʰaro**	εtʰārɔ male	^{Y}εtharo		
51 man$_4$			eboye				
51 man$_5$						**unyágílé**	^{K}**əŋa:gi** ^{C}**ŋ-amo-lan** you are a man
51 man$_6$							bitnik male
52 many$_1$		óte **pai** ke		Ø			Ø
52 many$_3$	not **pól**						
52 many$_5$			arakʰamo we (= all)		^{Y}arakʰamo we (= all)		
52 many$_6$						^{B}wo-**taŋabe**	
52 many$_7$							^{K}mala
53 meat$_1$	yé**tomo**	**tóma**-da	**tʰomo**	^{J}e-**tomo**	εtʰomo	Ø	
53 meat$_2$		è**rbung**					^{C}wuhi
54 moon$_2$		**pukí**					
54 moon$_3$				^{M}**cirikli** < Kede		**chílemé** = ^{B}**čilome**	
54 moon$_4$	**dolāū** = ^{M}**dula**		**drulya**	**ɖūllɔ dulo**	**ɖulo ~ ɖulɔ** ^{Y}**ɖuła**		
54 moon$_5$							**ɖābe** = $^{A+K}$tape
55 mountain	**burain**	**burin**-da	**buruing**	**būrin**	**ɑuruin** ^{Y}**ɓuruiŋ**	Ø	Ø
56 mouth$_1$	tá **póng**	tó **póng**	tra-**pʰong**	îr-**bôa**^{Man}	**pʰoŋ** ^{Y}**ʈapʰoŋ** / **ñpʰoŋ**		
56 mouth$_2$						^{B}ön-a-**laŋe**	
56 mouth$_3$							eru'**mu** / on'ni'**mu** = ^{C}**m-ona** = my mouth
57 name$_2$		ote **yá**-da	Ø			Ø	Ø
57 name$_3$	é **líwu**			thε**liu** lecobe my name is	e-**liu**		
58 neck$_1$	ot **longó**	ote **lóngo**	Ø	òt-**lôngo**^{Man} ʈʰut**lɔŋgo** my neck		ö**nángitó**	on'**nākīt'tō** ^{K}ə**n-inʈʰug**
58 neck$_2$					^{Y}ɔʈʈɔye		^{C}tohi
59 new$_1$	**koí**	**kuí**	erò-**kʰuyi**	Ø		Ø	Ø
59 new$_2$			è-**kòlyòt**		^{Y}ε**kɔłoʈ**		
60 night$_3$	yér **bát**	**pátí**-da	**bat** tr-ibir**bat**	^{J}**bat**	ir-**bat** ^{Y}**bat**	Ø	
60 night$_4$							^{K}kiʈʰale
61 nose$_2$	mér **kató**	mír **kátto**	tr-ar-**kòtʰò**	îr-**kâto**^{Man} tʰεrtɔtɔ	er-**kɔʈho** ^{Y}**ʈarkɔtʰo**		
61 nose$_3$						^{B}ön-i-**ya**-boi	^{K}ə**n-iɲapo** oŋniñānbo & oŋnīyānbō / eri'**yāp'pɔ̃** on'ni'nã'spō mu
61 nose$_4$					^{A}oranaŋ		

	Cari	**Bo**	**Kora**	**Jeru**	**Great Andaman**	**Onge**	**Jarawa**
	Portman 1887	**Portman 1887**		**Jeru lists**	**Mayank 2009**	**Portman 1887**	**Senkuttuvan[2000]** [K] = **Kumar[2012]**
61 nose[5]							[C]*m-eli* my nose
62 not[2] (no)	*tai **pubí***	***poi**-e*	Ø	*-pʰo- / -pʰu-*	Ø	***ébāūbé***	
62 not[3] (no)							*nāḍum* = [K]*naḍem*
62 not[4]							[K]*-ma*
63 one[1]	**on tolbó**		***entòblyò***	[Z]*ondoplO*	***ontoplo*** [Y]*ɛntobłɔ*		
63 one[2]		***lungí***					
63 one[3]						*yu **woiyá*** = [B]*g'i-**woia*** it is one	[K]***waja***, *wə:ja* ***ōya***
64 person[5]	Ø	Ø	***narakʰamo***		[Y]***narakʰamo*** people	Ø	Ø
64 person[6]				*kɔrlokho* people			
65 rain[2]		***léke***					
65 rain[3]	*jó **chér***		*gi-**cer***	*jicɛr / jicɛr*	*jicɛr* [Y]*ǧiǩer*		
65 rain[4]						***gujöngé***	[C]***oye***
65 rain[5]							[K]*wəwə* [A]*wəwə-le-yə*
66 red[2]		***chétá***		Ø			
66 red[3]	***bíu***						
66 red[4]			***ibirang***		[Y]***ibiraṇ*** / [Y]***eburaṇ***		
66 red[5]						***álámé***	
66 red[6]							[K]*hoṛgidu*
67 road[1]	*tó **luk***	***luk***					
67 road[3]			***nyòtò***	*mɔtto*	[Y]***ñɔtɔ***		
67 road[4]						***íchélé*** = [B]***ičule***	[C]***echollee***
67 road[5]							[K]*le:b*
68 root[1]	*jará **cháng***	*ár **chók**-da*	*ira-**cang***		[Y]***irakaṇ***	Ø	
68 root[2]				*ṭɔkotə-rābuc*			
68 root[3]							[K]*ṭʰucə*
69 round[1]		*ár **kór**-da*	Ø		Ø	Ø	Ø
69 round[5]	*máro yu*						
69 round[6]				*hirkʰdoe*			
70 sand[1]	***táro***	***tāūwer***		*ṭɔ̄ro*	*ṭɔrɔ ~ ṭorɔ*		
70 sand[2]			*kʰòro*		[Y]*kʰɔro*		
70 sand[3]			*kòtr*		[Y]*kɔṭ*		
70 sand[4]			*tarpʰidro*				
70 sand[5]			*tr-ot-pʰolyò*			***bélai***	***bīlu*** = [K]***bi:l**/łə*
70 sand[6]						*tokkāp'dē*	
70 sand[7]							[K]*teṭʰal*
71 say[2]		*ó **wár** kan*		Ø		Ø	
71 say[3]	*ére**mer***						
71 say[4]			***còlye***		[Y]***ǩɔłe*** speak		
71 say[5]							[K]*itatʰe*
71 say[6]							[K]*aṭiba*
71 say[7]							[K]*aheapa*
72 see[2]	*ér **tedé***	*ír **tílu** kan*		Ø	***tirḍe***	Ø	
72 see[3]			***iyolyè***		[Y]***iyołɛ***		[K]***illiye**ma* or [A]***əyoyə**ba* = [K]***əjojə**ba*
73 seed[3] (cf. eye)	*ér **ulu***	*ír **ule***	*yew**ulyu***	Ø	*eulu* [Y]*yew**ułu***	Ø	
73 seed[4]							[C]*kita-ŋe*
74 sit[1]							*en'nāp'**deyā*** *deʰ'gu*

	Cari	Bo	Kora	Jeru	Great Andaman	Onge	Jarawa
	Portman 1887	Portman 1887		Jeru lists	Mayank 2009	Portman 1887	Senkuttuvan$_{2000}$ K = Kumar$_{2012}$
74 sit$_2$		óte lítí kan					
74 sit$_4$	áko uno			ewnōbe imp. ^{J}ònyò	aka-uno ^{Y}ɔñɔ		
74 sit$_5$						unántököbé	^{A}ən-ōtəhə = ^{K}ən-əːtəhə
75 skin$_1$		óte kaitch					
75 skin$_3$	ót kobāū		kòwo	mɔtkəbɔ	ɛ-kobɔ ~ et-kɔbo ^{Y}kɔwo		
75 skin$_4$						gánguí	on'nōŋ'kiya
75 skin$_5$						^{B}ön-a-ti	un'nā'Ti ^{K}ən-itəjaŋ
75 skin$_6$							onnīppīl
76 sleep$_3$		mólí kan					
76 sleep$_5$	tubénó		beno	ubīno sleeping	beno ^{Y}beno		
76 sleep$_6$						ómókábé = ^{B}ön-i-omoka-be	^{C}omoha = $^{A+K}$omohə
76 sleep$_7$							dʰūle = ^{K}tʰulə
77 small$_1$		kétawa		Ø			
77 small$_2$			è-lyèwo		ɛ-leo ^{Y}ɛɫɛwo		
77 small$_3$	jó tāōu					^{B}i-tai	
77 small$_4$						baiai	^{K}boīja
77 small$_5$							on'nōt'tōn
77 small$_6$							pāli
78 smoke$_2$	léb	léb	lyeb	le āʈlip	lep ^{Y}ɫeb		
78 smoke$_3$						énó táboi	
78 smoke$_4$							^{C}bali-ŋi
78 smoke$_{4/5}$							^{K}bənel/pənel
79 stand$_2$		ché kan		Ø			
79 stand$_{3/4}$	ó roiító		òytò, ròytò		^{Y}rɔytɔ / ɔytɔ		
79 stand$_5$						dókábé	tok'kāp'ḍē $^{A+K}$ḍokəkte ^{K}tokəʈʰe
80 star$_1$	kátain	kaichen	katranye	kaʈɔn´	^{Y}kaʈañe		
80 star$_2$						Ø [chilome moon]	^{C}chilobe = ^{K}čiləpe
81 stone$_1$						taiyí	
81 stone$_2$	méāū	mé-da	menyo	myo rock ^{J}meo	meo ^{Y}meño		
81 stone$_3$							^{K}ulijə uɭ'ḷīvu = ^{C}wu-e
82 sun$_1$		pute	Ø				
82 sun$_2$	díu			dīu, diu	ḍiu ^{Y}ḍiyu		
82 sun$_3$						éké = ^{B}eke	ēvū = ^{C}ehe = ^{K}jehe
82 sun$_4$							likkā
83 swim$_2$	ngāūtāū	ngáta kan	nyòtrò		ŋɔto ^{Y}ñɔʈɔ		
83 swim$_3$			utebeno				
83 swim$_4$				līle			
83 swim$_5$						quáné	^{C}kwa-be
83 swim$_6$							ḍop'pič'čā
83 swim$_7$							vāṛ'ā = ^{A}waʈa = ^{K}waṛa

	Cari	Bo	Kora	Jeru	Great Andaman	Onge	Jarawa
	Portman 1887	Portman 1887		Jeru lists	Mayank 2009	Portman 1887	Senkuttuvan$_{2000}$ [K] = Kumar$_{2012}$
84 tail$_2$		*ár chálim*		Ø		Ø	
84 tail$_3$	*ára kuju*						
84 tail$_4$			*ara-wulyibi*		*arawułibi* dog´s tail		
84 tail$_5$			*ara-bèyic*				
84 tail$_6$							*yāw*
85 that$_1$	*kuelé*	*kuich*	*kʰu-ta-jono*		[Y]*kʰudiayiño*		
85 that$_3$		*du*		*da, du*	[Y]*du*	[B]*lu*	[K]*luwə*
86 this$_1$	*kurá*		*kʰitiyo*		[Y]*kʰitiyo*		
86 this$_2$		*íte*					
86 this$_3$			*di*	*di*	[Y]*di*	[B]*li*	[K]*lijə*
87 thou	*ngíó*	*ngula*	*ny-io*	*ngio, nio*	*ɲio* = [Y]*ñiyo*	[B]*ŋi, ŋ'* = [A]*ɲi*	*nī* = [A]*ɲi/ŋa/n* = [K]*ŋi*
88 tongue$_1$	*ákátát*	*ótátel*	*tr-atab*	*âkà-tât*[Man]	*akaṭaṭ* [Y]*ṭatab*	*?álándángé* = [B]*ön-a-laŋ-daŋe* mouth + bone?	*un'nā'ḍā* *ē'na'ḍā'lu* [C]*tali* = [K]*ən-aḍal*
89 tooth$_2$	*mér pílé*	*mo pélá*	*tr-èr-bilye*	*îr-pilê*[Man] *tirpilē-*	*er pʰile* ~ *ɛr pʰile* [Y]*ṭerbiłe*		
89 tooth$_3$						*mákué* = [B]*m'a-kwe*	[C]*mahoy* pl. *en'na'gō / onnāgu* pl. [K]*ən-hoḍ*
89 tooth$_4$							*dēl* pl.
90 tree$_1$	*áká tongel*	*ó tong-da*		*təŋ, əŋ*		[P]*da-nge*	*ḍān* = [K]*taŋ(g)*
90 tree$_2$			*tròkʰo*		[Y]*ṭɔkʰo*		*dʰāgu*
90 tree$_3$			*tròtarwe*				
90 tree$_4$				*līpʰi*			
91 two$_1$	*nérpól*	*írpól*	Ø		*ertapʰul*		
91 two$_2$				[Z]*oŋjinkO*	[Y]*nɔnǩɛnkɔ* two / many	*nínágá*	*nāya* = [K]*naja*
92 walk/go$_2$	*óí choló*	*chóleke*	*ècòlyè*	Ø	*šolo* [Y]*eǩɔłɛ*		
92 walk/go$_3$			*tròcanewòm*				[A]*cawāya* = [K]*čawaja*
92 walk/go$_4$					*ují öbé* = [B]*ön-i-buǰo-be*		*bēḍ'ḍiya* = [A]*beiṭʰe-ya* = [K]*bəiṭʰe* go
93 warm$_2$		*wíríwak*		Ø			
93 warm$_3$	*ó díríyé*						
93 warm$_4$			*kʰimily*		*ikʰimil* [Y]*kʰimił*		
93 warm$_5$						*jónjomébé*	
93 warm$_6$							[K]*hulug* hot
94 water	*ínó*	*éná*	*ino*	*ino, īno* [B]*ino*	*ino* = [Y]*ino*	*íngé* = [B]*inge*	[C]*migway* *īŋ* = [K]*iŋ*
95 we$_1$	*míó*	*mule*		[J]*mio*			*mallāvu*
95 we$_2$			*du tr-iyo*, incl. *ny-iyo tr-iyo*			[A]*eṭi*	
95 we$_3$					[Y]*ṭunǩenkɔ*		
96 what$_1$		*má-da*				Ø	
96 what$_2$	*ájíbí*		*cayèwe*	*cāybe*	[Y]*ǩayɛwe*		
96 what$_3$							[K]*onahə:*
97 white$_1$	*óluyo*		*è-tr-òlyò-tr-mo*	Ø	[Y]*eṭɔłoṭmo*	[B]*oi-kalai*	[K]*haləŋda*
97 white$_3$		*pómer*					
98 who$_1$		*méchele*		Ø		Ø	
98 who$_3$	*ngéáchu*		*nya-chubi*		[Y]*ñakʰubi*		
98 who$_4$							[K]*onno*
99 woman$_2$		*ábób*				Ø	[K]*əŋa:b*

	Cari	Bo	Kora	Jeru	Great Andaman	Onge	Jarawa
	Portman 1887	Portman 1887		Jeru lists	Mayank 2009	Portman 1887	Senkuttuvan[2000] ᴷ = Kumar[2012]
99 woman₃	*lāōbuku*		*ebukʰu*	*ebukʰu* *ebušuše*	*bukʰu* ᵞ*ebukʰu*		
99 woman							*in'rē* lady *dʰōyi* lady *o'ssāyā* wife *nāsa* female
100 yellow	Ø	Ø	Ø	Ø	Ø	Ø	Ø

1. The Andamanese classification by Manoharan (1983, 92) in Tree-diagram 1:
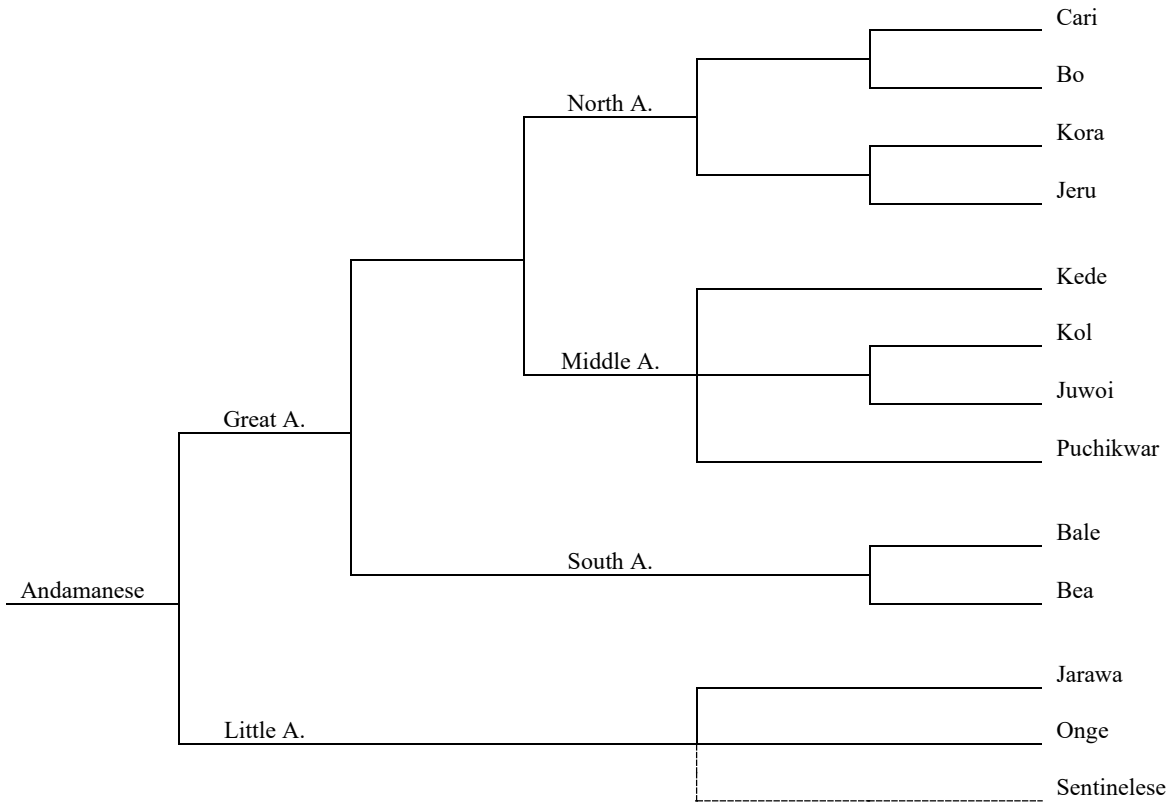
A. Andaman

2. The Great Andamanese classification by Hammarström, Forkel & Haspelmath 2019 (*Glottolog* 4.0) <https://glottolog.org/resource/languoid/id/grea1241> in Tree-diagram 2:
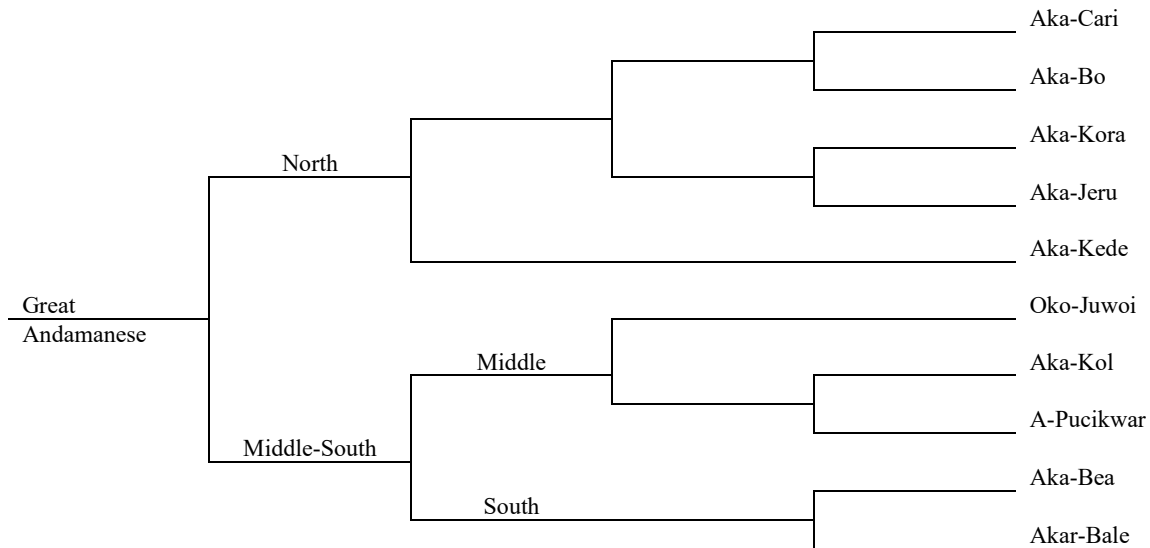
3. Andamanese classification by Ethnologue[22] (2019) in Tree-diagram 3: <https://www.ethnologue.com/subgroups/andamanese>
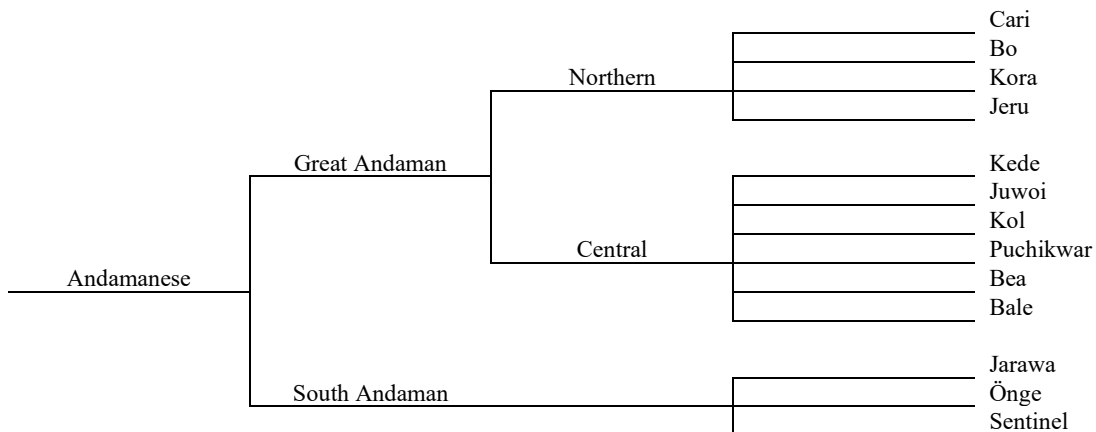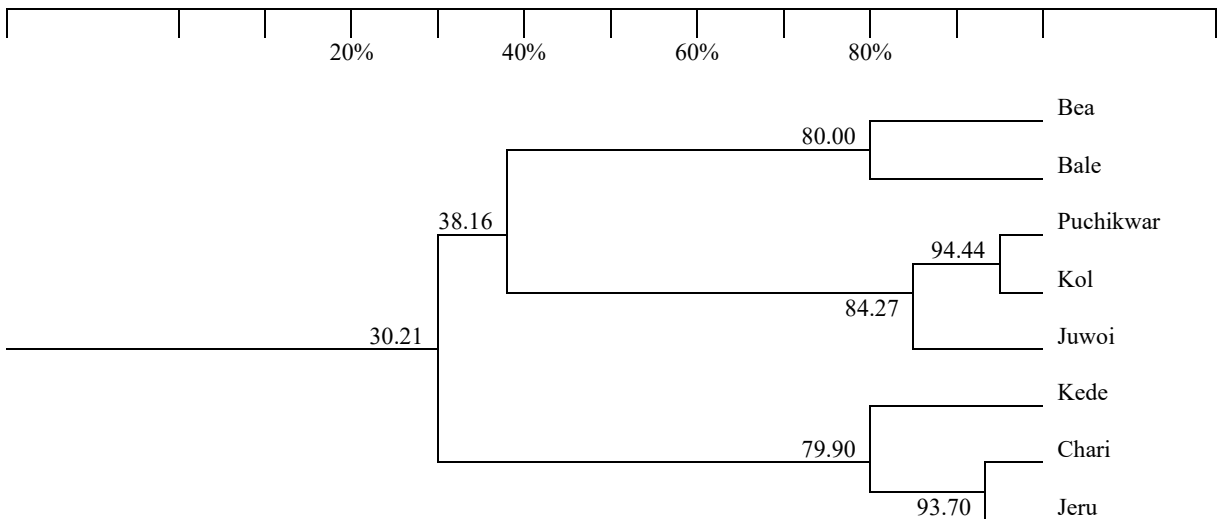
4. Probably the first quantitative classification of the Great Andamanese languages was realized by Comrie & Zamponi (2019). Applying the 200-word-list, they have obtained the following pairwise similarity percentages (p. 42):

%	Jeru	Great An.	Kede	Juwoi	Kol	Puchik.	Bea	Bale
Chari	54/58 = 93.10	114/149 = 76.51	120/153 = 78.43	54/147 = 36.73	49/149 = 32.89	51/150 = 34.00	34/154 = 22.08	32/149 = 21.48
Jeru		59/62 = 95.16	48/59 = 81.36	21/59 = 35.59	19/61 = 31.15	20/62 = 32.26	15/62 = 24.19	14/61 = 22.95
Great An.			97/150 = 64.67	52/173 = 30.06	48/175 = 27.43	47/177 = 26.55	28/182 = 15.38	29/175 = 16.57
Kede				59/147 = 40.14	52/149 = 34.90	55/150 = 36.67	37/154 = 24.03	36/149 = 24.16
Juwoi					150/178 = 84.27	150/178 = 84.27	64/178 = 35.96	68/178 = 38.20
Kol						170/180 = 94.44	67/180 = 37.22	71/180 = 39.44
Puchik.							70/181 = 38.67	71/180 = 39.44
Bea								144/180 = 80.00

These results may be projected into tree-diagrams according to two strategies, first applying the partial averages of the obtained percentages, second applying the minimal percentages from every partial group.

The method, using the partial averages of percentages, leads to **Tree-diagram 4a.**

The method, using the minimal values of percentages, leads to **Tree-diagram 4b:**

5. The present study aims to add to the Andamanese classification a chronological dimension, applying so-called 'recalibrated glottochronology,' which was developed by Sergei Starostin in the end of the 1980´s.

%	Bale	Puchi-kwar	Juwoi	Kol	Bo	Kede	Cari	Great An-dam.	Kora	Jeru	Onge	Jarawa
Bea	87/98 = 88.78	50/99 = 52.08	48/98 = 48.98	48/98 = 48.98	46.5/96 = 48.43	38/96 = 39.58	38/94 = 35.11	27/95 = 28.42	24/88 = 27.27	23/70 = 32.86	12.5/68 = 18.38	13/80 = 16.25
Bale		49/98 = 50.00	46/98 = 46.94	45/98 = 45.92	38/93 = 40.86	32.5/94 = 34.57	28.5/94 = 30.20	26/94 = 27.66	22/88 = 25.00	22/68 = 32.35	10.5/67 = 15.67	11.5/79 = 14.56
Puchi-kwar			87/98 = 88.78	93/98 = 94.90	74.5/95 = 78.42	44/95 = 46.32	39/93 = 41.94	36/94 = 38.30	32/87 = 36.78	27/69 = 39.13	11.5/67 = 16.17	15.5/79 = 19.62
Juwoi				83/98 = 84.69	69.5/93 = 74.73	48/94 = 51.06	42/92 = 45.65	41/94 = 43.62	32/87 = 36.78	28/68 = 41.18	11.5/67 = 16.17	16.5/79 = 20.69
Kol					70.5/93 = 75.81	48/94 = 51.06	41/92 = 44.57	37.5/94 = 39.90	31.5/87 = 36.21	26/68 = 38.24	11.5/67 = 16.17	14.5/79 = 18.35
Bo						57.5/94 = 61.17	46.5/94 = 49.47	36/91 = 39.56	32/85 = 37.64	28.5/66 = 43.18	9.5/68 = 13.97	16.5/79 = 20.89
Kede							69/94 = 73.40	57/95 = 60.00	47.5/85 = 55.88	41.5/69 = 60.14	15.5/68 = 22.78	15/79 = 18.99
Cari								62/90 = 68.89	51.5/84 = 61.31	43.5/68 = 63.97	13.5/68 = 19.85	14/79 = 17.72
Great An-dam.									86/88 = 97.73	55/67 = 82.09	14.5/67 = 21.67	14/78 = 17.95
Kora										46/61 = 75.41	14.5/63 = 23.02	11/75 = 14.67
Jeru											12.5/55 = 22.73	10.5/57 = 18.42
Onge												46/63 = 73.02

Applying the method of partial averages, these figures can be projected into **Tree-diagram 5a**:
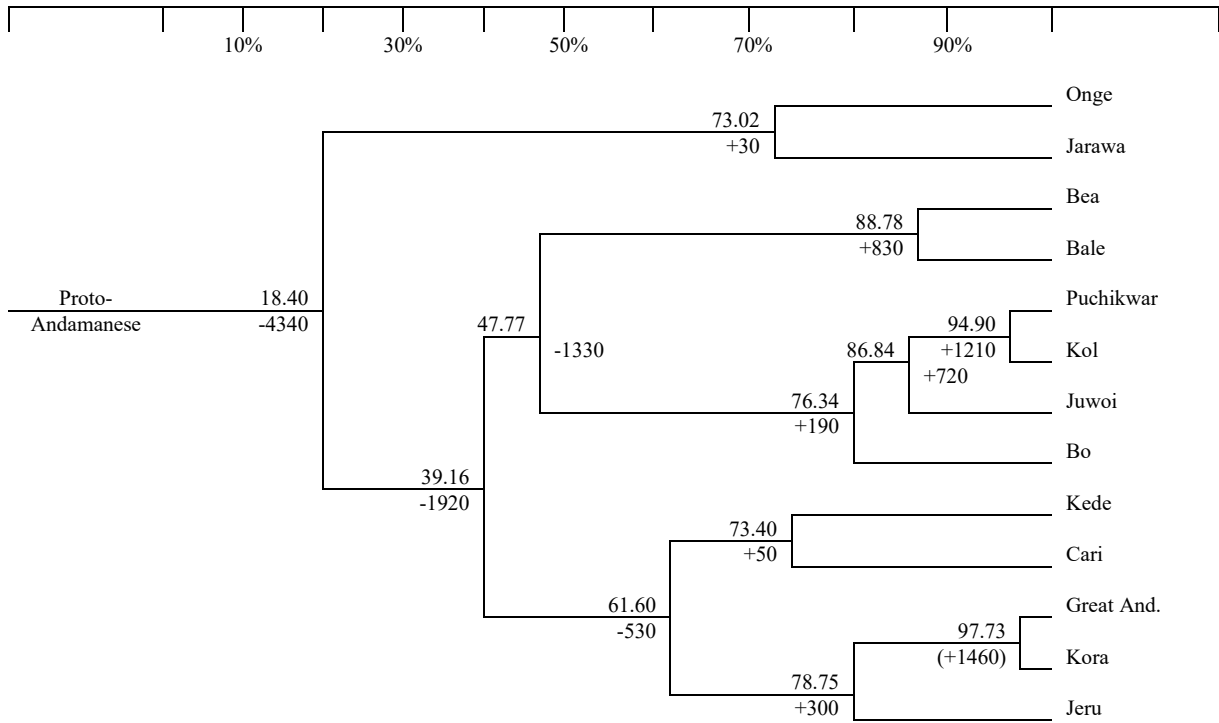
If the lowest percentages are preferred, the result is slightly different: **Tree diagram 5b**:
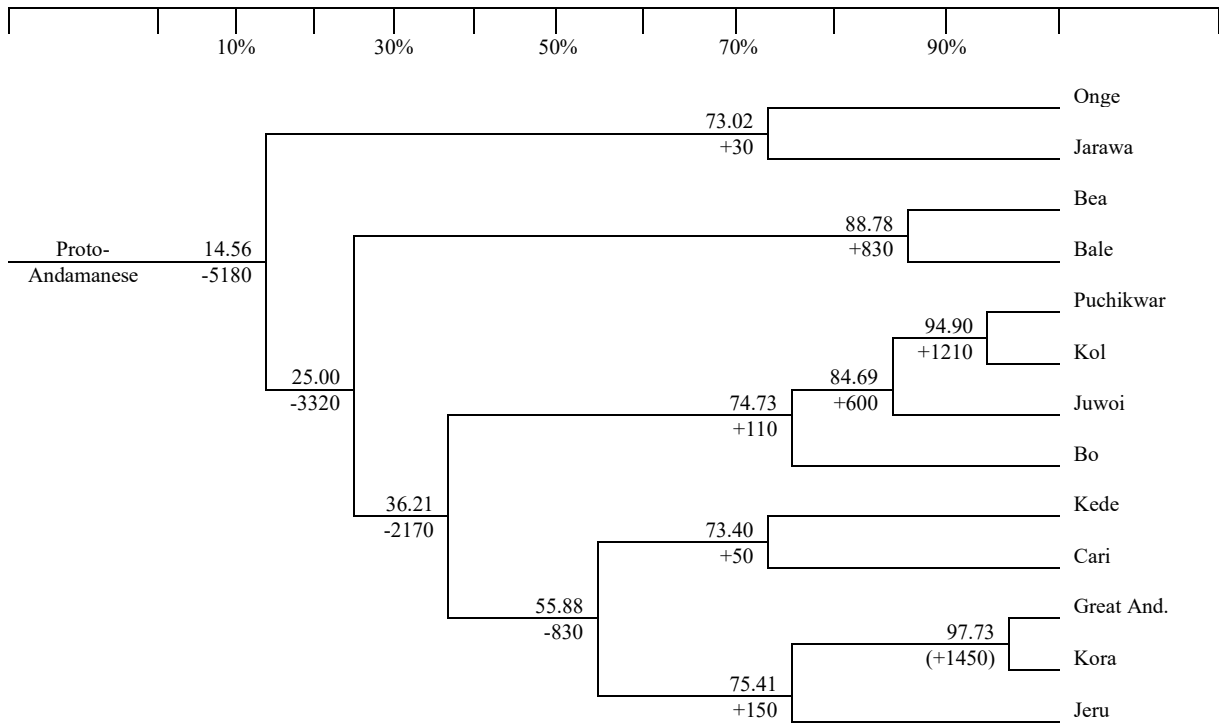
DISCUSSION OF RESULTS

Let us compare all models of classification of the Andamanese languages introduced here. The discussed models are designated according to the numbers of the corresponding tree-diagrams, i.e. models 1, 2, 3, 4a, 4b, 5a, 5b. With the exception of models 2 and 4, which classify only the languages of the Great Andaman, all remaining models agree in the first separation of the South/Little Andaman branch, represented by Kora and Jeru, and maybe also Sentinelese. The contemporary language called Great Andaman is more or less identical with Kora (97.73% common items in the 100-word-list), followed by Jeru (95.16% in the 200-word-list).

Models 1, 2 and 3 agree on the positions of Bo vs. Cari, Jeru & Kora; according to models 1 and 3 Kede belongs together with Kol, Juwoi & Puchikwar, while model 2 classifies Kede together with Bo, Cari, Jeru, Kora. On the other hand, the newly generated model 5 connect Bo with Juwoi, Kol, Puchikwar (74.73%, 75.81%, 78.42% respectively, against 49.47%, 43.18%, 39.56%, 37.64% for Bo vs. Cari, Jeru, Great Andaman & Kora respectively), and Kede with Cari (73.40%), and further with Kora//Great Andaman & Jeru (55.88%//60.00% & 60.14%, against 51.06%, 51.06%, 46.32% for Kede vs. Kol, Juwoi, Puchikwar respectively, all on the basis of the 100-word-list). The close position of Kede to Jeru (81.36%) and Chari (78.43%) is also supported in model 4, generated on the basis of 200-word-list. The relatively high score of Bo vs. Kede, 61.17%, is significantly lower than Kede vs. Cari (73.40%; both in 100-word-list) and may be explained from the direct Bo-Kede neighborhood along the western coast, while the Kede and Cari languages were separated just by the Bo and Jeru languages.

The second diagnostic feature in all classifications is the position of the Bea-Bale cluster. Models 2, 3, 4a, 5a agree on the closer relationship of Bea-Bale with Juwoi, Kol, Puchikwar (plus Bo according to the model 5), while models 1, 4b and 5b connect first Cari-Kora-Jeru and Kol-Juwoi-Puchikwar and only their common ancestor with Bea-Bale with regard to the lowest result between Bea(-Bale) and Cari-(Kora-)Jeru. For construction of tree-diagrams the method of partial averages is more adequate than the method of lowest percentages of the shared cognates. In the cases of models 1, 2, 3, it is not known which approaches to classification were applied.

On the other hand, models 4a & 5a represent in principle the same topology of the Great Andamanese tree-diagram - they differ only in the number of the languages studied. The chronological data of model 5a offer estimations of when the processes of divergence culminated. On the other hand, the chronological estimations developed in model 5b indicate the hypothetical beginnings of divergence. This means that the dates 5180 BCE and 4210 BCE are supposed to determine the probable times when the disintegration of the Andamanese protolanguage began, and when it culminated, respectively. This time interval is comparable with the dates of disintegration of several other language families, applying the same glottochronological procedure: Mon-Khmer - 5100 BCE; Sino-Tibetan - 5090 BCE; Austronesian - 4800 BCE; Tai-Kadai - 4310 BCE; Indo-European - 4340 BCE (all George Starostin 2015, 568) or 4670 BCE (Sergei Starostin, *Workshop on the chronology in linguistics*, Santa Fe 2004). These results give evidence that it is not necessary to divide the Andamanese languages into two independent language families. But it is also necessary

to stress that the comparison of Onge-Jarawa and the Great Andaman (sub-)families is only tentative and preliminary, namely for two reasons: (a) Lexical data of both, Onge and Jarawa, are incomplete: in the Onge and Jarawa 100-word-lists there are 33 and 20 missing items respectively; (b) The regular phonetic correspondences between both of the (sub-)families are not yet established and every lexical match is determined only intuitively. There were only several attempts to formulate basic sound rules between the Great Andamanese languages, which remain symptomatically unpublished, namely Alfredo Trombetti 1922-23, 409-18 (referring to the unpublished ms. *Studi di fonologia andamanese* of his former student, Emilia Pilla, from 1921); Timothy Usher (ms. 2003; he kindly sent to the author a synopsis of phonetic correspondences on June 21, 2014) and Juliette Blevins (forthcoming). It is important to mention that old records from the end of the 18th cent. till the early 1960´s are imperfect, only later descriptions recognize e.g. retroflexive dentals or aspirate labials.

APPENDIX 1: SUMMARY OF SOUND CORRESPONDENCES AMONG THE LANGUAGES OF GREAT ANDAMAN

Emilia Pilla (apud Alfredo Trombetti 1922-23, 409-18): lexical correspondences established by her lead to the following sound rules:

Bea	*t*	*d*	*d*	*p*	*b*	*b*	*p*	*k ~ ø-*	*g*	*g*
Bale	*t*	*d*	*d*	*p*	*b*	*b*	*p*	*k*	*g*	*g*
Puchikwar	*t*	*t*	*d*	*p*	*b*	*p*	*b*	*k*	*k*	*g*
Juwoi	*t*	*t*	*d*	*p*	*b*	*p*	*b*	*k*	*k*	*g*
Kol	*t*	*t*	*d*	*p*	*b*	*p*	*b*	*k*	*k*	*g*
Kede	*t*	*t*		*p*	*b*	*p*	*b*	*k*	*k*	
Chariar	*t*	*t*		*p*	*b*	*p*	*b*	*k*	*k*	

Bea	*č*	*ǰ*	*-ǰ-*	*y-*	*w*	*m*	*n*	*l*	*r*	*-ŋ-*
Bale	*č*	*ǰ*	*-ǰ-*	*y-*	*w*	*m*	*n*	*l*	*r*	*-ŋ-*
Puchikwar	*č*	*č*	*-ǰ-*	*y-*	*w*	*m*	*n*	*l*	*r*	*-ŋ-*
Juwoi	*č*	*č*	*-ǰ-*	*ǰ-*	*w*	*m*	*n*	*l*	*r*	*-ŋ-*
Kol	*č*	*č*	*-č-*	*y-*	*w*	*m*	*n*	*l*	*r*	*-ŋ-*
Kede	*č*	*č*	*-ǰ-*	*y-*	*w*	*m*	*n*	*l*	*r*	*-ŋ-*
Chariar	*č*	*č*		*ǰ-*		*m*	*n*	*l*	*r*	*-ŋ-*

Timothy Usher: Tentative consonantal correspondences.

Gr. Andaman*	**m*	**p^h*	**b*	**b'*	**n*	**t^h*	**t*	**d-*	**n^y*	**c^h*
North*	**m*	**p^h*		**b*	**n*	**t^h*	**t*		**n^y*	**c^h*
Central*	**m*	**p*		**b*	**n*	**t*	**t*	**d-*	**n^y*	**c*
South*	**m*	**p*		**p*	**n*	**t*	**t*	**d*	**n^y*	**j*

Gr. Andaman*	**c*	**j-*	**ŋ*	**kh*	**k-/*-k-*	**g?*	**l*	**r*	**y*	**w*
North*	**c*	**j-*	**ŋ*	**kh*	**k-/*-ø-*		**l*	**r*		
Central*	**c*	**j-*	**ŋ*	**k*	**k-/-k-*		**l*	**r*		
South*	**c*	**y-*	**ŋ*	**g*	**k-/-k-*		**l*	**r*		

Timothy Usher: Tentative vocalic correspondences.

Gr. Andaman*	**i*	?	**ei*	**e*	**E*	**æ*	**a*	**å*	**ü [iu]*	**ö [eu]*
North*	**i*	*i*	*e*	*e*			**a*		**i*	**e*
Central*	**i*	*e*	*e*	*e*	**E*	**æ*	**a*	**a*	**i*	**e*
South*	**i*	*i*	*i*	*e*	**E*	**æ*	**a*	**å*	**u*	**u*

Gr. Andaman*	*u [uo]	*o	*O	*oa	*Oa		*ai	*aü	*Oi
North*	*u	*o		*o	*O				*oi
Central*	*u	*o	*O	*o	*O	*ai	*ai	*ai	*oi
South*	*o	*o	*O	*a	*a	*æ	*ai	*u	*ai

Blevins fc.

Great Andaman*	*p	*b	*m	*w	*t	*d?	*n	*l	*r	*c	*ɲ	*y	*k	*ŋ
North														
Cari	p	b	m	w/ø	t	d	n	l	r	c	ɲ	j	k	ŋ
Kede	p	b	m	w	t	d	n	l/y/ø	r	c	ɲ	j/y	k	ŋ
Central														
Bo	p	b	m	w	t	d	n	l	r	c	ɲ	y	k	ŋ
Puchikwar	p/ø	b	m	w	t	d	n	l	r	c	ɲ	y	k/c	ŋ
South														
Bea	p/b/ø	b	m	w	t/d	d	n	l	r	c/j	ɲ	y	k/g	ŋ

Great Andaman*	*i	*u	*a	*e	*o	*ə	*uə	*ai
North								
Cari	i/e	u	a	e	o	o / V	i	ai
Kede	i	u	a	e	o	o / V	i	ai
Central								
Bo	i	u	a	e	o	o / V	i	ai
Puchikwar	i	u	a	e	o	a / V	i	ai
South								
Bea	i	u/o	a	e	o	a / V	u	ai/e/i

Note: The idea of Blevins (2007) about the Austronesian links of the Onge-Jarawa protolanguage should be carefully verified in perspective of the Great and perhaps Common Andamanese protolanguage. The Austronesian influence cannot be excluded, but probably came later, e.g. a hypothetical trajectory of the migration wave bringing Malagasy to the island of Madagascar could have included the Andamanese Islands. It is possible to speculate that disintegrations of several partial protolanguages in the period 30-300 CE or 30-150 CE according to models 5a and 5b, respectively, may reflect these events.

APPENDIX 2: LANGUAGE MAPS

The Andamanese tribal territories just before earliest intensive European contact (mid-19th century)

Note that many of the borders between the tribes were fairly flexible and may have changed every now and then.
This was especially so in the south between the Jarawa and Aka-Bea where continuous hostilities characterized the only common border between the two main Andamanese groups (the Great Andamanese and the Onge-Jarawa group).

Aka-Cari
Aka-Kora
Aka-Bo
Aka-Jeru
Aka-Kede
Oko-Juwoi
Aka-Kol
A-Pucikwar
Aka-Bea
Akar Bale
HJW

Great Andamanese tribes
Jarawa
Sentineli
Jangil (extinct ca. 1905)
Onge

<http://www.andamanese.net/Grammar_Notes.html>

Blevins 2007, 157

APPENDIX 3: THE INDO-PACIFIC HYPOTHESIS

The Indo-Pacific hypothesis proposes a genetic relationship among pre-Austronesian languages in the insular area between the Indian and Pacific Oceans. These include the languages of the Andaman Archipelago; the Indonesian islands Timor, Alor and Pantar; North Halmahera; all Papuan (i.e. non-Austronesian) languages of New Guinea; Tasmania; and the islands to the west of the (mostly Austronesian-speaking) Solomon Islands, as that hypothesis was proposed by Joseph H. Greenberg (1971-2005). Jonathan Morris (2008) speaks about Alfredo Trombetti as the forefather of the Indo-Pacific hypothesis, but Trombetti more accurately played the role of a godfather since he was working from the results of his two predecessors, Hans Schnorr von Carolsfeld and Riccardo Gatti. These (also cited by Morris), and especially the latter, were the true forefathers of the hypothesis.[1]

Both Schnorr von Carolsfeld and Gatti concentrated on the Australian languages, searching for potential relatives outside the Australian continent. In *comparanda* summarized by Schnorr von Carolsfeld it is possible to identify 20 lexical parallels between Australian and Andamanese languages, with three possible Papuan cognates among them. Gatti collected as many as 170 Australian-Andamanese lexical parallels, with 21 possible Papuan cognates. Among these Australian-Andamanese parallels are also two hypothetical Tasmanian cognates, but without Papuan counterparts.

Greenberg (1971, 2005) excluded the Australian languages and focused on comparing the various Papuan languages to the Andamanese and the extinct Tasmanian languages. Altogether he

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[1] In his book *L'unità d'origine del linguaggio* (1905), Trombetti could not yet use the results of Gatti, published only in 1906 and later. Among his examples of global etymologies, Trombetti included 6-7 lexical comparisons connecting the Andamanese, Papuan and Australian languages, which were apparently identified by himself.

collected 35 Andamanese-Papuan lexical parallels. In addition, he identified three common pro-nominal bases, as well as the velar suffix of the past tense, which are common to both the Anda-manese and several groups of the Papuan languages.

Wurm (1975: 927-929) generally accepted Greenberg's Andamanese-Papuan comparisons, though he believed it more probable that their similarities were due to the existence of a substratum.

More critical was Pawley (2009), and for this reason his careful evaluation of Greenberg's results is instructive. From the corpus of 84 Indo-Pacific lexical comparisons collected by Green-berg, where the Andamanese data were represented in 35 items, Pawley (2009: 167) chose the 23 most promising lexical comparisons, including six hypothetical cognates in the Andamanese lan-guages and five in the Tasmanian languages. He remains skeptical, citing other specialists in the field who hold a similar opinion (Pawley 2009, 160):

> Why has the Indo-Pacific hypothesis received little attention from specialists in the relevant language groups? In the four decades since Greenberg's main publication on this subject there have been a handful of brief assess-ments by specialists, consisting of just a few sentences, and all have rejected the evidence as unconvincing (among these are Laycock 1975; Pawley 1998, 2005; Ross 2005).

But Pawley's categorical dismissal of the hypothesis is weakened by his omission of the work of Timothy Usher, who focuses his attention on reconstruction of the partial protolanguages of the individual language families, including the reconstruction of the protolanguage of the Great An-daman languages.[2] Usher offers a quite new conception of the genealogical classification of all non-Austric languages of the Indo-Pacific region, dividing them into two great super-groups, and noting their mutual interactions and relations:[3]

Paleo-Sundic
   A. Kusunda
   B. Great Andamanese
   C. Önge
   D. North Halmahera
   E. West Bird's Head
   F. Bernesu
   G. Abun
   H. Brat
   I. ?Yawa

Old Oceanic
   A. Timor-Alor-Pantar & Trans New Guinea
   B. East Papuan ('Paleo-Melanesian': New Britain, Solomons, Santa Cruz, Bougainville)
       & Tasmanian
   C. Australian

---

[2] This ms. was unfortunately lost, but was seen by the present author in Santa Fe in 2003.
[3] Originally presented at the conference *Asian Remnant Languages and the Year of the Australoid*, held at Harvard University, Oct 21-22, 2006, and published in *Mother Tongue* 11, 2006, 295–298.

The East Papuan phylum is classified by Usher (2002: 66) as follows:

```
                        Pele-Ata
                                          West Bougainville
                        Bougainville
                                          East Bougainville

                                                          Baniata-Bilua
   East Papuan         Central Solomons
   = Paleo-Melanesian                                     Lavukaleve-
                       Central Melanesian
                                                                  -Savosavo
                                                          Yele (Rossel Island)
                                    Rossel-Santa Cruz
                                                          Reef-Santa Cruz
                       Tasmanian
```
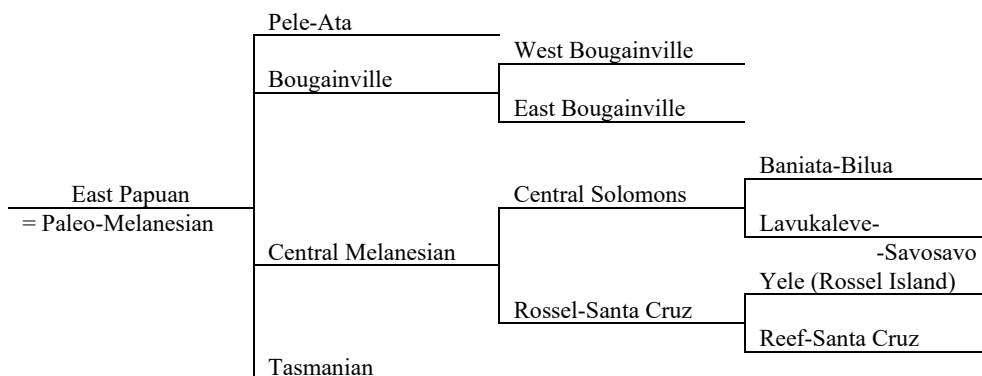
The conclusions of Timothy Usher should naturally be verified, but his proposal allows for the inclusion of a greater number of reconstructed protolanguages of individual Papuan families, and so the conditions for the use of the standard comparative method are thereby improved.

Acknowledgements

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J = Jero Wordlist₂, https://ia800301.us.archive.org/24/items/rosettaproject_akj_swadesh-1/akj.txt.

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Bea: <https://ia800300.us.archive.org/34/items/rosettaproject_abj_swadesh-1/abj.txt>
Jeru: <https://ia800301.us.archive.org/24/items/rosettaproject_akj_swadesh-1/akj.txt>
Juwoi: <https://ia800502.us.archive.org/1/items/rosettaproject_okj_swadesh-1/okj.txt>
Kede: <https://ia800300.us.archive.org/27/items/rosettaproject_akx_swadesh-1/akx.txt>
Kol: <https://ia800301.us.archive.org/25/items/rosettaproject_aky_swadesh-1/aky.txt>
Kora: <https://ia800303.us.archive.org/22/items/rosettaproject_ack_swadesh-1/ack.txt>
Puchikwar: <https://ia800302.us.archive.org/9/items/rosettaproject_apq_swadesh-1/apq.txt>

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THE FATHER TONGUES L, R AND P

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Abstract

The Father Tongues L, R and P represent hypothetical ancestral languages spoken by the original bearers of these paternal haplogroups at the dawn of the Holocene. This time depth lies at, or slightly beyond, what I have termed the Linguistic Event Horizon, and as such may still just be accessible to historical linguistic research by means of the comparative method. This article serves succinctly to present these three hypotheses as components of an integrated theory of male-biased migrations representing linguistic intrusions associated with the founding dispersals of linguistic phyla.[1]

THE INDIAN SUBCONTINENT

The role of the Indian subcontinent in hominin prehistory was no doubt far more pivotal than has hitherto been appreciated. Despite the overwhelming evidence for an ultimate African origin of our species, the possibility that the most recent common ancestor of *Homo sapiens* and *Homo neanderthalensis* might have lived in southwestern Asia cannot be excluded (Bermúdez de Castro & Martinón-Torres 2022). At the same time, the Narmadā skull, discovered in Madhya Pradesh in 1982 and dated as being anywhere between 46,000 and 236,000 years old, could represent a form intermediate between *Homo erectus* and archaic *Homo sapiens* (Sonakia & de Lumley 2006, Athreya 2010). In a similar vein, the molecular vestiges of introgression in modern populations of the Indian subcontinent indicate at least two independent episodes of archaic Denisovan admixture (Browning *et al.* 2018. Teixeira & Cooper 2019, Mondal *et al.* 2019). The chronology of Palaeolithic cultural evolution and tool artefacts in the Indian subcontinent is not as simple and straightforward as it is in

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[1] This paper has been written up in sequel to a series of invited lectures which I have presented over the past few months, viz. 'The discovery of Indo-European: The true story' and 'The provenance of the coastal Karnataka languages and the Greater Dravidian question', both at Mangalore University on 19 December 2022, 'The Elamo-Dravidian linguistic theory and a hypothetical molecular genetic correlate', at Banaras Hindu University on 12 March 2023, 'Indo-European, Indo-Iranian and Burushaski: Linguistic intrusions and the Aryan controversy', at Mohanlāl Sukhāḍiyā University in Udaipur on 15 March 2023, and 'The Aryan Invasion controversy resolved: The lost ancestral Father Tongues L, R and P', at Banaras Hindu University on 24 March 2023.

Europe and instead suggests prehistoric cultural plurality, with a diversity in material cultures mirroring a population history that was likely to have been of a more complex nature in the Subcontinent than what transpired in Europe (Dennell *et al*. 1988, Akhilesh *et al*. 2018, Anil *et al*. 2022).

Language families represent the maximal time depth accessible to historical linguists because the relatedness of languages belonging to a recognised linguistic phylum represents the limit of what can be demonstrated by the comparative method. For good reason, therefore, the epistemological boundary beyond which attempts at linguistic comparison are reduced to sheer speculation has been called the Linguistic Event Horizon (van Driem 2017). Consequently, the linguistically reconstructible past has a far shallower time depth and takes us back only to the dawn of the Holocene or perhaps just to the tail end of the Pleistocene. However, even in this briefer span of time the Indian subcontinent has repeatedly served as a crossroads and staging area, shaping the ethnolinguistic prehistory of the world (van Driem 2021).

FROM LINGUISTICS TO POPULATION GENETICS

Often we forget that linguists and philologists blazed the trail in the field of research into ethnolinguistic prehistory. Since the 19th century, linguistic findings and philological gleanings have prompted the investigations of archaeologists, ethnographers and, most recently, population geneticists. Vedic textual evidence (Lassen, 1847, 1852, 1858, 1861) and the geographical distribution of Dravidian languages viewed against the language family's internal phylogeny (Caldwell 1856) led scholars to seek a Dravidian homeland in the northwest of the Indian subcontinent. In 1861, Lord Canning appointed Alexander Cunningham as the first director of the Archaeological Survey of India, in which capacity Cunningham (1875) became the first to describe an Indus seal. When the first archaeological excavations in the Indus valley were undertaken in the 1920s, the textual analysis of Vedic toponyms by Brunnhofer (1893) and the phylogenetic position of Brahui within the Dravidian language family as well as the geographical position of the Brahui speaking community (de Saumerez Bray 1909, 1934) inspired the identification of the newly discovered Indus civilisation as an ancient Dravidian culture that had been overwhelmed by incursive Indo-Aryans (Marshall 1924, 1926, 1931, Schrader 1925, Chatterji 1951, Wheeler 1959, 1966, Zvelebil 1965). A Dravidian Indus still fits both the Indo-European historical comparative linguistic consensus (Beekes 1995) as well as our understanding of the wider archaeological context (Mallory 1989, Kuz'mina 1994).

The Elamo-Dravidian hypothesis was advanced in 1856 by Robert Caldwell, who discerned a genetic relationship between the Dravidian languages and one of the three languages of the Behistun inscription, which had been deciphered by Henry Creswicke Rawlinson in 1847. The language of antiquity in question was only later identified as Elamite, and the hypothesis advanced by Caldwell in his comparative grammar of the Dravidian languages would only receive the name 'Elamo-Dravidian' over a century later when Igor' Mixaǐlovič D'ǐakonov in 1967 fleshed out Caldwell's conjecture into an empirically based linguistic theory of genetic relationship. Much of Dravidian verbal inflection is innovative (Bloch 1946, D'ǐakonov 1967, Steever 1993), and for purposes of historical linguistic comparison it is essential to proceed from the reconstructible Proto-Dravidian system. In addition to the

typological similarity that both Elamite and reconstructed Proto-Dravidian exhibit suffixal agglutina-tion to largely invariant verbal and nominal stems, D'i̯akonov adduced correspondences between Proto-Dravidian case endings and Elamite nominal postpositions, the match of the pronouns, the cor-respondence of the Elamite desinence for the *nomen actionis* <-ka ~ -kka> with modern Dravidian reflexes, the correspondence of the Elamite perfect or subjunctive suffix <-ta> with the Dravidian past participial ending <-ta> and salient shared lexical roots. Proponents of the theory included Mixail Ser-geevič Andronov (1978) and David Wayne McAlpin (1981), but the theory also had its detractors, most notably the late Bhadriraju Krishnamurti (1978), who, however, in the face of cumulative evi-dence, subsequently softened and, before his death, essentially reversed his stance (Krishnamurti 2003). Although research on the Indus script has not yielded a definitive decipherment, the Indus writ-ing system has been shown most likely to have represented a Proto-Dravidian tongue (Mahadevan 1977, Knorozov *et al.* 1981, Parpola 1994, 2010).

In the late 1990s, a Swiss and Italian team of population geneticists led by Laurent Excoffier at the University of Bern studied the global distribution of uniparental markers, comparing and con-trasting maternally inherited markers in the mitochondrial dna and paternally inherited markers on the Y chromosome. The Swiss-Italian team discovered that the languages spoken by particular com-munities were shown ubiquitously, although not universally, to correlate with the paternally inherited markers prevalent in that same population (Poloni *et al.* 1997, 2000). This pattern of Y-chromosomal markers correlating with language reflects male-biased linguistic intrusions and has become known as the *Father Tongue* correlation. The preponderance of the pattern allows us to deduce that a mother teaching her children their father's tongue must have been a prevalent and recurrent pattern in lin-guistic prehistory (van Driem 2007).

THE LONG LOST ANCESTRAL FATHER TONGUES L AND R

Although the Indus population may very well have been heterogeneous in terms of the paternal lineages present in the extensive area covered by this ancient civilisation, the hypothesis was ad-vanced that the paternal lineage L (M20/PF5570) may be associated with Elamo-Dravidian civili-sation (van Driem 2012: 353). Assuming the veracity of this hypothesis, this Y-chromosomal marker could serve as a molecular tracer dye for the waves of Indus migrants moving from the northwest into southern India at the beginning of the second millennium BC (Figure 1). Such cor-relations have indeed been observed in the Y-chromosomal phylogeography of the Indian subcon-tinent (Sequeira *et al*. 2023). It must be kept in mind that the chronology of the branching off of the various paternal subclades of the molecular polymorphism putatively associated with ancient speakers of a lost ancestral Father Tongue L need not necessarily have lain at the same time depth as the geographical dispersal of the ancient Elamo-Dravidian bearers of the haplogroups in ques-tion. This emerging Y-chromosomal picture appears to capture portions of the prehistoric dispersal of Dravidian, which Andronov (1978) visualised as originating in the northwest somewhere be-yond the Indus and spreading gradually across the entire Indian Subcontinent toward the Palk Strait like 'a head of cabbage which shed its leaves one after another as it moved southwards.'

Figure 1: The Y-chromosomal clade K (M9) splits into K1, also known as paternal clade LT (L298), and paternal K2 (M526). Y-chromosomal clade LT (L298) splits further into the lineages L (M20) and T (M184), reproduced from van Driem (2021: 160) with the gracious permission of the publisher.

Frederik Kortlandt (2020) presented a comprehensive phylogeny of the Indo-European language family based on sound laws and innovations to the morphological system. In the updated *Stammbaum*, depicted by Raṇdhīr Śāṇḍilya in my ethnolinguistic handbook (van Driem 2021: 37), the bifurcation of East Satəm into Indo-Iranian and Balti-Slavic is seen to constitute the most recent split in the chronology of branching of the Indo-European language family tree. Linguistic phylogeny therefore snugly fits the conventional view of a relatively recent Indo-Iranian linguistic intrusion spreading from Central Asia southward onto the Iranian plateau and into the Indian subcontinent in the early second millennium BC. The spread of the Y-chromosomal subclades R1a (M420) and R1b (M343) are currently considered to be the molecular proxies for the paternally mediated spread of Indo-European language into Europe as well as for the spread of Indo-Iranian from Central Asia into the Indian subcontinent at the time of the demise of the Indus civilisation. However, the spread of paternal lineages R1a (M343) and R1b (M420) into the Indian subcontinent from the northwest at this time form part of a larger episode of prehistory at a more profound time depth.

Inside India a controversy has long waged amongst scholars and laymen, with one camp knowledgeable with regard to the overwhelming cumulative linguistic, archaeological and, most recently, molecular genetic evidence for an Indo-Iranian linguistic intrusion into the subcontinent from the northwest and the other camp opposing an 'Aryan invasion' and favouring an indigenous origin for the Aryans, with a handful of Western polemicists egging them on. Witzel (1999, 2001, 2005) has occasionally taken the trouble to assail the indigenist stance, and popular scientific books have sought to enlighten the general public by undertaking to explain the more well-informed view of the peopling and prehistory of the Subcontinent (Joseph 2018, Thapar 2019). On the other side, a passionate belief in an indigenous Indian origin of the Aryans has spawned a veritable cottage industry of poorly informed popular polemic, brimming with misappraisals of the scientific evidence, e.g. Fraudley (1994), Knapp (2012), Lal (2015), Chavda (2017), Elst (2018), Talageri (2019), Sastry (2020). The latter group has failed to understand and consequently misinterprets the evidence and the science. But ironically these same polemicists might be pleased by the newer linguistic and Y-chromosomal evidence suggesting that that the linguistic ancestors of the Indo-Europeans, millennia before the advent of the Aryans to the Subcontinent, are likely to have been indigenous to India at some more distant point of time in the prehistoric past.

This evidence comes both from linguistics and population genetics. Ilija Čašule (1998, 2003, 2012, 2014, 2016, 2017, 2018, 2020) has adduced evidence for a deep genetic relationship between Indo-European and Burushaski. In their reactions to Čašule's 2012 presentation of correspondences in the *Journal of Indo-European Studies*, the late Indo-European linguist Eric Pratt Hamp and Phrygian scholar Vladimir Petrovič Neroznak favourably appraised the evidence (Čašule 2012).[2] Čašule's linguistic hypothesis gains interest when viewed in the light of Y-chromosomal phylogeography. The finding that Y-chromosomal haplogroup R2 (M479) is the most frequently occurring paternal lineage amongst the Burusho dovetails neatly with Čašule's theory of a linguistic relationship between Burushaski and Indo-European. Assuming the applicability of the widely observed Father Tongue correlation, the phylogeography of the Y-chromosomal haplogroup R (M207) and its subclades suggests that a genealogical tie between Burushaski and Indo-European would have lain at the time depth of the clade R (M207) itself (Figure 2).

This Father Tongue R theory of a 'Burusho-European' proto-language, presented in the ethnolinguistic handbook (van Driem 2021), distils a whittled down version from Čašule's theory, with Proto-Indo-European associated with the paternal subclades R1, R1a, R1b and Proto-Burushaski associated with the Y-chromosomal subclade R2. At the time depth of the break-up of Indo-European, the Indo-Europeans spread from the Pontic Caspian steppe, bearing both their languages and their Y-chromosomal subclades westward across the continent of Europe, eastward into what today is East Turkestan and southward through Central Asia into the Indian subcontinent and onto the Iranian plateau. The East Satəm branch splitting into Indo-Iranian and Balto-Slavic representing the most recent major split in the Indo-

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[2] In addition to arguing for the Indo-European affinity of Burushaski, Čašule's 'Burushaski-Phrygian' theory comprises two other subsidiary hypotheses, viz. a close genetic affinity between Burushaski and Phrygian and a provenance of the linguistic ancestors of the Burushaski in Asia Minor or even the Balkan. Here I disregard the latter two hypotheses for which the evidence to date appears to me to be less compelling.

European language family tree, and the subsequent advent of the Aryans to the northwestern portion of the subcontinent coincided with the demise of the Indus civilisation in the early second millennium BC.

In fact, a causal relationship between the two has long been argued, with the Aryans depicted as illiterate bellicose migrants, exhilarated by the ephedra alkaloids contained in *soma*, overwhelming and infiltrating the urbanised and more urbane Indus valley civilisation. The Aryan linguistic intrusion into the subcontinent as depicted in the Ṛgveda 'constantly assumes the form of an onslaught upon the walled cities of the aborigines,' i.e. the *pur*, with the Aryan god Indra featuring as the *puraṃdara* 'destroyer of aboriginal forts,' who shattered ninety of such strongholds (Wheeler 1966, 1968). Gordon Childe (1964: 188) observed that the ancient Aryan bards 'sang their Vedic hymns in a prehistoric night, for the invasion completely broke the literary tradition, and there is no fixed point in Indian history till the reign of Darius.' Over a millennium later, ca. 500 BC, the bureaucracy of the Persian Empire brought the Aramaic variant of the Semitic consonantal alphabet to the Indus Valley, where this writing system was adapted, developing into the Kharoṣṭhī script.
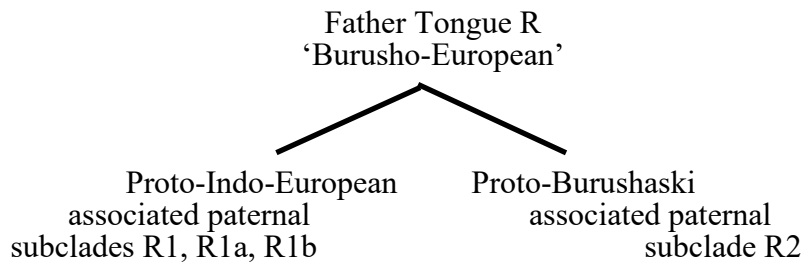

Figure 2: The Y-chromosomal clade R (M207) gave rise to the subclades R1a (M343), R1b (M420) and R2 (M479), reproduced from van Driem (2021: 205) with the gracious permission of the publisher.

So, whilst the Aryans do indeed appear to have come to India from the steppe, the ancestors of the Indo-Europeans, several millennia before the ethnogenesis of the Aryans, originated from India. Journalists have begun to share this message with the public at large, albeit in a simplified form (Asthānā 2023).

The long lost ancestral Father Tongue P

Ilija Čašule's Burushaski theory therefore takes us back to a time long before the back migration of the ancient Indo-Iranians to the Indian subcontinent, further back to a more distant time when the linguistic ancestors of the Proto-Indo-Europeans first left the Indian subcontinent for the steppe, whence they would later disseminate in all directions, including back to the Indian subcontinent. In addition to arguing for the Indo-European affinity of Burushaski, Čašule's theory comprises two other subsidiary 'Burushaski-Phrygian' hypotheses, viz. a close genetic affinity between Burushaski and Phrygian and a provenance of the linguistic ancestors of the Burushaski in Asia Minor or even the Balkan. If, for the time being, we disregard the latter two hypotheses, for which the evidence to date appears to me to be less compelling, then we are left with the Father Tongue R, which we may call 'Burusho-European'.

Father Tongue R
'Burusho-European'

Proto-Indo-European
associated paternal
subclades R1, R1a, R1b

Proto-Burushaski
associated paternal
subclade R2

An older linguistic theory with regard to the genealogical affinity of Burushaski takes us back to an even greater time depth in the prehistoric past. Morphological correspondences between the Burushaski and Yenisseian systems of biactantial verbal agreement were first adduced by Vladimir Nikolaevič Toporov (1969, 1971) as evidence of a genetic relationship. I proposed that Yenisseian could be related to Kusunda (van Driem 2001, 2008), with additional data on the Kusunda language made available by the late David Watters (2006). More recently, the Na-Dene languages have been added to this putative linguistic phylum (Vajda 2010, 2013), much of whose work owes an unacknowledged debt to the extensive research of the late Sergeĭ Anatol'evič Starostin. A critical appraisal of the various versions of this Greater Yenisseian or Dene-Kusunda theory was provided by Gerber (2017), who highlighted problematic and undecided issues.

Father Tongue P
'Kusunda-European'

Father Tongue R
ancestral to Burushaski
and the Indo-European
languages

Dene-Kusunda
ancestral to Kusunda,
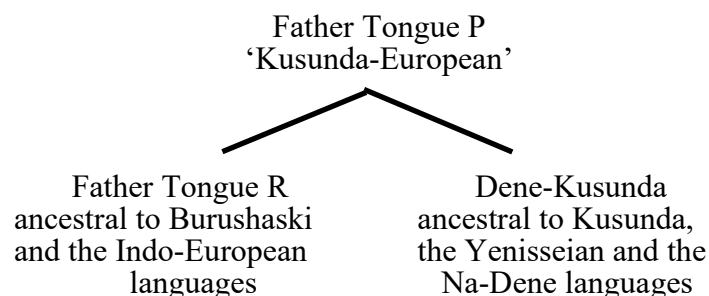the Yenisseian and the
Na-Dene languages

Figure 3: The paternal clade known by its traditional Y Chromosome Consortium label as haplogroup P, now relabeled by the International Society of Genetic Genealogy as haplogroup K2b2 (P295, PF5866, S8), gave rise to the subclades Q (M242) and R (M207/UTY2).

Fifteen years ago, in a *Festschrift* for the late Roland Bielmeier, I proposed that the dispersal of a subset of paternal lineages of the Y-chromosomal haplogroup Q (M242) might serve as a molecular tracer dye for the dispersal of the Greater Yenisseian or Dene-Kusunda linguistic phylum (van Driem 2008: 50). Both the paternal lineages Q (M242) and R (M207/UTY2) are subclades of the Y-chromosomal haplogroup K2b2 (P295, PF5866, S8), better known by its older Y Chromosome Consortium label as haplogroup P (Figure 3). The time depth of a hypothetical Father Tongue P most likely lies beyond the epistemological boundary of the Linguistic Event Horizon, but the highly flectional nature of this hypothetical 'Kusunda-European' proto-language can perhaps to some extent be inferred from the linguistic typology of its putative descendants.

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ROOT TRANSFORMATIONS IN PROTO-INDO-EUROPEAN

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Abstract

Proto-Indo-European roots may exhibit the *s*-mobile, vowel ablaut, or nasal infix with no change in semantic value. This paper suggests three additional types of regular variation that may occur in the phonetic structure of PIE roots without causing core semantic change: (1) Medial resonants can vary within a fixed consonant structure; (2) Radical metathesis can occur where the consonantal root structure inverts; and (3) Synonym pairs occur that differ only in that one of the members shows a reduction in voicing and aspiration similar to the changes that occurred in Tocharian. Recognition of these three types of root variation allows for a meaningful grouping of genetically related roots. This classification may aid in making valid long-range comparisons between PIE and outside language families.

I. INTRODUCTION

Attempts to demonstrate genetic links between Indo-European and outside language families have, so far, achieved only limited success, generally failing to convince a majority of scholars. The reasons for this cannot always be justly ascribed to the obstinacy of established academia, since all too often the evidence presented has been weak.

In a recent and well-reasoned article, Starostin, Zhivlov, and Kassian[2] assess the current state of the Nostratic Hypothesis, observing that, "Nostratic linguistics has remained in a state of permanent crisis." They recommend that further work in the field should focus on the quality of the putative correspondences rather than simply adding to their quantity. The article ends with the statement:

> Ultimately, it is our firm belief that Nostratic linguistics, while currently in a state of mild stagnation, may overcome this state by means of important methodological reforms—even if many of these reforms might not be for the liking of conservative supporters of the hypothesis... We also believe that these reforms, in the long run, will be useful not only for all the other promising hypotheses of long-distance relationship…, but also for further research on uncontroversial families of small time depth, including Indo-European itself.

Part of the problem may be that PIE, as currently reconstructed, reflects a time depth that is out of sync with the other languages to which it can be meaningfully compared. This problem was noted by Winfred Lehmann almost twenty-five years ago. He wrote,

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[2] Starostin, Zhivlov, and Kassian, "The 'Nostratic' roots of Indo-European," 392-415.

> Proto-Indo-European is reconstructed on the basis of languages attested in the second millennium B.C. It may then be dated in the third millennium, with possible extension to the fifth. No one assumes that date for Proto-Afroasiatic, since we have Egyptian and Akkadian texts from the third millennium. The two languages differ from one another considerably so that Proto-Afroasiatic must be dated from a much earlier time. *For reconstructing Nostratic, a far earlier form of Indo-European must then be reconstructed than that in the well-known handbooks*.[3]

What follows is a presentation of evidence suggesting the presence of grammatical or dialectical variants within the reconstructed roots of the PIE lexicon. By recognizing such variants and reconstructing their common source it may be possible to recover an earlier stage of the proto-language, one that is more amenable to longer-range comparisons.

This investigation is entirely focused on roots and root structure. It starts by noting three well-established phonetic variations that can occur in PIE roots that do not affect their semantic value: the *s*-mobile, vowel ablaut, and the nasal infix. It continues by suggesting three additional types of root modification that likewise do not change semantic values.

The examples cited involve roots that appear to reflect the deepest strata of the language. Their meanings involve primal human activities: breathing, hunting, social structure, conception and birth, preparing and sharing out food, seeing and knowing, fighting, and building with earth. This observation suggests that the phonetic mutations involved must have originated at a time-depth significantly older than the so-called "period of PIE unity" around 4,500 BC.

Another indication that these mutations are ancient is the degree of fluidity exhibited in the root structure. What we see is not mere tinkering around the edges of roots with prefixes and suffixes, but rather significant transformations in the very structure of the root itself. It would be surprising if such transformations were to occur in a later period when, by comparison, root structure in PIE had already become much more stabilized.

The argument for the existence of these fundamental root transformations is that they are consistent and widespread. The semantic values of roots, despite phonetic transformations, generally cluster in tight fields of meaning, typically not more divergent than that seen within individual roots widely accepted as part of the PIE lexicon. Occurrences of the universally recognized *s*-mobile, can, for example, be shown in sufficient quantity to establish its unquestioned place in the proto-language.[4] Like the *s*-mobile, the following three types of root-variation occur widely in the PIE lexicon.

1. Resonant Variation

Two earlier papers by the present author[5] suggested that resonant-variation within a fixed consonant structure can occur with little or no semantic effect on PIE roots. This is an archaic feature of

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[3] Lehmann, "What Constitutes Scientific Evidence in Paleolinguistics?" 76 (emphasis added).

[4] Out of the approximately 1050 roots listed in LIV, about 45 exhibit the *s*-mobile. Mann states: "For such a science [Indo-European linguistics], absolute and final proof is probably unattainable, but if a relationship can, in terms of Euclid, be 'demonstrated' by an adequate amount of analogy, the result can be both probable and convincing." Mann, *An Indo-European Comparative Dictionary*, viii.

[5] Haynes, "Resonant Variation in Proto-Indo-European," *Mother Tongue Journal* 22 (2020): 151-222; and Haynes, "Resonant Variations on Immortality," *Mother Tongue Journal* 23 (2021): 151-162 (both articles are available on-line at https://www.mother-tongue-journal.org/).

the language that must have occurred during the pre-Proto-Indo-European period. Despite the passage of time, the core semantic field of the roots remains narrow, intact and identifiable. The following briefly summarizes the conclusions of those earlier papers about the structure of the archaic Proto-Indo-European root:

- The root structure can be generalized as *(s)-C [+/- R (R)] -C-, where (s) is the s-mobile, C is any consonant, and R is any resonant or laryngeal (or a zero-grade of the same). Any additional element that follows the final consonant is a root-extension, a derivational ending, a suffix, or the remnant of some ancient compound that will not have been a part of the original root.

- The initial and final consonants together carry the semantic core of the root. Medial resonants may provide nuance but do not significantly change the underlying semantic value.

- Inside the stable consonant-structure are combinations of the neutral PIE vowel and either zero, one, or two resonants that act as vowel modifiers. These are represented in generalized form as *(R)* in the descriptions that follow.[6]

- The resonants may include any of the following: *r, l, n, m, u̯, i̯, h₁, h₂, h₃,* or ∅ = zero-grade. Inside the root, laryngeals function as do the other resonants.[7] The resonant *m*- most typically reflects an *n*- that has been assimilated to a following labial.

- All of these resonants functioned as semivowels. That is, in addition to their ability to modify the vowel, they could at times act as an unchanging consonantal element. Resonants do not vary when they function as consonants in the root-initial or root-final positions of closed roots (CRC-) nor do they vary when they stand in the initial position of open roots (CR-).

- Regarding the source of these resonant variants, two possible explanations readily present themselves: (1) Pre-Proto-Indo-European employed resonant infixes grammatically in order to form derivatives, or (2) The observed resonant variation is the result of a fusion of closely related dialects.[8]

- Over time, the genetic affiliations of the root-variants were forgotten. These are the PIE roots as we know them today.[9]

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[6] Very rarely a root with two medial resonants and a laryngeal is encountered.

[7] This has been noted by Todd B. Krause and Jonathan Slocum, who write, "Given the ability of the laryngeals to vocalize between consonants, it is occasionally convenient to think of the laryngeals likewise as resonants." https://lrc.la.utexas.edu/eieol/tokol/20.

[8] "We can anyway not [completely] reconstruct the actual phonetics of PIE which moreover, was not A LANGUAGE, but a dialect cluster..." Igor Diakonoff, *Mother Tongue Newsletter* 8, question 4 (1989): 27.

[9] A much fuller description of this resonant variation dynamic can be found in those earlier works (Haynes 2020, Haynes 2021). After publishing those articles, I discovered an article by Roger Williams Wescott which anticipated me in certain aspects. The following is a quote from that article:

"In terms of typological evolution, the most archaic type of additive affixation is probably infixation of an asyllabic type. In both attested and reconstructed languages, asyllabic infixes most commonly consist of non-obstruent consonants known as sonorants — that is, nasals, linguals, or glides. These sonorants may either precede or follow the monophthongal vocalic nucleus of a base or word. In the former case, the sonorant may be termed prenuclear; in the latter case, postnuclear."

2. Radical Metathesis (Inversion)

A root in the form C_1RC_2- can change to the form C_2RC_1- without semantic alteration. This is not an unfamiliar concept since several widely accepted PIE roots are noted for exhibiting this feature. The following are a few examples:

- *$d^héĝ^h$-om-*, the PIE term for *earth* was for many years analyzed as *$*ĝ^hđem$*, with the dental element in final position as reflected in Grk *χθών* 'earth.' With the 20th century discoveries of Hittite and Tocharian (Hit *tēkan* 'earth,' TochA *tkaṃ* 'earth') this root became re-analyzed with the dental as the initial element. Consequently, those attestations of the root with the dental in the final position are considered to be instances of metathesis.[10]

- *$dṇĝ^hu̯h_2$-*, the PIE term for *tongue*, is attested in Old Irish as *tengae*, Old Latin as *dingua*, and in Modern English as *tongue*. But Tocharian A shows an inverted form *käntu*, Tocharian B *kantwo*, both from Proto-Tocharian *$*käntwo$*, where the dental element appears in final position.[11]

- *$*pek^u$-*, a PIE term for 'cook, boil, bake' is widely attested: Av *pačaiti* 'cooks,' OCS *pek* 'bake, roast,' Alb *pjek* 'bake,' Skt *pácati* 'cooks,' TochAB *päk* 'become ready for eating,' and many others. But also included within that root are Lith *kepù* 'bake,' and Latv *cepu* 'bake,' with the initial and final consonants in inverted position.[12] As with the previous examples, these are semantically identical with the non-inverted forms.

- *$*kannabis$*, the generalized term for *hemp* among the Indo-European languages, although somewhat irregular in its various formulations, shows a fairly consistent phonetic pattern: OIr *cnāip* 'hemp,' Lat *cannabis* 'hemp,' ON *hampr* 'hemp,' OE *hænep* 'hemp,' OPrus *knapios* 'hemp,' Grk *κάνναβις* 'hemp,' Arm *kanap'* 'hemp.' But the Sanskrit attestation *bhanga* 'hemp' shows inversion, with the labial first and the velar last.[13] This would also be an instance of Phonetic Reduction as described below in Section 3.

- *$*(s)pek̑$-* is a common PIE term for *see*. It is attested in Ved *páśyati* 'behold, see, look, consider,' Lat *speciō* 'see, look at,' OHG *spehōn* 'spy, watch, be on the lookout for,' Av *spasyeiti* 'spies,' and TochAB *päk* 'intend.' But Greek cognates show the root in inverted form: *σκέπτομαι* 'look at,' *σκοπέω* 'look at, spy.'[14]

- *$*k̑eu̯d^h$-* 'to hide' shows reflexes in Germanic, Greek, and Armenian: OE *hȳdan* 'to hide,' Grk *κεύθω, κευθάνω* 'to hide, Arm *suzanem* 'hide.' But inverted (metathesis) forms exist alongside these and are considered attestations of the same root: OE *dēog* 'he concealed himself,' *dēagol* 'secret, hidden, mysterious,' OHG *tougan* 'hidden,' *tougali* 'secret,' TochB *tuk-* 'be hidden,' all from *$*d^heu̯k̑$-*.[15]

Wescott, "Consonantal Apophony in Indo-European Animal Names," 127; see also Wescott, "An Editorial for Mother Tongue III," 95-98; and Wescott, *Protolinguistics*, 113.

[10] IEW 414; Mallory and Adams 120; Buck 16; Beekes 1632-1633; NIL 86-99; Ringe 19.

[11] Mallory and Adams 175; IEW 223.

[12] LIV 468; EIEC 125; IEW 798; Mallory and Adams 259.

[13] EIEC 266; Mallory and Adams 166.

[14] LIV 575-576; Mallory and Adams 326; IEW 984; EIEC 505.

[15] EIEC 268; Mallory and Adams 281.

- Lat *forma* 'form,' Grk *μορφή* 'form.'[16]
- *$h_2\acute{e}\acute{k}$-mōn* 'stone' is represented by Lith *akmuõ* 'stone,' Grk *ἄκμον* 'anvil,' Hit *aku* 'stone,' Skt *áśman* 'stone,' but also OCS *kamy* 'stone,' and Serbo-Croatian *kamēn* 'stone.' These last two "are isolated and point to *$keh_2m\bar{o}n$* which would seem to represent a metathesis of *$h_2\acute{e}\acute{k}$-…".[17]
- *b^hag-* 'beech/oak/elm/a tree with edible acorns' as attested in Grk *φηγός* 'a sort of oak with edible acorns,' Lat *fāgus* 'beech,' Germanic *bōkō* 'beech, oak,' but Lith *guoba* 'elm' with the initial and final consonants in metathesis position.[18]
- *$p\underset{.}{n}k^ust$-* 'fist,' as attested in OCS *pęstĭ* 'fist,' and NE *fist*, but Lith *kùmstė* 'fist.'[19]
- *$d^h e\underset{.}{i}\acute{g}^h$-* 'form, build, mold mud or clay, knead, smear, plaster; wall of mud bricks' as attested in: Skt *déhmi* 'spread, fill,' *déhī* 'wall, rampart, dam,' Goth *digan* 'form, fashion, knead, make pottery,' ON *deig* 'dough', *digr* 'thick,' NE *dough*, TochB *tsikale* 'to form,' Lat *fingō, finxī* 'form, shape,' *figūra* 'form, shape, figure,' *fictilis* 'fashion out of clay, made of earth or clay,' *figulus* 'potter,' Av *pairi-daēza-* 'enclosure' (> NE *paradise*); Grk *τεῖχος, τοῖχος* 'wall, embankment,' OIr *digen* 'build, firm, solid, hard, strong, fixed.' But metathesis forms (from *$\acute{g}^h eid^h$-*) include: Lith *žiedžiù* 'form from mud,' *žiẽsti* 'make clay pots, form, shape,' Latv *zìežu* 'smear,' OCS *žiždǫ, zьdati* 'build.'[20]

In all of these examples the attested metathesis-variants are recognized alongside the non-inverted forms as genetically related descendants of the PIE roots cited. But in addition to these cases, there are numerous instances where distinct synonymous roots in the lexicon differ only in the inverse order of the initial and final consonant. In some cases this structure is obscured by variations in the medial resonants as described above, but once these obscurities are resolved the parallelism becomes evident. More such examples will be cited below.

Although regular metathesis is not uncommon in world languages, this type of radical metathesis with inversion in the ordering of non-contiguous root consonants is considered rare. One significant exception can be found in the Salish language family spoken by indigenous people in the Pacific Northwest. This language group shares many features with PIE and is more fully described in the Appendix.

3. Phonetic Reduction

Another type of root mutation could be called *reduction*. This concept is also familiar, since something very close to it is seen in Tocharian (and to some extent in Hittite) where the rich PIE obstruent inventory has been reduced to include only the simple, unvoiced, unaspirated (lenis)

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[16] OLD 722; de Vaan 233-234.
[17] EIEC 547; The laryngeal notation of EIEC has been regularized to the three-laryngeal system used here. Numerous other Slavic languages retain derivatives of this metathesis form; see Derksen 220.
[18] Václav Blažek, "The Ever-green 'Beech'-argument in Nostratic Perspective," 85, see also Václav Blažek, "Indo-European Dendronyms in the Perspective of External Comparison," 21-25 (especially 22n23).
[19] Jaan Puhvel, "All our 'yesterdays', 318n12.
[20] LIV 140; IEW 245; Mallory & Adams 223, 224, 228; Watkins 18; EIEC 283, 649; ALEW 1509-1510; Fraenkel 1306-1307.

forms.[21] It has been suggested that this change may have been due to the influence of a substrate language with a similarly limited range of obstruents.[22] This same dynamic can be seen in distinct synonymous PIE roots. Obvious examples are often remarked upon in the standard handbooks such as, for example:

- *gol(H)u̯os 'bare, bald'   *kl̥Hu̯os 'bald'[23]
- *-dʰro-, *dʰlo- = instr. suffix   *-tro-, *-tlo- = instr. suffix[24]
- *h₂eng- 'bend'   *h₂enk- 'bend'[25]
- *peh₂ĝ- 'fasten securely'   *peh₂ḱ- 'fasten securely'[26]
- *pei̯ĝ- 'draw, color'   *pei̯ḱ- 'draw, color'[27]
- *sredʰ- 'boil, be agitated, move'   *sret- 'boil, be agitated, move noisily'[28]
- *bʰendʰ-r̥ros 'relation'   *pent-h₂r̥ros 'father-in-law'[29]
- *h₂eu̯g- 'increase, become strong'   *h₂eu̯k-s- 'grow, become large'[30]
- *greh₂bʰ- 'hornbeam'   *karp- 'hornbeam'[31]
- *gʰabʰ- 'take, seize'   *kap- 'have, hold, seize'[32]
- *pleh₂g- 'strike, beat'   *pleh₂k- 'strike, beat'[33]
- *ḱu̯oi̯dis 'white'   *ḱu̯oi̯tós 'white'[34]
- *sab- 'sap'   *sap- 'sap'[35]
- *stei̯b- 'make stiff'   *stei̯p- 'make stiff'[36]
- *dei̯ĝ- 'teach, show, indicate'   *dei̯ḱ- 'preach, say, index'[37]
- *u̯ei̯bʰ- 'vibrate, be agitated'   *u̯ei̯p- 'move back and forth, vibrate'[38]
- *gʰebʰōl 'head'   *kapolo- 'head'[39]
- *ĝʰr̥d- 'heart'   *ḱḗrd- 'heart'[40]

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[21] See EIEC 14, 28, 592. See also Kloekhorst, "Chapter 5: Anatolian," in Thomas Olander, ed., *The Indo-European Language Family*, 2022, "…the merger of PIE mediae and aspiratae into a single series that is called lenis (PIE*d,*dʰ > PAnat.*/t/)…" See Hodge, "Indo-European Consonant Ablaut," 143-162, for an early attempt to systematize some of these features along with a good survey of the prior literature on the subject.

[22] Peyrot, "The deviant typological profile of the Tocharian branch of Indo-European may be due to Uralic substrate influence," 72-121.

[23] EIEC 45; IEW 554.

[24] EIEC 52; IEW 692; Mallory and Adams 57.

[25] EIEC 61; IEW 45-46.

[26] EIEC 64; IEW 787-788.

[27] EIEC 64; IEW 794-795; LIV 464.

[28] EIEC 76; IEW 1001-1002.

[29] EIEC 196; IEW 127; Beekes 1171.

[30] LIV 274-275, 288-289; EIEC 248; IEW 84-85.

[31] EIEC 273; de Vaan 94; Mallory and Adams 161.

[32] EIEC 563; IEW 407-409, 527-528; Watkins, s.v. "*kap*-" 38.

[33] LIV 484-485, see 485n1 regarding the original identity of these roots.

[34] Mallory and Adams 332; Watkins 46; IEW 628-629; see below, Table 19.

[35] Mallory and Adams 158; IEW 880.

[36] LIV 592, 594.

[37] Watkins 15; IEW 188.

[38] de Vaan 674; IEW 1131; LIV 671.

[39] See below, Table 18.

[40] IEW 580; EIEC 262-263; Mallory and Adams 187; Michael Witzel, "Comparison and Reconstruction," 48.

Many more examples of this dynamic can be observed once the variation of medial resonants in PIE roots is allowed for. The evidence suggests that an ancient dialectical subset of PIE speakers experienced a phonetic influence similar to that which occurred in Tocharian, and then, during a later period of reunification with a group that had not experienced this linguistic change, the dialects became merged. The result is that, after this merger, synonymous pairs (doublets) coexisted within the basic vocabulary of PIE and these have persisted down into the various daughter languages. These synonyms are now considered separate roots, but they should, it will be argued, be seen as variants of an ancient original.

In their most strict formulation, these phonetic reductions can be summarized as follows:

- d, d^h became   t
- b, b^h became   p
- ĝ, ĝ^h became   ḱ,
- g, g^h became   k
- g^u, g^{uh} became   k or k^u

This is the system of correspondences that has been followed in the present paper even though there is evidence for crossover between /g/ and /ĝ/ in some cases, and /k/ and /ḱ/ in others. Such exceptions are often acknowledged in the standard handbooks, for example, in the root *pei̯k/pei̯ḱ.[41] In this paper, the intention is to argue *a fortiori*, adhering to the sound-relationships described above in all but the rarest of cases (and then only when on good authority), but once these root-dynamics are conclusively demonstrated, it may be possible to allow more latitude going forward. Note that the reduced forms of the root could also undergo radical metathesis and resonant variation as described in the proceeding sections.

II. EXAMPLES OF PIE ROOT VARIANTS

None of these observations alter the inventory of PIE roots as they have been identified and catalogued by historical linguists over the last two hundred years. They merely assist in forming a meaningful grouping of those roots into more or less distantly related families. One benefit of this analysis would be to help facilitate longer-range comparisons with more distant language families, as these can meaningfully be compared only by using the earliest form of the proto-language.

The following examples will illustrate the three types of root variations as described above.

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[41] EIEC 289, 795; There are many examples of this, e.g., *moko/*moḱo 'gnat, stinging insect' (EIEC 312); *g^{h}el-/*ĝ^{h}el- 'yellow' (EIEC 654); *g^{h}órd^{h}os/ĝ^{h}erd^h- 'court, yard, enclosure, garden' (EIEC 199, 224); *kseros/*ḱseros 'dry' (Mallory and Adams 125, 348); etc.

*ḱ(R)ei̯- and Its Root Variants

Table 1: *ḱ(R)ei̯- 'lie down, persons to lie down with, place to lie down'

PIE Root	Initial	R1	R2	Final	Ref	Semantic Value
*1.*ḱei̯-*	ḱ			i̯	1	lie (down), rest, lie dead, (matrimonial) bed, nest, sleep, sleeping room, village, home, family
ḱei̯-u̯-os-	ḱ			i̯-u̯	2	citizen, household, wife, sleeping partner, dear, kind, auspicious
ḱói̯-mos-	ḱ			i̯	3	household, village, world, home, cohabit with, marry, have intercourse with, dear, family, sleep, farmstead
*2.*ḱei̯-*	ḱ			i̯	4	fall (< "fall into horizontal positon")
ḱlei̯-	ḱ	l		i̯	5	lean, rest, recline, lie down, fall, bed, cabin, shelter, house, dwelling, sleep
ḱlei̯-s-	ḱ	l		i̯	6	cling to, embrace, attach to, unite, join, be connected
METATHESIS VARIANTS (of *ḱei̯-u̯-os-*)						
* u̯iḱ-s-, *u̯ei̯ḱ-*	u̯		i̯	ḱ	7	household, village, tribe, hamlet (Metathesis variant of *ḱei̯-u̯-os-*, above)
u̯rei̯ḱ-	u̯	r	i̯	ḱ	8	protect, conceal, cover, unite, build, put together, construct; a band

1.   *l.*ḱei̯-*   'lie (down), rest, lie dead, bed, sleeping room'
Cluv *zīyar(i)* 'lie (down),' Hit *kitta(ri)* 'lie (down),' Grk κεῖμαι 'lie (down), lie dead, rest, remain, lie sick or wounded, have a fall (wrestlers),' κείω 'I will lie (myself) down,' κοῖτος 'layer, bed, sleep,' κοῖτη 'matrimonial bed, nest,' κοῐτών 'sleeping room.'[42]

2.   *ḱei̯-u̯-os-* 'belonging to the household (hence > friendly, intimate, dear), wife, citizen, auspicious'
Lat *cīvis* 'citizen,' Osc *ceus* 'citizen,' OE *hīwan* 'household,' Latv *sieve* 'wife,' Skt *śéva-* 'trusty, friendly, kind, auspicious, dear,'[43]

Mallory and Adams write: "Some derive this word from *ḱei̯-* 'lie,' i.e. either 'those who lie together (in sleep)' or 'those who depend on one another'." See below for a metathesis version of this root (u̯i̯ḱ-s-, u̯oi̯ḱ-os-).

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[42] LIV 320; Mallory and Adams 223, 296; EIEC 352; IEW 539-540; Beekes 663-664; LSJ 934; Monier-Williams 1065, 1077.   ***Note: The representative attestations listed for the roots cited in this paper are primarily for identification purposes; space limitations here do not allow for completeness. Note also that the listed semantic values of the attestations cited are not exhaustive, but rather are selected from the Lexicon as evidence of semantic continuity. Likewise, reference citations are limited to a small sampling, however all listed attestations and difinitions can be found in the references cited.
[43] Mallory and Adams 204; Monier-Williams 1074, 1088; EIEC 214, 622; de Vaan 116; Möller (1970:113) compares Arab *šahii̯a* (ii̯ < iu̯) 'desire, long for, love.'

3. *ḱói̯-mos- 'household, village, home, cohabit with, marry, dear, family, sleep, farm'
OIr *cāem* 'dear,' MWels *cu/cuf* 'dear,' ON *heimr* 'abode, world,' *heima* 'home,' OE *hām* 'home,' *hǣman* 'have intercourse with, cohabit with, marry,' Goth *haims* 'village, country,' NE *home*, OPrus *seimīns* 'household servants,' Lith *šiemà* 'family,' Latv *sàime* 'family,' OCS *sěmija* 'household servants,' *sěmĭja* 'family,' Grk κώμη 'village,' κοιμάομαι 'sleep.'[44]

4. *2.*ḱei̯-* 'fall'
Ved *áva-śīyate* 'fall out or away, *śad* 'fall, fell, throw down, slay, kill, destroy,' Cymr *cwydd* 'fall.'[45]

Falling typically results in a horizontal (lying) position; hence the semantic connection to *1.*ḱei̯-*. Some parallel English expressions are: "He fell into bed," or "She fell asleep." LIV suggests that this root may well be part of *1.*ḱei̯-* 'lie (down)' since semantically *lie* can be seen to be the result of *having fallen*.

5. *ḱlei̯- 'bend, incline, lean on, recline, rest, lie down, fall, bed, sink, hut, nuptial bed'
Lat *clīvus* 'hill, slope, declivity,' NE *lean*, Lith *šliēti* 'lean against,' Rus *sloj* 'layer, level,' Grk κλίνω 'cause to lean, incline, lean on, sink, bend, make one thing lean against another, lean it, rest it, recline, lie down, fall, fallen (leaves), fall (on knees), lie near, (med.) decline or wane,' κλισία 'place for lying down or reclining, sitting down to meals, hut, shed, booth, cot, cabin, couch, nuptial bed,' κλίσις 'bending, lying down, place for lying on, region,' κλινικός 'of or for a bed, a physician who visits his patients in their beds, bed ridden,' Ved *śráyate* 'lean oneself on,' *śrāyá* 'refuge, reliance, shelter, protection, house, dwelling, abode,' OHG *hlinēn* 'lean,' Alb *fle* 'sleeps.'[46]

6. *ḱlei̯-s- 'cling to, embrace, attach to, unite, join, be connected'
Ved *ā-śliṣyet* 'remain attached to,' *-śliṣya* 'adhere, attach, cling to, clasp, embrace, unite, join.'[47]

7. *u̯iḱ-s- , u̯oi̯ḱ-os- 'household, village, tribe, hamlet' (Metathesis variant of *ḱei̯-u̯-os-)
Grk οἶκος 'house, home, dwelling, room, chamber, household, servant, housemate,' οἰκέω 'live, dwell, inhabit, be situated,' Lat *vīcus* 'group of dwellings, village, hamlet,' Ved *véśa* 'house, dwelling, brothel,' *veśya* 'neighborhood,' Skt *viśáti* 'sit down, settle, enter,' *vaiśya* 'a man of the third caste,' OCS *vьsь* 'village, field,' Rus *ves'* 'village.'[48]

This and the following root conform closely to the semantic field as seen in the foregoing roots. They are metathesis formations of *ḱei̯-u̯-os-* (no. 2, above). The /u̯/ of the root extension in *ḱei̯-

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[44] EIEC 622; IEW 539-540; Mallory and Adams 223; Beekes 814; DELG 583.

[45] LIV 321 (see note #1 for possible connection to *1.*ḱei̯-*); LIV Add. 45; Monier-Williams 1051, 1077.

[46] LIV 332; LIV Add. 46; IEW 601-602; Mallory and Adams 296; Beekes 716-717; de Vaan 122; LSJ 961; OLD 337-338; Monier-Williams 1096; EIEC 348.

[47] LIV 333 (See notes 1 and 2 for probability that this root is an extension of *ḱei̯-*); Monier-Williams 1104.

[48] LIV 669; IEW 1129, 1131; Mallory and Adams 205, 221; LSJ 1202, 1204; OLD 2058; Beekes 1055-1056; Monier-Williams 989, 1019; EIEC 193, 622; de Vaan 675.

u̯-os- was apparently taken at one point as the final consonantal element of the original root and then subjected to metathesis.

8. **u̯rei̯ḱ-* 'cover, protect, construct, conceal'

    OE *wreón* 'protect, conceal, clothe, cover,' Lith *rišù* 'bind, unite, combine, a band, compingō ('fix, attach, fix together, bind, together, build, construct, put together,'), introligō (fasten, bind, unite in harmony or kinship),' YAv *uruu̯aēsaii̯eiti* 'turn, twist.'[49]

The semantic field encompassed by this root seems to refer to the communal process of constructing the shelters that comprise the *οἶκος* or *vīcus*. Notions of turning and twisting could refer to the techniques of building with wattle and daub, where withies are twisted and woven to create a lattice which can then be filled by a mixture of clay and straw.[50]

Semantic Commonality in this Series

Table 2: Semantic map for **ḱ(R)ei̯-* 'lie down, persons to lie down with, place to lie down'

	1 1.**ḱei̯-*	2 **ḱei̯-u̯-os-*	3 **ḱói̯-mos*	4 2.**ḱei̯-*	5 **ḱlei̯-*	6 **ḱlei̯-s-*	7 u̯iḱ-s-	8 **u̯rei̯ḱ-*
Semantic Values								
lie, lean, rest, recline, sit down, settle, sink, sleep	x		x	x	x		x	
fall ("assume a lying position")	x			x	x			
bed, sleeping place, room, household, home, village	x	x	x		x		x	x
embrace, cling to, unite, join, wife, family, tribe, citizen, dear, friendly, kind, auspicious	x	x	x			x		x

Table 2 illustrates the large degree of semantic overlap that each root shares with the other roots in this resonant series. These can be summarized as follows:

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[49] LIV 699; IEW 1158-1159; ALEW 999-1000; Bosworth and Toller 1274; OLD 376, 1030; de Vaan, "Wrestling with metathesis," 184-190.

[50] "[Around 6000-5500 B.C.] a population increase is shown in the Mediterranean and Aegean regions, the central Balkans, and central Bulgaria by agglomerations of houses built of bricks on stone foundations (in the Aegean), and of timber uprights and clay daub (in the temperate zone)." –Gimbutas, "Old Europe in the Fifth Millennium BC, 2.

1. *1.*ḱei̯-*   shares some semantic values with 7 other roots in the series.
2. **ḱei̯-u̯-os-*   shares some semantic values with 6 other roots in the series.
3. **ḱói̯-mos-*   shares some semantic values with 7 other roots in the series.
4. *2.*ḱei̯-*   shares some semantic values with 4 other roots in the series.
5. **ḱlei̯-*   shares some semantic values with 6 other roots in the series.
6. **ḱlei̯-s-*   shares some semantic values with 4 other roots in the series.
7. **u̯iḱ-s-*   shares some semantic values with 6 other roots in the series.
8. **u̯rei̯ḱ-*   shares some semantic values with 6 other roots in the series.

Estimate of Statistical Validity

Disregarding medial resonants, the entire PIE lexicon contains eight roots with the consonantal form **ḱ—i̯*.[51] As shown in the table above, six of those roots share a semantic field that includes the concepts:

- lie down, fall down, recline, rest
- persons to lie down with (wife, family, friends, tribe, community), or terms that relate to such people (dear, friendly, kind; embrace, cling to, unite)
- place to lie down (bed, home, room, village)

These six roots then represent 75% of all roots with this consonantal form in the PIE lexicon. Taking any one of these six roots as a starting point, what are the chances that seven roots, selected at random from the approximately 1,500 roots in the PIE lexicon, would yield five more that fall within this semantic field? No doubt, the chances would be extremely small. This suggests that some other factor accounts for their higher than expected frequency. That factor is very probably that they are ultimately cognate.

It remains to analyze the metathesis forms **u̯iḱ-s-* and **u̯rei̯ḱ-*. Disregarding medial resonants, the entire PIE lexicon contains only two roots with the consonantal forms *i̯—ḱ* (none) or the extended form **u̯—i̯ḱ*.[52] Of those two roots, both share a semantic field that includes the concepts:

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[51] In addition to those listed in Table 1, these include **ḱei̯s-* and **ḱrei̯H*. Counts are based on roots appearing in either LIV (verbal only) or Mallory and Adams (verbal and nominal). An argument could be made that **ḱei̯-s-* (LIV 321) also falls within the above semantic field. It denotes "those left over, the others, the remnant, survivors, directed, ordered, commanded" (see Monier-Williams 1076, 1088). These meanings could very well be subsumed under the category "civilians" (as opposed to warriors), which would then connect the root to **ḱei̯-u̯-os-*, the source of Lat *cīvis* 'citizen, civilian.' But because this concept would represent a slight semantic shift, it is not at this time included in the list of cognates shown in the table above.

[52] Forms in **u̯—ḱ-* (without /i̯/) would include **u̯eḱ-* (see below) and **u̯oḱeh₂-* 'cow,' Not included in this list are: **u̯eḱs* 'six' (because of its multiple phonetic forms: **ksu̯eḱs, *kseḱs, *(s)u̯eḱs, *seḱs,* and **u̯eḱs,* see Mallory and Adams 313) and **u̯īḱm̥tih₁* 'twenty' (because it can be analyzed as **du̯ī* 'two' + *ḱm̥tih₁* 'tens,' see Mallory and Adams 308). It could be argued that the root **u̯eḱ-* 'a docile and obedient subject, willing, voluntary' could be included in the semantic field of Table 1. It is attested by the following: Ved *váṣṭi* 'desire, wish for, willing, eager, zealous, obedient, *vaśya* 'to be subjected, subdued, tamed, humbled, being under control, obedient to another's will, dutiful, docile,' *vaśyaka* 'obedient, dutiful,' *vaśyakā* 'an obedient wife,' *vaśīkara* 'bring into subjection, subjugating, making anyone subject to one's will,' Grk *ἑκών* 'deliberate, willing, voluntary,' *ἑκοτής* 'volunteer,' Hit *wēkmi* 'wish, desire,' Av *vasəmi* 'wish' (LIV 672; Monier-Williams 929; Beekes 400; IEW 1135; Mallory and Adams 341; Turner 667). This root combines somewhat contradictory notions of "free will," "subjugating," and "being subject to the will of others." Perhaps the common referent is that of villagers subject to a king or chief,

- house, dwelling, village, tribe
- cover, protect, construct (the characteristics of a house or dwelling)

Combining all instances of roots showing either the direct or metathesis forms (*$\acute{k}$—$i̯$, $i̯$—$\acute{k}$, and the extended form *$u̯$— $i̯\acute{k}$) results in ten roots, with eight sharing the semantic field of Table 1. Thus 80% of the phonetic forms share in this semantic field, vastly more than would be expected from a random sampling of roots in the reconstructed PIE lexicon.

<p style="text-align:center">*   *   *</p>

*p(R)eu̯- and Its Root Variants

The following table illustrates a resonant series composed of elements that are each traditionally considered separate roots in PIE. The semantic field is tightly concentrated on notions of breathing, blowing, panting, gasping, snorting, wind and spirit. Those roots that reference lungs, floating, and swimming can be included here because the lungs are the organ of breathing, and both floating and swimming require the lungs to be filled with breath. While the ultimate source of these roots was no doubt onomatopoeic[53], its elaboration using resonant variants is clearly derivative.

Note that the root-final /u̯-/ does not act as a variable resonant, but rather as a fixed final consonant that is consistent across all the roots in this series. Any element following this final consonant is a root extension or suffix. As mentioned above, semi-vowels have the ability to function either as vowels or consonants, and in this case the function is unvaryingly consonantal and structural.

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volunteers in times of external conflict, "civilians" as opposed to regular warriors or soldiers, inhabitants of the *οἶκος* or *vīcus*.

[53] Consider Maya K'iche' *ajpu* 'hunter' (*aj*- is agentive, and *pu* is 'blowgun') literally, 'he of the blowgun.'

Table 3: *p(R)eu̯- 'breathe, breathe heavily, pant, lungs, float, wind, vapor, spirit, scent'

PIE Root	Initial	R1	R2	Final	Ref	Semantic Value
*preu̯-th₂-	p	r		u̯	1	pant, blow, breathe heavily, gasp, snort, inflate, foam, froth
*pneu̯-	p	n		u̯	2	blow, breathe, fragrance, pant, snort, sneeze, wind, breath, puff, blast, soul, spirit
*pleu̯-mon-	p	l		u̯	3	lungs, right lung, float, swim, sail
*pleu̯-d-	p	l		u̯	4	swim, flow, wash
*pleu̯-k-	p	l		u̯	5	swim, push, set in motion, float, throw, fly, rush
*peu̯-	p			u̯	6	pant, gasp, puff, wheeze, lungs, breath, wind, spirit, soul, foam, blast, bellows
*peu̯-k-	p			u̯	7	breathe, exhale, respire, pant, gasp
2.*peu̯-H-	p			u̯	8	to stink, rot, putrefy, decay
*peu̯-t-	p			u̯	9	breathe, blow, swell, exhale
METATHESIS VARIANTS						
*u̯ep- *u̯ap-ōs	u̯			p	10	vapor, steam, exhalation, blow

1. *preu̯-th₂-   'pant, blow, breathe heavily, gasp, snort, inflate, foam, froth'
   Ved *próthati* 'pant, blow, breathe heavily, gasp, snort,' *pra-próthati* 'pant, blow up, inflate,' YAv *fraoθaṯ.aspa-* 'with snorting horse,' OE *ā-frēoðan* 'foam, froth,' ON *frauð* 'foam.'[54] Note that Pokorny also analyzes this root as *preu-t(h)-*.

2. *pneu̯- 'blow, breathe, fragrance, pant, snort, wind, breath, blast, soul, spirit'
   Grk *πνέω* 'blow, breathe, draw breath, fragrance,' *πνεῦμα* 'blast, wind, breath, spirit, soul,' ON *fnýsa* 'pant, blow, breathe heavily, snort,' OE *fnēosan* 'sneeze,' *fnæst* 'puff, blast, breath.'[55]

3. *pleu̯-mon-, *pleu̯- 'lungs, right lung, float, swim, sail'
   Skt *klṓman-* 'right lung,' Grk *πλεύμων* 'lung,' Lat *pulmō* 'pl. lungs,' Lith *plaũčiai* 'lungs,' ORus *pljuča* 'lungs,' Ved *plávate* 'swim, float,' Grk *πλέω* 'to sail, to swim,' TochB *plyewsa* 'float.'[56]

[54] LIV 494; IEW 810; Monier-Williams 711; Bosworth and Toller 27; de Vries 140.
[55] LIV 489; IEW 838-39; LSJ 1424-25; Beekes 1213; de Vries 136; Bosworth and Toller 296.
[56] Mallory and Adams 187; IEW 837; OLD 1518; EIEC 359, 561; LIV 487; Beekes 1207-1208; de Vaan 497. Compare also the unrelated PIE root *ḱu̯ésHmi 'breathe deeply, sigh, lungs' for a parallel and similarly encompassing semantic field, i.e., *breathe* and *lungs* (EIEC 82, 518; IEW 631-632). One could also cite external evidence attested in Shabo *pʰu* 'blow with the mouth' and *pʰuh* 'lungs' (Ehret's 654 and 656) quoted in Bürgisser, "Some thoughts about Shabo, Ongota and the Kadu family of languages," 192.

The lungs are the instruments (organs) for breathing, panting, blowing, gasping and snorting, therefore they legitimately fit into the semantic field defined by the other roots in this series.

PIE *pleu̯- 'float, swim' has been seen as the source for Latin *pulmō* 'lungs' etc., but this is unlikely. Names for parts of the body generally do not derive from abstract concepts, rather the contrary is much more common. We say, for example, "the mouth of the river," "the foot of the mountain," "the head of the department," "the heart of the artichoke." For this reason, the concept "floating" is much more probably derived from the notion, "breath, breathe air into the lungs." The following two roots are clearly derivatives of *pleu̯- 'float, swim.'[57]

4.   *pleu̯-d- 'swim, flow, wash'
   ON *fljóta* 'flow, wash, swim,' Lith *pláudžiu* 'to wind, to coil, wash,' OIr *lúaidi* 'move, put in motion, agitate,' ON *fleyta* 'push, lift up.'[58]

5.   *pleu̯-k- 'swim, push, set in motion, float, throw, fly, rush'
   ON *fliúga* 'fly, rush,' Lith *plaukiù* 'swim, push, set in motion, float,' ON *fleygja* 'throw.'[59]

6.   *peu̯- 'pant, gasp, puff, wheeze, lungs, breath, wind, spirit, soul, foam, blast, bellows'
   Skt *phupphukāraka* 'pant, gasp, puff, wheeze,' *phuphusa* 'lungs,' Arm *(h)ogi* 'breath, spirit, soul,' MIr *ūan* 'foam,' Grk φῦσα 'breath, wind, blast, bellows,' Latv *pũga* 'squall of wind.'[60]

7.   *peu̯-k- 'breathe, exhale, respire, pant, gasp'
   Arm *p'č'em* 'breathe, exhale, respire, pant, gasp.'[61]

8.   2.*peu̯-H- 'to stink, rot, putrefy, decay'
   Ved *pū́yati* 'decay, rot, stink,' YAv *puiieti-ča* 'putrefy, decompose, decay, molder, rot,' ON *fúa, fúinn* 'rot, putrefy,' *feyja* 'allow to rot,' Lith *pūnù (pū́ti)* 'rot, decay.'[62]

The sensation of odors is carried by the breath, hence the semantic connection to this archaic root.

9.   *peu̯-t- 'breathe, blow, swell, exhale'
   Lith *pučiù* 'breathe, blow,' *puntù* 'swell, exhale.'[63]

10. *u̯ep-, u̯apōs- 'vapor, steam, exhalation, blow'
   Lat *uapor* 'an exhalation, vapor, steam,' *uaporium* 'a room in which steam circulates for heating part of a bath suite,' *uaporifer* 'producing steam or hot vapor,' Skt *vāpáyati* 'causes to blow,' Skt *vāṣpá / bāṣpá* 'vapor, steam.'[64]

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[57] See LIV 488, footnote #1 to each of these roots, which state that they are root extensions of *pleu̯-*.
[58] LIV 488; IEW 837; de Vries 132.
[59] LIV 488; IEW 837.
[60] IEW 847; Mallory and Adams 386; LSJ 1963; EIEC 72; Beekes 1599; Bomhard 137.
[61] LIV 481; IEW 847.
[62] LIV 480; IEW 848-49.
[63] LIV 481; IEW 848.
[64] IEW 1149-1150; Mallory and Adams 128-129; OLD 2010-2011; Monier-Williams 730, 934, 949.

Semantic Commonality in this Series

All of the members of this series share in a tight semantic field denoting: breathe, breathe heavily, pant, lungs, float, wind, vapor, spirit, scent. It appears that closed roots ending in a semi-vowel tend to attract (mostly obstruent) root-extensions to provide a kind of psychological closure in cases where that final could be mistaken for a medial resonant as in the various extended forms seen above.

Estimate of Statistical Validity

In addition to the nine roots listed in Table 3, five other PIE roots share in the closed consonantal structure *p—$u̯$- (or in a structure that could possibly be analyzed to that form).[65] Therefore nine out of fourteen roots (64%) bearing that consonantal structure share this semantic value. Taking any one of the roots in Table 3 as a starting point, a random sampling of thirteen additional roots out of the approximately 1,500 in the PIE lexicon would likely yield less than one semantic match. Eight matches would be improbable in the highest degree. How could this be explained other than by concluding that these roots are cognate?

In addition to the root *$u̯ep$-, $u̯apōs$- 'vapor, steam, blow,' six other PIE roots bear the consonantal structure *$u̯$—p, none of which shares this semantic value.[66] The argument that this root is cognate to the others in Table 3 rests only on the observation that their consonantal structures are inverses of each other and that they share comparable semantic values. The level of confidence of this root being cognate to the others should perhaps be equal to our confidence that Latin *speciō* 'see, look at,' is cognate to the Greek words in inverted form: *σκέπτομαι* 'look at,' *σκοπέω* 'look at, spy.' If that is the case, then the likelihood of *$u̯ep$- being cognate to *$peu̯$- is high.

$*$ $*$ $*$

*$g^{u̯h}e(R)i̯d$- and Its Root Variants

The semantic field encompassed by the following series of roots includes two primary concepts:

- shine, be bright
- see, find, know

The connection between these two concepts is readily apparent: Objects can be seen because they are bright, and once they have been seen, they are known. Some of the roots in this series combine both notions, others either one or the other. Together they form a tight sematic field.

They also share similar phonetic features:

- 11 out of 13 roots continue the initial labiovelar in one of the following three forms:
   1. Intact (g^{u̯h}, k^{u̯})

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[65] *$peh_2u̯$- (LIV 462), *$peu̯g^{(')}$- (LIV 480), 1. *$peu̯H$- (LIV 480), *$pneu̯H$- (LIV 489, probably identical to *$pneu̯$), *$preu̯$- (LIV 493).
[66] *$u̯rep$- (LIV 701), *$u̯ep$- (LIV 689), *$su̯ep$- (LIV 612), *$u̯ei̯p$- (LIV 671), *$u̯elp$- (LIV 680), *$u̯erp$- (LIV 690).

     2. Separated (ku̯)

     3. Loss of one element (labial or velar) and retention of the other (k or u̯).

- 12 out of 13 show a medial resonant (R2) in /i̯/.

- 11 out of 13 show a root-final consonant /d/, or /t/ in the reduced variants. Of the remaining two, one could be considered a /t/ that has decayed into a sibilant and the other as a dental that has become lost.[67]

- The other medial resonant (R1) shows limited variability: Those in /u̯/ reflect the labial element of the separated initial labiovelar and should therefore technically be considered as a medial resonant (R1) in /ø/. One root shows a medial resonant in /h₂/. In conclusion, 12 out of 13 are essentially R1 in /ø/.

It is not unusual for single PIE roots to encompass the two semantic values *see* and *bright*. Consider the root *leu̯k-*, for example:

> NWels *amlwg* 'evident,' OPrus *laukīt* 'seek,' OCS *lučiti* 'meet someone,' Grk λεύσσω 'see, look, examine,' Skt *lókate* 'see, behold, perceive, shine, *locana* 'illuminating, brightening,' *ruc* 'shine, be bright, radiant, to be splendid or beautiful or good,' Lat *lūceō* 'shine,' *lux* 'light,' Hit *lukke-* 'shine,' TochAB *luk-* 'shine.'[68]

Another example can be found in Tocharian, where TochB [1]*pälk* 'see' corresponds to TochB [2]*pälk* 'shine.'[69] See also *bʰeh₂-* 'light, bright, shine, light up, make visible, white' (Table 16 below).

Table 4: *gᵘʰe(R)i̯d-* 'be bright, shine, clear, be visible, see, know'

Root	Initial	R1	R2	Final	Ref.	Semantic Value
gᵘʰeh₂i̯d-	gᵘʰ	h₂	i̯	d	1	bright, clear
u̯ei̯d-	u̯		i̯	d	2	see, find, know, seek
(s)u̯ei̯d-	(s)u̯		i̯	d	3	shine, gleam, sparkle, clear, star, look at
METATHESIS VARIANTS (from *u̯ei̯d-*, *(s)u̯ei̯d-*)						
di̯eu̯	d		i̯	u̯	4	bright sky, heaven, god
di̯eu̯-t	d		i̯	u̯	5	shine, be bright, star, see
dei̯-	d		i̯		6	shine, bright, clear, is seen

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[67] The conventional view sees the /t/ as a root extension, but the pervasive presence of dentals in the other roots of this series argues strongly in favor of the alternative explanation.

[68] LIV 418-419; Mallory and Adams 326; Beekes 851-852; Monier-Williams 881-882, 906-907; de Vaan 355; EIEC 505; Adams 549-550; Hoenigswald, *Language Change and Linguistic Reconstruction*, 39-40. Beekes (2009: 852) observes: "The meaning 'to see' arose from 'to light up'." See also Blažek, "Indo-European Astronomical Terminology," 138-139.

[69] Adams (377-378) states these are from PIE *bʰleg-* 'burn, singe, ignite, flame, blaze, shine' as seen in Grk φλέγω (Beekes 1575-1577).

REDUCED VARIANTS (from *gᵘʰe(R)i̯d-)						
*kʷei̯t-	kᵘ		i̯	t	7	shine, appear, observe, know
*ku̯ei̯t-	k	u̯	i̯	t	8	shine, glisten, sparkle, bloom
*ḱu̯ei̯t-	ḱ	u̯	i̯	t	9	light up, shine, be bright
*kei̯t-	k		i̯	t	10	be bright, shine, lighten
*kʷei̯-	kᵘ		i̯		11	observe, take notice
*kʷei̯s-	kᵘ		i̯	s	12	see, observe, take notice
METATHESIS VARIANTS						
*tu̯ek-	t	u̯		k	13	be visible, visible form

1. *gᵘʰeh₂i̯d- 'bright, clear, shining'
    Grk φαίδιμος 'shining, noble,' φαιδρός 'bright, clear, joyous,' φαιδύνω 'to make bright, cleanse, cheer up,' φαιδυντής 'purifier,' φαιδιμόεις 'shining, radiant, glistening,' Lith giẽdras 'clear, bright,' gaidrùs 'fine, clear, bright, limpid,' gaidrà 'cloudless heaven, clear weather.' Latv dziedre 'clear, cloudless heavens.'[70]

2. *u̯ei̯d- 'see, find, know, seek'
    Lat uīdī 'see,' videō 'to see,' Ved ávidat 'have found,' vindáti 'find,' véda 'to know,' Grk εἶδον 'see, perceive,' εἴδομαι 'appear, seem, resemble,' ἰδανός 'fair, good-looking,' ἰδέα 'appearance, form,' ἰδεῖν 'behold, recognize,' ἰδυῖοι 'witnesses,' οἶδα 'to know,' Goth wait, witum 'know,' OCS vědě 'to know.'[71]

3. *(s)u̯ei̯d- 'shine, gleam, sparkle'
    Lith svidėti 'shine, gleam,' Latv svîstu 'become bright,' svîst 'break of day,' OE switol 'clear,' Av xᵛaēna 'glowing,' Lat sīdus 'star, planet, constellation, heavenly body,' consīderō 'to observe, examine, look at.'[72]

4. *di̯eu̯-os 'heaven, divine, god, the light of day'
    Grk δῖος 'belonging to heaven, godlike,' Ζεύς 'Zeus, heaven, god of heaven,' Lat deus 'a god, deity,' Iūpiter 'Jupiter,' Diespiter 'Father Jupiter,' diu 'by day,' diēs 'day, daytime,' Lith diẽvas 'god,' Hit sius 'god,' Skt devá 'god,' dív 'heaven, the sky,' dívā 'day,' divyá 'divine,

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[70] IEW 488; Beekes 1544; Mallory and Adams 330; LSJ 1911-1912; DELG 1127; Frisk 981; ALEW 366-367; EIEC 83; Václav Blažek, "Indo-European Astronomical Terminology," 145.

[71] LIV 665-666; IEW 1125-1127; Beekes 379-381, 576-577, 579; de Vaan 676; Mallory and Adams 321-322; EIEC 337; OLD 2058-2060; Dolg 2548. The attestations of Grk ἰδεῖν and οἶδα (from ϝιδεῖν and ϝοῖδα) suggest that the root *gᵘʰeh₂i̯d- probably originally had resonant variants in the forms *gᵘʰeh₃i̯d- and *gᵘʰei̯d-. For the initial /w/ in Goth witum (<*gᵘʰ ?), see Polomé, "Initial PIE *gʷh- in Germanic," 303.

[72] LIV 608 s.v. "2.*su̯ei̯d-"; IEW 1042; Mallory and Adams 329; OLD 414, 1757; ALEW 1153-1154; EIEC 514; Václav Blažek, "Indo-European Astronomical Terminology," 144. The initial /s/ of this root is not generally attributed to the s-mobile, but is considered so here in alignment with the other roots in this series.

heavenly, celestial, wonderful, charming, beautiful,' ON *Tyr*, 'god of war,' OE *Tīw* 'god of war,' NE *Tuesday*.[73]

5.   **di̯eu̯-t* 'shine, be bright, star, to see'
Ved *dyutāná* 'to shine, be bright or brilliant,' *dyút* 'shining, splendor, ray of light,' *dyota* 'light, brilliance,' *dyótana* 'shining, illuminating, enlightening, seeing, sight,' *jyótis* 'light, brightness (of the sky), the heavenly bodies, planets, stars,' Palaic *Tiyat-* 'the sun.'[74]

6.   **dei̯-* 'bright, shining, seen'
Grk *δέατο* 'is seen, appeared, seemed,' *δῆλος* 'clear, visible,' Skt *dīdeti* 'shines, is bright,' ON *teitr* 'glad.'[75]

This root is traditionally seen as the basis for the previous two roots in this series. The fact that the others show a final consonant in /u̯/ (including the metathesis forms) raises the question of whether or not they were all constructed on an extended form in /u̯/, or whether, on the other hand, the final was lost in this root. The latter explanation is most likely.

7.   **kʷei̯t-* 'shine, appear, observe, know'
Ved *cétati* 'perceive, observe, take notice, understand, know, appear,' *cikitvás* 'knowing, understanding, shining,' Latv *škìetu* 'to shine, to think,' Rus *čitát'* 'read,' Czech *čítati* 'read, count.'[76]

As noted above, roots sharing the semantic values *bright*, *visible*, *see*, and *know* are not uncommon in PIE.

8.   **ku̯ei̯t-* 'shine, glisten, sparkle, bloom'
Latv *kvitu* 'shine, sparkle,' OCS *cvisti* 'bloom.'[77]

9.   **ḱu̯ei̯t-* 'light up, shine, be bright, white'
Skt *śvíndate* 'to lighten,' *śvetá* 'white, bright,' *śvitrá* 'whitish,' Av *spaēta* 'white,' Lith *švitėti* 'shine shimmer,' *švaitaũ* 'make bright,' OCS *svъěti* 'shine,' ORus *svъnuti* 'become bright, dawn,' NE *white* (< **ḱu̯ei̯d-*).[78]

LIV calls **ku̯ei̯t-* the "Kentum-Form of *ḱu̯ei̯t-*" implying that the two are ultimately cognate (LIV 375n1 of lemma **ku̯ei̯t-*). Based on that authority, *ḱu̯ei̯t-* is included in this series despite the initial /ḱ/.

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[73] Mallory and Adams 329, 408-409; Beekes 338, 498; IEW 184-186; de Vaan 167, 170, 172, 315; Monier-Williams 478-479, 499; OLD 534-535; Frankel 193-194; Ringe 127; Bomhard 235; Dolgopolsky 2241; Haynes 2009: 211-213; EWKS 158 "Kartvelian **tew-* 'white, star, moon, sunrise, awake'."
[74] LIV 125; IEW 185; Monier-Williams 427, 500; de Vaan 172-173; Václav Blažek, "Indo-European Astronomical Terminology, 133. The final /t/ is a root extension of the previous root as per LIV 125n1.
[75] Mallory and Adams 301, 305 328, 329, 408; Beekes 307, 324; LSJ 372; de Vries 586; IEW 183-187; Monier-Williams 480-481, 492.
[76] LIV 382-383; IEW 637; Monier-Williams 395; Derksen 90; EWAia 547-548.
[77] LIV 375; IEW 629; Mallory and Adams 332; etc.
[78] LIV 340; IEW 628-629; Derksen 478; Mallory and Adams 332; Monier-Williams 1106; EWAia 678-679; Watkins 46; AHD 2034. NE *white* (< **ḱu̯ei̯d-*) per Mallory and Adams.

10. *keį̯t- 'be bright, shine, lighten'

Ved *cetati* 'shine, appear, stand out,' *citrá* 'visible, shining, bright, appearance,' *ciketa* 'has lightened,' Av *ciθra-* 'shining, visible,' Goth *haidu-* 'appearance,' ON *heið* 'clear heavens,' *heiðr* 'clear,' OHG *heitar* 'radiant, shining.'[79]

11. *kʷei̯- 'observe, take notice, perceive, see'

Ved *cā́yati* 'take notice, observe,' *cinóti* 'perceive,' Grk *τηρός* 'guardian,' *τηρέω* 'observe, watch over, guard, give heed to,' OIr *ad-ci* 'sees,' Lith *skaitaũ* 'count, read,' OCS *čĭtǫ* 'count, reckon, read.'[80]

This root is traditionally seen as the basis of the extended root *kʷei̯t-* 'shine, appear, observe, know.' Considering, however, that the vast majority of the roots in this series show a final dental, it is more likely that *kʷei̯-* reflects an instance where the original final was lost.

12. *kʷei̯s- 'see, take note, perceive'

OAv *cōišt* 'decide,' OIr *:ac-castar* 'was seen,' *:ac-cae* 'saw, has seen,' *ad:cichestar* 'will be seen,' Gall *pissíiumí* 'will see.'[81]

According to LIV (381n1), this root is cognate to *kʷei̯-* 'observe, take notice, perceive, see.' The final in /s/ may indicate a /t/ in process of being lost, as seen in the previous root.

13. *tu̯ek- 'be visible, the visible form'

Hit *dukkāri* 'is visible, is seen, is important,' *tuekk(a)* 'the body,' Ved *tvāc-* 'skin.'[82]

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gʷe(R)bʰ- and Its Root Variants

Table 5: *gʷe(R)bʰ-* 'womb, woman, act of conception, embryo, offspring'

PIE Root	Initial	R1	R2	Final	Ref.	Semantic Value
*gʷrebʰ-, *gʷerbʰ-*	gʷ		r	bʰ	1	fetus, embryo, child, newborn babe, cub, nestling, foal
gʷelbʰ-	gʷ		l	bʰ	2	womb, uterus, menstruation, young child or animal, newborn
g(ʷ)embʰ- (*g(ʷ)enbʰ-*)	gʷ		m	bʰ	3	womb, vulva, slit, deeply excited, sexual intercourse, depth, to know carnally
gʷei̯bʰ-	gʷ		i̯	bʰ	4	dive, covet, seek, female pudenda, vibrate fornication, lewdness (Proposed root)
gʷeh₁bʰ- (*gʷēbʰ*)	gʷ		h₁	bʰ	5	something slimy, young animal, woman, wetness, vibrate, emit fluid or liquid

[79] LIV 347; IEW 916-917; EWAia 542-543, 548-549; de Vries 216-217. Möller (129) compares Ethiop. *gahada* 'open, clear, lucid, manifest.'

[80] LIV 377; IEW 636-637; Mallory and Adams 327; LSJ 1789; Beekes 1480; DELG 1076; Monier-Williams 393; EWAia 531.

[81] LIV 381; IEW 637.

[82] LIV 654; Joseph, "On the Etymology of Hittite *tuqqāri* 'be visible," 205-513.

*gʷeh₂bʰ- (*gʷābʰ)	gʷ		h₂	bʰ	6	dive, plunge, dip, deep, become hard, dye with blood or other colorants
*gʷebʰ-	gʷ			bʰ	7	have sexual intercourse, masturbate, soften with the hand (Proposed root)
METATHESIS VARIANTS (female sexual organs and stereotypical female characteristics)						
*bʰegʷ-	bʰ			gʷ	8	womb, vulva, clitoris, desire for sexual pleasure, woman, wife, sister, flee, fear
*bʰorgʷ-os	bʰ		r	gʷ	9	foolish, silly, stubborn, capricious, raw, tart, un-refined, ignorant, angry, furious
*bʰergʷ-	bʰ		r	gʷ	10	feed, nourish, tend (Proposed root)
*bʰlegʷ-	bʰ	l		gʷ	11	swell up, inflate, expand, blood flow, vulva, but-tocks, fetus
REDUCED VARIANTS *k⁽ʷ⁾e(R)p- (womb, vulva, uterus, vibrate, sexual excitement, desire)						
*keu̯p-	k		u̯	p	12	desire, covet, shake, tremble, vibrate, be in a passion, vulva
*ku̯elp-	k	u̯	l	p	13	womb, vagina, gulf, arched or vaulted room
*k⁽ʷ⁾lep-	k	u̯	l	p	14	desire
*krep-	k	r		p	15	body, belly, womb, uterus, midriff
*k⁽ʷ⁾emp-	k	(u̯)	m	p	16	tremble, shake, quiver, vibrate
*k⁽ʷ⁾Rep-H	k	(u̯)	R	p	17	yearn for, desire, lament
METATHESIS VARIANTS						
*pleh₂k-	p	l	h₂	k	18	appease passions and appetites, find favor
*(s)plek-	(s)p	l		k	19	copulate (Proposed root)
*preK-	p	r		K	20	fear, be afraid, feel fear, frighten

1. *gʷrebʰ-, *gʷerbʰ-   'fetus, embryo, child, foal'
   Grk βρέφος 'babe in the womb, fetus, newborn babe, foal, whelp, cub, nestling,' βρεφόω 'form into a fetus, engender,' OCS žrēbę (< *gʷerbʰen-) 'foal,' MIr brommach 'foal.'[83]

2. *gʷelbʰ-   'womb, uterus, young animal'
   OE cilfor-lamb 'ewe lamb,' OHG kilbur 'ewe lamb,' Grk δελφύς 'uterus,' δέλφαξ 'young pig,' δελφάκειος 'female pudenda,' δελφίς 'dolphin (fish with womb, i.e. mammal),' Av gərəbuš- 'newborn animal,' and from *gʷolbʰo- 'womb, fruit of womb,' ON kalfr 'calf,' OE cealf 'calf,' NE calf, OHG chalb, chalp 'calf,' Goth kalbō 'calf,' Grk (Hesychius) δολφός 'womb,' Av

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[83] EIEC 615; IEW 485; LSJ 329; Monier-Williams 349-50; DELG 186; Bomhard 539. Möller compares Hebrew ḳirb- 'womb, inside, middle,' Assyrian kirbu 'in the middle,' Arab ḳ-r-b- in 'aḳrabat 'she was near to bringing forth,' see Möller, Vergleichendes indogermanisch-semitisches Wörterbuch, 91, 101. Militarev (2005: 45) compares Proto-Afrasian *garab- 'stomach, belly, body, womb.'

garəwa- 'uterus,' Skt *gárbha-* 'to conceive, womb, uterus, fetus, embryo, child, brood off-spring, a woman's courses,' Lat *volba* (& variants *volva, vulva*) 'womb,' Gall *galba* 'pot-belly,' Ukr *helevo* 'belly.'[84]

3. **g^(u)emb^h-*   'womb, vulva, slit, deep down, sexual intercourse'
   Skt *gabhīrá-, gambhīrá-* 'deep,' *gambha-, gámbhan-, gambhára-* 'depth, slit, vulva,' *gambh-vepas* 'moved deeply or inwardly, deeply excited,' *gabhi-shák* 'deeply down, down or within,' *jambh* (also *jabh*) 'to know carnally,' *jambhana* 'sexual intercourse.'[85]

4. **g^u e i̯ b^h-*   'dive, covet, female pudenda, vibrate, fornication, lewdness' (Proposed root)
   TochA *kip* 'female pudenda,' TochB *kwīpe* 'female pudenda,' Lat *uibrō* 'vibrate, become excited, catamite, be homosexual,' Grk *δῑφάω* 'dive, covet, seek,' YAv *vaēpaiiaṇt* 'fornication, lewdness.'[86]

5. **g^u eh₁b^h-*   'something slimy, young animal, woman, wetness, vibrate, emit fluid'
   OSax *quappa* 'eel pout,' MHG *quappe* 'tadpole, belly,' ON *kvap* 'something slimy or gelatinous' (IEW 466), Swed-dial *(s)kvebba* 'fat woman,' NE *quab* 'bog, mire,' NE *quaver* 'shake, vibrate,' Norw-dial *kvapa* 'emit a fluid or liquid,' Old Prussian *gabawo* 'toad,' OCS *žaba* 'toad.'[87]

6. **g^u eh₂b^h-*   'dive, plunge, deep, become hard, dye with blood or other colorants'
   ON *kafa* 'dive, plunge,' *kvefja* 'dip, submerge, OSwed *kvaf* 'depth,' Grk *βάπτω* 'dip, plunge, dip a sword into a liquid in order to temper the steel, become hard, to dye, to dye someone with their own blood (cutting by sword), draw water by dipping.'[88]

7. **g^u eb^h-*   Proposed Root: 'sexual intercourse, masturbate, soften with the hand'
   Grk *δέφω* 'soften by working with the hand, masturbate, have sexual intercourse,' present tense variant (taboo deformation?) *δέψω* 'work or knead a thing until it is soft,' Lat *depsō* 'work up into a paste, knead, soften by rubbing or squeezing in one's hands, to pound or beat in an obscene sense, shamelessness in sexual conduct, "apparently of sexual intercourse."'[89]

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[84] EIEC 615; IEW 473; Watkins 34; LSJ 377-78; DELG 250; de Vries 298; Mallory and Adams 184; Bomhard 462; Mann 354; Beekes 313-314. Note that Germanic forms in initial /k/ represent a variant where *g^u- > *g-.

[85] IEW 466; Monier-Williams 346, 348, 412; EWAia *gabhá* 463.

[86] Watkins (2000) 2030, s.v. "**ghwībh*"; OLD 2054; Fortson 282-283, 402-403; AHD 1915; LIV 671; IEW 1132; DELG 275; Autenrieth 78; Homer, *Iliad* 16.747, Murry, trans., 216; Hesiod, *Works and Days*, 373-374, Evelyn-White, trans., 30-31; LSJ 438; Beekes 314; Adams, s.vv. "*kwīpe, kwipe, onkipṣe*"; de Vaan 674. See discussion in Haynes (2020) Table 28 for proposed root-status of **g^u e i̯ b^h-*. See also: Winter, *Lexical Archaisms*, 347-348 for the semantic development: shame > place to be ashamed of > genitals in TochB *kwipe*.

[87] Watkins 34; IEW 466; A. Christenson, *K'iche' – English Dictionary*, s.v. "*t'ot'*"; Kluge s.v. "*Quappe*" 572; *New Cassell's German Dictionary* (defines *Kröte* as: 'toad, malicious person; bitch; jade, wench... (vulg.) niedliche kleine Kröte, pretty wench') s.v. "*Kröte*" 280; Nesselmann, s.v. "*gabawo*" 41.

[88] Watkins 34; IEW 465-466; LIV 205; EIEC 160; DELG 156; LSJ 305-306; Mallory and Adams 403.

[89] LSJ 382-383; Beekes 320; Frisk 372-373; DELG 256; OLD s.v. "*depsō*" 521. The comic poet Eubulus (4th century B.C.) is quoted in a fragment: "ἀλλ' οὐδὲ μίαν ἀλλ' ἑταίραν εἶδέ τις αὐτῶν, ἑαυτοὺς δ' **ἔδεφον** ἐνιαυτοὺς δέκα." referring to the sexual practices of the Greeks at Troy. —G. Kaibel, *Athenaei Naucratitae deipnosophistarum libri xv*, Book 1, Paragraph 46, Line 10. For a rough translation, see Kock, ed., *Comicorum Atticorum Fragmenta*, vol.2, 207. A raw translation might run something like, "Nor did any one of them ever see a prostitute, but they f—ked each other for ten long years." See also Jones and Wilson, *Prolegomena de comoedia. Scholia in Acharnenses, Equites,*

Latin *depsō* is considered to be from the Greek, but it preserves the original sexual denotation as attested in Grk *δέφω*. Neither of these words has a known PIE etymology.

8.   *$b^h eg^u$-* ʻwomb, vulva, desirous of sexual pleasure, woman, wife, sister, flee, fearʼ
     Ved *bhága* ʻlove, affection, sexual passion, amorous pleasure, dalliance, the female organ, pudendum muliebre, vulva,ʼ *bhága-deva* ʻwhose god is the female organ, lustful, a libertine,ʼ *bhágam-dara* ʻlacerating the vulva,ʼ *bhága-bhakshaka* ʻliving by the vulva, a procurer, pander,ʼ *bhagâṅkura* ʻthe clitoris,ʼ *bhagâsya* ʻwhose mouth is used as a vulva,ʼ *bhaginī* ʻsister (sibling with a womb),ʼ *bhagaḥ* ʻfemale sexual organ, vulva,ʼ Grk *φέβομαι* ʻto flee,ʼ *φοβέω* ʻfrighten away,ʼ OLith *bėgmi* ʻrun, flee,ʼ ORus *běgu* ʻrun,ʼ Hindi *bhāgnā* ʻflee.ʼ[90]

In ancient (and in modern tribal) societies, in case of enemy attack, the men grab their weapons and run to meet the foe, while it is the responsibility of the women to gather up the children and to flee to safety in the surrounding forest. Hence, whether justified or not, the propensity to flee in fear is commonly ascribed to members of the female gender.[91]

     Since Sanskrit is a satem language, the reflex of this root would have been *bhag*, which is identical to the form taken by another root *$b^h eg$-*, *$b^h ag$-* ʻdivine apportioner, God (Slavic *bogŭ* ʻGod,ʼ Rus *bog* ʻGod,ʼ Av *baγa-* ʻGod,ʼ Skt *bhága-* ʻlordʼ), Av *bag* ʻdistribute,ʼ Skt *bhájati* ʻdivides, distributes, portion,ʼ Grk *φάγειν* ʻeat,ʼ TochB *päke* ʻshare, portion.ʼ[92] Over time these two roots have fallen together in Sanskrit because of their identical phonetic form, but semantically they are quite distinct. For this reason I have here treated them as two separate roots. The root *$b^h eg$-*, *$b^h ag$-* ʻshare, portion,ʼ has been analyzed below in Table 11.

9.   *$b^h org^u$-os*   ʻfoolish, silly, stubborn, capricious, unrefined, ignorant, angry, furiousʼ
     Arm *bark* ʻfurious,ʼ OIr *borb, borp* ʻfoolish, silly,ʼ MIr *borb* (*$*burbo$-*, PIE *$*b^h_o rg^u o$-*) ʻunrefined, ignorant,ʼ Latv *bar̂gs* ʻstern, unfriendly, unmerciful,ʼ Swed dial. *bark* ʻstubborn, capricious, unfriendly,ʼ *barkun* ʻcoarse.ʼ[93]

In this case again, ancient female stereotypes are expressed.

10.   *$b^h erg^u$-*   ʻfeed, nourish, tendʼ
     Grk *φέρβω* ʻnourish, feed, tend, preserve,ʼ *φορβὰς κόρη/γυνή* ʻprostitute,ʼ Myc *po-qa* /$p^h org^w ā$/ ʻfeed, nourish,ʼ *φέρβητης* ʻherdsman.ʼ[94]

Nubes [*Scholia in Aristophanem* 1.2. Groningen: Wolters-Noordhoff, 1969]: 1-277, "*δεφόμενος · ξυνουσιάζων, ἀποδέρων τὸ αἰδοῖον*" ʻto have sexual intercourse (LSJ 1723), to rub the sexual organs,ʼ (LSJ 36, 196).

[90] Monier-Williams 743-744; KEWA 459-460; IEW 116; LIV 67; Mallory and Adams 398; ALEW 109-110; Beekes 1559; EIEC 491; DELG 1140-1150; LSJ 1920, 1946. For parallel semantics, compare *$*péses$* ʻpenis,ʼ Hit *pisna-* ʻmanʼ (< ʻone provided with a penisʼ) EIEC 507, EDHIL 670.

[91] This is not uncommon in ancient thought. With regard to gender attitudes concerning left-handedness, for example, EIEC writes, "Thus, the semantic associations of ʻleftʼ in the various IE stocks… are broadly feminine and negative, i.e., left indicates the female side, matrilineality, chthonic, unlucky, unordered, weakness, and is expressed in polar opposition as ʻnorthʼ"—EIEC 349. A semantic parallel in Modern English: A man who runs away in fear from danger is liable to be called a vulgar term designating the female sexual organ, (p_ssy).

[92] LIV 65; IEW 107; Mallory and Adams 274, 318, 410.

[93] IEW 163; Mallory and Adams 340.

[94] Beekes 1561-1562, 1554; DELG 1144-1145; LSJ 1921, 1950.

Greek φέρβω is considered by Beekes to be an agricultural term without PIE etymology. Women are, however, anatomically adapted to provide nourishment to their children: to feed, nourish, and tend them. This biological and social dynamic conforms to the general semantic field of the resonant series under discussion here.

11. *bʰlegᵘ- 'blood vein, womb, vulva, buttocks, embryo, fetus'
Grk φλέψ, φλεβός 'vein,' φλεβοτομέω 'bleed, let blood,' φλεβάζονες · βρύοντες (Photius, *Etymologicum Magnum* 795.43: βρύω 'to swell, teem with,' βρυασμός 'pleasure,' ἔμβρυον 'newborn (lamb), fetus, that which grows inside the womb,' English *embryo*), OHG *bolca, bulchunna* (*bʰl̥gᵘ-) 'bulla,' Lat *bulla* 'bubble, "compare Lith *bulìs*" (OLD 244). Lith *bulìs* 'buttocks, arse, vulva.'[95]

According to both Beekes and DELG, there is no known PIE etymology for Grk φλέψ, φλεβός, with Frisk stating that it is an unsolved riddle. The semantics of this particular root, however, intersect very directly with the overall trends within this series: female anatomy, sexual functioning, reproduction, child bearing, and the woman's place in society. First, a highly marked female characteristic is the swelling of their bodies that occurs during pregnancy. Second, the monthly flow of blood from their reproductive organs strongly distinguishes them from males. Third, the sexual act is linked to feelings of pleasure. Fourth, women are unique in that they are able to bring forth young from their bodies.

12. *keu̯p- 'desire, covet, vibrate, be in a passion, vulva'
ON *hjúfa* 'moan,' Skt *kupyati* 'shake, tremble, thrill, vibrate, to be moved, be excited, be agitated, be in a passion,' Lat *cupiō* 'wish, want, desire,' *cupiditās* 'passionate desire, longing, yearning, lust, passion, the object of one's desire,' *cupidus* 'eager for carnal pleasure, wanton, lecherous, passionately longing,' *cupītus* 'that which one desires, beloved,' Ved *kopáyati* 'shake, quake, vibrate, be in a passion,' Slav *kъpъ, Czech *kep* 'vulva.'[96]

13. *ku̯elp- 'womb, vagina, gulf, arched or vaulted ceiling'
Grk κόλπος 'bosom, lap, vagina, womb, bay, gulf, fold of garment,' ON *holf* 'the domed, arched, curved, or vaulted ceiling of a room,' OHG *be-welben* 'surround, encircle, curve or arch over.'[97]

14. *k⁽ᵘ⁾lep- 'desire'
Av *xrap-* 'desire,' TochAB *kulyp-* 'desire.'[98]

15. *krep- 'body, belly, womb, uterus, midriff'
OHG *(h)rëf* 'belly, womb, uterus,' OFris *href* 'belly,' OE *hrif* 'womb, uterus, belly,' *mid(h)rif* 'midriff,' Grk πραπίς 'diaphragm,' Lat *corpus* 'the body, the generative powers, to live by

[95] IEW (*bulla*) 99 (*bʰlegᵘ-) 155; LSJ (βρύω) 332, (φλέψ, φλεβός) 1944; Beekes (βρύω) 246, (φλέψ, φλεβός) 1578; Frisk (βρύω) 274-275, (φλέψ, φλεβός) 1025; DELG (βρύω) 190-191, (φλέψ, φλεβός) 1167-1168; OLD (*bulla*) 244-245; ALEW (*bulìs*) 167-168; Monier-Williams (*buri, buli*) 735.
[96] LIV 359; IEW 591, 596; Monier-Williams 291; de Vries 233; OLD 472-73; Watkins 47.
[97] LIV 375; IEW 630; LSJ 974; de Vries 247; Kluge 869; Mallory and Adams 384; EIEC 62.
[98] Mallory and Adams 342; EIEC 158.

prostitution (*corpore quaestum facere*), the center of certain physiological needs and desires, especially as representing the grosser elements in human nature,' Skt *kr̥pá* 'form, beauty,' Av *kəhrpəm* 'form, body,' MIr *crī* 'body' (< *kr̥pes*).[99]

16. **k⁽ᵘ⁾emp-*　'tremble, shake, quiver, vibrate'
Ved *sam-pra-kampante* 'tremble, shake, quiver, vibrate, to be in excited motion,' *kampáyāmi* 'let shake, tremble, vibrate,' YAv *kafsąn* 'shake, tremble, quiver, vibrate.' Possibly Lat *concumbō* 'to lie together (for sexual intercourse).'[100]

17. **k⁽ᵘ⁾Rep-H*　'yearn for, desire, lament'
Ved *akr̥payat* 'yearn for, desire, lament,' *Kr̥ipaṇya* 'wish, desire, pray for,' *cakr̥pánta* 'desire, wish for, long for, hanker after, crave.'[101]

18. **pleh₂k-*　'appease passions and appetites, find favor'
Lat *placeō* 'to be pleasing, to be sexually attractive to, to find favor,' *complacēre* 'to capture the affections of,' *plācāre* 'to make favorably disposed, appease,' *plācō* 'to make a person calm, to soothe, to appease passions and appetites,' TochB *plāktsi* 'agree,' TochA *plākäm* 'permission.'[102]

19. **(s)plek-*　'copulate'　(Proposed Root)
Grk *σπλεκόω, κατασπλεκόω* 'to copulate, have sexual intercourse,' *σπλέκωμα* 'sexual intercourse,' *πλεκοῦν* 'have sexual intercourse.'[103]

Beekes states that there is no known PIE etymology for these Greek terms.

20. **preK-*　'fear, be afraid, frighten, danger'
TochB *parskaṃ* 'be afraid,' *prāskaṃ* 'will be afraid,' TochA *praskatär* 'fear,' *proskiye* 'fear, danger,' *pärsk-* 'feel fear, be afraid,' *parski* 'fear,' Goth *faurhts* 'frightened,' *faurhtjan* 'fear,' OHG, OSax *forhta* 'fear,' OE *forht* 'frightened.'[104]

Those Tocharian attestations in /rsk/ are originally from *prk-ske/o*. The velar at final could be from *k* or from $G^{(h)}$, see LIV 491n1. Note that the meaning *fear* in this root corresponds to one semantic value of **bʰegᵘ* (as seen in Greek *phobia*) in root #8 above.

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[99] Mallory and Adams 178; IEW 620; OLD 448; Bomhard 530.
[100] LIV 351; [IEW 525; Mallory and Adams 384]; OLD 392, 464.
[101] LIV 370; Monier-Williams 305.
[102] IEW 831; OLD 1385-1386; de Vaan 469; LIV 485; Beekes 1384; Mallory and Adams 337; EIEC 334.
[103] LSJ 913, 1415, 1628; Beekes 1384; DELG 881; Frisk 769.
[104] LIV 491; IEW 820; Adams 360, 375, 422.

Table 6: Phonetic Grid Showing *$g^u e(R)b^h$- and Its Root Variants

	Initial	∅	r	l	n/m	u̯	i̯	h₁	h₂	h₃	Final
Root: *g^u—b^h 'womb, woman, act of conception, embryo, offspring'											
Voiced/ aspi-rated	gᵘ	*gᵘebʰ-	*gᵘerbʰ	*gᵘelbʰ	*g⁽ᵘ⁾embʰ		*gᵘei̯bʰ	*gᵘeh₁bʰ	*gᵘeh₂bʰ		bʰ
Inverted	bʰ	*bʰegᵘ	*bʰorgᵘ *bʰergᵘ	*bʰlegᵘ							gᵘ
Lenis	k		*krep *k⁽ᵘ⁾Rep-H	*ku̯elp *k⁽ᵘ⁾lep	*k⁽ᵘ⁾emp	*keu̯p					P
Inverted lenis	p		*preK	*(s)plek *pleh₂k							k

Using the Phonetic Grid as a Heuristic Guide

There is reason to believe that the presently reconstructed lexicon of PIE amounts to only about 10% of the spoken language that must have existed before the break-up of the daughter languages.[105] In the best case scenario there is evidence from eleven or twelve different stocks to support PIE root reconstructions, but many lexical items are reconstructed with far less support, some with as few as one or two stocks. No doubt there are many roots that have survived with only a trace or two here and there, but with insufficient evidence to be confidently accepted as established roots in the lexicon.

If, however, a word can be placed somewhere in the grid of a table like the one above, with a strong semantic conformity to the series as a whole, then it may be possible to assign a plausible and even convincing etymology for it.

In this way, new roots can be identified with a reasonable degree of confidence, since using gaps in the grid as a guide often leads to the discovery of attestations that would otherwise have escaped notice. Drawing from the history of another scientific field as a paradigm, empty gaps in the early development of the periodic table, in several instances, led chemists to discover the missing elements in question because they then knew what they were looking for.

Estimate of Statistical Validity:

1. Aside from the seven roots listed in Table 5, there are no other roots with the consonantal form *g^u—b^h in the reconstructed proto-language. Statistically, the chances of seven roots with this phonetic form all carrying similarly related semantic values (womb, woman, act of conception, embryo, off-spring) are infinitesimal when compared to a random sampling of PIE roots. One must therefore conclude that other factors are involved, the most probable being that of genetic relation-

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[105] Dictionaries of non-literate languages tend to have between 15,000 and 20,000 headwords. The reconstructed lexicon of PIE (as listed in Watkins or EIEC) show approximately 1,500 roots. Additionally, about 58 plant and tree names can be reconstructed for PIE, whereas studies of traditional farming societies tend to have an average of approximately 520 botanical items in their vocabulary. Here again, the ratio is somewhere around 10% (see Mallory and Adams 117-119).

ship, i.e., they are cognates. Note: An extensive discussion about the semantic connections between some of these roots can be found in Haynes (2020: Table 28). Space does not allow that discussion to be reproduced here.[106]

2. Aside from those four roots listed in Table 5, the only other root with the consonantal structure *b^h— g^u in the PIE lexicon is *$b^h ei̯g^u$-, the meaning of which is obscure.[107] Four semantic matches out of five roots with this phonetic shape, despite some limited semantic divergence, far exceeds what would be expected in a random sampling.

3. Five of the six roots of the resonant series *$k^{(u)}e(R)p$- show /u̯/ in the phonetic structure, either in the character of the initial labiovelar or as a separate resonant element. It is doubtful that this is merely the result of coincidence; on the contrary, it raises the likelihood that these roots share a genetic connection. In all, there are about twenty roots (depending on how they are counted) with the phonetic form *$(s)k^{(u)}e(R)p$ in the PIE lexicon,[108] six of which show a semantic value related to: *womb, woman, vulva, vibrate, sexual excitement, desire, act of conception, embryo, offspring,* as shown in Table 5. These six roots then represent 30% of all roots with this phonetic form in the PIE lexicon. Note especially that roots comprised of lenis consonants (p, t, k, ḱ) are more plentiful since they represent both those roots that carry such consonants organically, as well as roots whose consonantal elements are derived by reduction from voiced/aspirated originals.

In a random selection of twenty PIE roots, how many would be expected to carry this or a related semantic value? It is very unlikely that more than fifty PIE roots could be found with meanings that fall within this semantic field.[109] If it is assumed that the PIE lexicon contains approximately 1,500 entries,[110] then fifty items would represent approximately 3% of the distinct semantic values in the lexicon. Therefore it would not be unreasonable to say that this correlation, by limiting selections to roots in the form *(s)k^{(u)}e(R)p$*, is about ten times greater than if the selection were random.

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[106] An on-line version can be found at https://www.mother-tongue-journal.org/MT/mt22.pdf (p. 181).

[107] It is sometimes explained as 'pure, clear, bright,' because it is used as an epithet for water, fire, and the light of the sun and moon, but is without any clear PIE etymology. Derivatives include: *Φοῖβος* 'epithet and name of Apollo,' *φοιβάς* 'priestess of Phoibos, inspired woman, prophetess,' *φοίβη* 'daughter of Ouranos and Gaia,' *φοιβάζω* 'to prophesy, inspire,' *φοιβάω* 'to purify,' *φοίβησις* 'inspiration,' *φοιβήτρια* 'purification, also the name of a goddess, perhaps Isis' (Beekes 1582-1583; IEW 118; LSJ 1947; DELG 1172-1173; Frisk 1031). An argument could be made that *$b^h ei̯g^u$- (in the sense of daughter, priestess, inspired woman, prophetess, a goddess perhaps Isis) also reflects the feminine behaviors and characteristics as seen in the other attestations of the consonant structure *b^h— g^u in Table 5, but because of semantic uncertainties it is not included there at this time. Note also that IEW (495) alternatively assigns *Φοῖβος* and its derivatives to a different root, *$ǵh u̯oig^u$.

[108] *keu̯p-, *ku̯elp-, *k^u lep-, *krep-, *$k^{(u)}emp$-, *$k^{(u)}RepH$-, kamp-, keh₂p-, ku̯ep- ki̯eh₂p-, klep, *$k^{(u)}rei̯p$-, *ku̯eh₁p-, 1.*(s)kep-, 2.*(s)kep-, *(s)kerp-, *KrepH-, k^u erpH-, *ku̯Hp-, *kelp-. As stated above, the canonical form of the primitive root is (s)CRRC-. Following elements are considered to be later accretions.

[109] Based on the word count of terms relating to this semantic field (*womb, woman, vulva, vibrate, sexual excitement, desire, act of conception, embryo, offspring,* etc.) in Mallory and Adams 2006: 523-564.

[110] This is an approximation of the number of items in the PIE lexicon given in Mallory and Adams (2006: 117-119).

*h₂(R)eĝ- and Its Root Variants

Table 7: *h₂(R)eĝ- 'hunt animals; herd, drive, raid for, breed, raise, care for, milk, maintain and protect animals; hunting tools: spear, arrow, sharp point; hunting and pasturing lands'

PIE Root	Initial	R1	R2	Final	Ref	Semantic Value
*h₂(R)eĝ- 'hunt animals, herd, breed, and maintain them'[111]						
1.*h₂eĝ-	h₂			ĝ	1	drive cattle, drive off cattle as booty, lead, guide, manage, keep
*h₂eĝ-reh₂	h₂			ĝ	2	hunt, fish, the chase, prey, game, net, hunter, wild game, battle
*h₂(ĝ)-er-	h₂			(ĝ)	3	gather, collect, take, seize, capture
*h₂eĝ-ros	h₂			ĝ	4	countryside, field, plain, pasture
*h₂le(ĝ)-	h₂	l		(ĝ)	5	look after, care for, give careful attention to, gather up
*h₂melĝ-	h₂	m	l	ĝ	6	squeeze out, press out, milk animals
*h₂merĝ-	h₂	m	r	ĝ	7	squeeze out, gather up, wipe clean, graze animals
*h₂reh₁(ĝ)-	h₂	r	h₁	(ĝ)	8	help, aid, support, be concerned about, care for, pay attention to
*h₂erĝ-	h₂		r	ĝ	9	white, white as color of sheep
*h₂eiĝ-(s)-, *h₂eĝ-os-	h₂		i̯	ĝ	10	goats and sheep, small cattle
*h₂eĝ-inom	h₂			ĝ	11	leather, hide
2.*h₂eĝ-	h₂			ĝ	12	order, command, say ('verbally lead or drive men, slaves, soldiers')
*s(e)h₂(ĝ)-	(s)h₂			(ĝ)	13	track, scent, trail, seek, lead, direct, drive
METATHESIS VARIANTS						
*ĝe(R)h₂- 'steal animals, drive them home, breed them, feed them, and raise them to maturity'[112]						
*ĝi̯eH-	ĝ	i̯		H	14	steal, deprive someone of property, overpower, rob, grow old

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[111] Some of these roots were originally included in Haynes (2020: Table 37). For this root see especially Anttila, *Greek and Indo-European Etymology in Action: Proto-Indo-European *aĝ-*. For a further discussion on the antiquity of these roots see Anttila, "Beating a Goddess out of the Bush?", 1.

[112] This resonant series should probably include a hypothetical root *ĝeh₂- that would account for Grk γῆ, 'earth, land, country, ground, native land,' γαία 'land, country, earth,' γεωργέω 'to be a husbandman, farmer, literally "earth worker," till, plough, cultivate,' γᾶ 'Dor. and Aeol. for γῆ,' γαιών 'heap of earth, boundary-heap.' This root would be semantically parallel to *h₂eĝ-ros 'countryside, field, plain, pasture' but in metathesis form, (Beekes 254-255, 269-270; LSJ 335, 347; Mallory and Adams 392; DELG 210; and for the Attic change of original *ā to ē, see EIEC 240).

*ǵeu̯H-	ǵ		u̯	H	15	set in motion, drive, rouse, impel
*ǵemH-	ǵ		m	H	16	breed, mate, marry, copulate
*ǵieu̯H-	ǵ	i̯	u̯	H	17	eat, consume, devour, chew, masticate
*ǵerh₂-	ǵ		r	h₂	18	ripen, mature, cause to grow old, become old
REDUCED VARIANTS						
*ḱe(R)h₂- 'care for animals, toil over them, settle them down, skin them, clean them, drive them to pasture, carry them off as prize or booty, horned animals'						
*ḱemh₂-	ḱ		m	h₂	19	carry off as prize or booty, care for, look after, attend to animals or men, toil, to calm, pacify, soothe, or settle
*ḱleu̯H-	ḱ	l	u̯	H	20	wipe, sweep, brush, clean, purify
*ḱei̯h₂-	ḱ		i̯	h₂	21	set in motion, drive, arouse, urge on, excite
*ḱrh₂-	ḱ		r	h₂	22	horn, stag, hornet, cow, claw, talon
*ḱ⁽'⁾ueh₂-	ḱ	u̯		h₂	23	gain, obtain, acquire, earn, win (animals as wealth)
METATHESIS VARIANTS						
*h₂e(R)ḱ- 'feed animals, soothe, and protect them; animals with antlers, sharp, sharp objects, lead or drive wheels (axle)'						
*h₂eḱ-h₃-	h₂			ḱ	24	lead or drive to pasture, consume, eat up, tend, feed, graze
*Hmelḱ-	H	m	l	ḱ	25	stroke lightly, touch, soothe, appease, caress, fondle
*h₂erḱ⁽'⁾-	h₂		r	⁽'⁾ḱ	26	keep, keep away, fend off, shut up, guard, ward off, defend
*Hólḱ-is	H		l	ḱ	27	elk, wild sheep, antelope
*h₂eḱ-	h₂			ḱ	28	sharp, pointed, sharpen, pungent, sour, needle, grinding stone, sharp edge, hunting spear, prick, sharpen
*h₂ei̯ḱ-(smeh₂)	h₂		i̯	ḱ	29	spear, spit, pointed stick, point of spear, arrow, impale, run through with sword, put on a spit
*h₂eḱ-s	h₂			ḱ	30	axle, axis, (literally 'leads or drives the wheels')
*h₂ei̯ḱ-	h₂		i̯	ḱ	31	possess, property, earnings, rule over, (animals as wealth)

1.   *h₂eĝ-   'lead, carry, fetch, bring; drive cattle, fight'
     Lat *agō* 'drive cattle, drive off cattle as booty, plunder, of men: to force to move on, set in motion,' *agitō* 'set in motion, drive or ride horses, propel forcefully, drive before one,' Grk ἄγω 'of living creatures: lead, carry, fetch, bring; carry off as captives or booty, lead, guide, manage, keep,' ἀγός 'leader,' ἀγών 'gathering, assembly, battle,' ἀγέλη 'herd; herd of horses, oxen or kine; any herd or company, bands in which boys were trained,' ἀγελικός 'of the flock,' Ved *ájati* 'to drive,' *ajá* 'a drove, a troop, driver, leader, the leader of a flock, a he-goat, ram,' (with instrumental suffix -*trā*) *aštrā* 'whip, lash, scourge,' Skt *ājí* 'race, fight,' Arm *acem* 'leads,' OIr -*aig, -agat* 'drive, lead,' *tāin* (from **to-ag-no*) 'raid,' ON *aka* 'go, travel, drive,' MIr *āg* 'fight, warrior's ardor,' TochAB *āk-* 'lead, guide, drive,' *āśäṃ* 'lead.'[113]

Leading or driving the flocks to fresh pastures and clean water sources is central to the semantic field denoted by this root series. Cattle raids were also clearly a part of ancient practice.[114] The application of animal herd nomenclature to young human beings is common, as for example, the English use of the word, *kids*, to refer to human children.

2.   *h₂eĝ-reh₂- 'hunt'
     OIr *ār* 'carnage (especially by dogs), battlefield,' Wels *aer* 'battle,' Grk ἄγρα, ἄγρη 'hunting, the chase, way of catching, quarry, prey, game, fish,' ἀγρεμῶν 'hunter,' ἄγρευμα 'that which is taken in hunting, prey, means of catching, hunting or fishing, net, take by hunting or fishing, catch,' ἀγρηνόν 'net,' ἀγριμαῖος 'wild, wild game,' Av *azrō* 'hunt.'[115]

Of this root, EIEC states: "Although all are derived from **h₂eĝ-* 'drive,' the antiquity of this loose set of comparisons is not clear. The Avestan term occurs in a compound hapax -*azro-daiδim* as an epithet of a she-wolf and is also translated as 'roaming in the fields'."

3.   *h₂⁽ĝ⁾-er- 'gather, collect, capture'
     Grk ἀγέροντο 'collect, get together, fetch,' ἀγρόμενοι 'collected,' ἀγρέω 'take, seize, capture,' ἀγορά 'assembly, place of assembly, marketplace,' TochB *karāre* 'gather, collect.'[116]

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[113] LIV 255-56; IEW 4-6; LSJ 8, 14, 17-18; OLD 85, 87; Monier-Williams 9; DELG 9, 16; Bosworth and Toller 5 (see LIV 256n3); Mallory and Adams 280, 403; Buck 191; EIEC 201, 284, 348; Frisk I-18, II-348; EWAia 50-52; Beekes 18-19; de Vries 3; Adams 36; Anttila 1ff and Anttila, "Aggression and Sustenance, 121; NIL 267-270; Watkins 1; Bomhard 706, 707; Dolgopolsky no. 17. An interesting possibility for the origin of the PIE term for *king* (usually given as **h₃rḗĝ-* 'stretch out the arm') is that it is also derived from this proto-root (**h₂(R)eĝ-*) with medial resonant in /r/. EIEC (330) suggests this possibility: "It is possible that this **h₃reĝ-* is distinct from **h₃reĝ-* 'stretch out the arm.' (In which case we should reconstruct **(H)reĝ-* for 'king')." Perhaps originally from **h₂reĝ-* 'leader.' For comparanda in outside language families, see Bjørn, *Foreign elements*, no. 43-44, pp. 68-69.

[114] "Many of the IE stocks preserve traditions of cattle raiding. In some cases, these are almost central to their epic literature, e.g., in early Ireland the *tāna* 'cattle raids' were a recognized narrative category and in a society where wealth was reckoned in cattle, cattle-rustling was regarded as the most appropriate activity for young male warriors. That the practice of cattle raiding might be earlier and postulated for PIE itself rests on several bodies of evidence. There are a number of correspondences among the various IE stocks for cattle stealing that are built on the verb 'to drive': OIr *tāin* (< **to-aĝ-no-*) *bō* 'cattle raid,' Lat *bovēs agere* 'to drive or raid for cattle,' Av *gam varətam az-* 'drive off cattle (as) booty'" –EIEC 138.

[115] EIEC 284; lEW 6; Watkins 1; Mallory and Adams 403; Buck 191; LIV 255; Frisk I 18, Frisk II 348; EWAia 50-52; Beekes 15; DELG 14.

[116] LIV 276; LIV Add. 36-37; IEW 382; LSJ 13-14; Beekes 10, 14. For another voice suggesting that these roots belong with **h₂eĝ-*, see Anttila, *Beating a Goddess out of the Bush*, 2.

Rounding up animals for protection, milking, shearing, slaughter, or sale is a necessary part of normal animal husbandry. Seizing them is part of traditional cattle raiding.

4.   *h₂eĝ-ros*   'field'

Lat *ager* 'land, field, countryside,' Skt *ájra* 'field, plain,' Grk *ἀγρός* 'field,' OE *æcer* 'field,' NE *acre* 'field,' Arm *art* 'field.'[117]

Integral to the tending and care of flocks is providing them with adequate pasturage. The root *h₂eĝ-ros* probably originally denoted *hunting ground*, which was later expanded to include *animal pasture*, and then any kind of field. It is not surprising that this resonant series combines notions of hunting and pasturing, since both concepts are tightly connected with the habitat of animals. Compare the unrelated OHG *weidōn* 'hunt, pasture' (Buck 191).

5.   *h₂le⁽ĝ⁾-*   'look after, care for, give careful attention to, gather up'

Grk *αλέγω* 'to mind, look after, care for,' Lat *-legō, legere* 'look after, care for,' *dīligens* 'fond of, careful, attentive, diligent,' *dīligentia* 'carefulness, attentiveness, give careful attention to,' *legō* 'gather up, count up, follow the track of.'[118]

6.   *h₂melĝ-*   'squeeze out, press out, milk animals'

Grk *ἀμέλγω* 'squeeze out, press out, to milk,' MIr *bligim* 'to milk' (< *mligim*), OE *melcan*, OHG *melchan* 'to milk,' Lith *mélžu* 'to milk,' Alb *mjel* 'to milk,' Lat *mulgeō* 'to milk,' TochA *mālk* 'milk.'[119]

7.   *h₂merĝ-*   'squeeze out, gather up, harvest, wipe clean, drive and graze animals'

Grk *ἀμέργω* 'squeeze out, pluck, gather, harvest,' *ὀμόργνυμι* 'wipe off,' *ἀμοργός* 'press out,' *ἀμόργη* 'the liquid that runs out when olives are pressed' (also Lat *amurga, amurka*), Ved *mā́rṣṭi* 'wipe off, clean,' YAv *marəzaiti* 'touch, strip off, take off,' Arm *meržem* 'expel, drive cattle out to graze.'[120]

8.   *h₂reh₁⁽ĝ⁾-*   'help, aid, support, be concerned about, pay attention to, care for'

Grk *ἀρήγω* 'help, aid, succor, be good for, ward off,' ON *røkja* 'to be concerned, pay attention to, take care of,' OHG *ruoh, ruohha* 'pay attention to, take trouble for, care, attention, conscientiousness,' NE *reck-* (opposite of *reckless* 'carelessness').[121]

9.   *h₂erĝ-*   'white'   *h₂erĝ-n̥t-om*   'white metal: silver'

Skt *árju-na-ḥ* 'light, white,' *rajatá* 'white,' *rajatám* 'silver,' TochB *ñkante* 'silver,' Grk *ἀργός* 'white,' *ἀργεννός* 'white ("in Homer almost always of sheep" –LSJ 235), of woolen cloths,'

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[117] Mallory and Adams 163-64; LSJ 15-16; OLD 82; Monier-Williams 10; Starostin (2009) 98; Beekes 16; EIEC 8, 200-201; Watkins 1; de Vaan 29; Anttila, *Greek and Indo-European Etymology in Action*, 3; Starostin, "Indo-European – North Caucasian Isoglosses," 120.

[118] LIV 276; IEW 658; LSJ 61; OLD 543-44, 1014; Haynes (2020) Table 37.

[119] LIV 279; IEW 722-723; Mallory and Adams 261-262; LSJ 80; Bomhard 850; Haynes (2020) Table 37. See also, Garnier, Sagart, and Sagot, "Chapter 13. Milk and the Indo-Europeans"; Ruhlen and Bengtson, "Global Etymologies," 308-309.

[120] LIV 280; IEW 738; Mallory and Adams 169; LSJ 81, 1227; OLD 125; EIEC 258; Haynes (2020) Table 37.

[121] LIV 284; IEW 857; LSJ 238; de Vries 457; Haynes (2020) Table 37.

ἄργυρος 'silver,' TochA *ārki* 'white,' OIr *argat* 'silver,' Lat *argentum* 'silver,' Av. *ərəzatəm* 'silver,' Arm *arcat* 'silver,' Hit *harkis* 'white.'[122]

The use of this root to denote the concept *white* would be a result of observing the white fleecy sheep and lambs against the green pastures. This would then be applied to other white or light colored materials such as the metal, silver. For an outside linguistic connection between *lamb* and the color *white* in Basque, see Trask.[123]

10. **h₂eiĝ-(s)- *h₂eĝos-*   'goat'
     Skt *aja-karṇa* 'goat's ear,' *aja-kshīrá* 'goat's milk,' *ajajīvana* 'goat herd,' *ajapa* 'goat herd,' *ajaví* 'goats and sheep, small cattle,' Alb *edh* 'kid,' Grk αἴξ 'goat,' αἰγο-βάτης 'goat slayer,' αἰγο-βοσκός 'goatherd,' αἰγο-φάγος 'goat eating,' Arm *ayc* 'she-goat,' Av *izaēnā* 'goat hide.'[124]

Ancient flocks were most often composed of goats and sheep.

11. **h₂eĝ-inom*   'hide, leather'
     OCS *(j)azno* 'hide, leather,' Skt *ajinam* 'hide.'[125]

12. **h₂eĝ-*   'proclaim, order, command, say' ('verbally lead or drive men, slaves, soldiers')
    Grk ἦ 'say,' ἄν-ωγα 'command, order (especially of kings and masters), advise, urge, bid,' Lat *aiō* 'say, (of law) prescribe, lay down,' Arm *asem* 'say,' TochB *ākṣäṃ* 'announce, proclaim, instruct, issue a proclamation, recite.'[126]

Since the root 1.**h₂(R)eĝ-* 'lead, drive' was applied figuratively to groups of people, soldiers, troops, young boys, etc., as well as originally to animals, this may represent a semantic split where *to order* soldiers or slaves was conceptually equivalent to *driving or leading* them.

If this is true, then every PIE root with the structure **h₂(R)ĝ-* is devoted to terms originally indicating the hunting, herding, feeding, tending, protecting, pasturing, leading, driving, gathering, and milking of flocks of animals. References to both goats and sheep (with their characteristic color) are evident.[127]

13. **s(e)h₂(ĝ⁾-* 'track, scent, trail, seek, lead, direct'
    OIr *-saig* 'trace something, search, seek,' Goth *sokjan* 'seek, search, attack,' Lat *sāgiō* 'trace, track down, get the scent of,' Hit *sākiya* 'discover,' Grk ἡγέομαι 'lead, direct, drive.'[128]

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[122] Mallory and Adams 242, 332; IEW 64-65; LSJ 235; NIL 317-318; Watkins 5; Starostin, "Indo-European – North Caucasian Isoglosses," 121.

[123] R. L. Trask, "Basque and Dene-Caucasian: A Critique from the Basque Side," and Xabier Zabaltza, "Comments on R. L. Trask's Article "Basque and Dene-Caucasian: A Critique, 18, 166.

[124] Mallory and Adams 141; IEW 6, 13; LSJ 35, 40; Monier-Williams 9; EIEC 229; Watkins 2; Starostin, "Indo-European – North Caucasian Isoglosses," 105-106.

[125] Mallory and Adams 179; IEW 7.

[126] LIV 256; IEW 290-291; Mallory and Adams 353; Beekes 110-111, 519; LSJ 169, 771; Watkins 1; OLD 91-92; de Vaan 31-32; Adams 38-39. For the linguistic link between speaking and driving, see Raimo Anttila, *Greek and Indo-European Etymology in Action*, 111.

[127] Another potential reflex of this root is Grk ἀγαθός 'good, fit, noble,' possibly originally indicating the desirability of herds of animals (Beekes 7, DELG 5-6) with disputed etymology; see also ἄξιος 'worth' (Beekes: 111).

[128] LIV 520; IEW 876-877; Beekes 508; Mallory and Adams 327; de Vaan 534; Watkins 75; Balg 384-385; OLD 1679; LSJ 763.

A word with uncertain etymology is Grk ἀγαπάω 'to regard with affection, to love, especially when directed toward children.' Later Christian terminology used the nominal, ἀγάπη to denote 'the love of God for man, and of man for God.' It has been suggested (DELG 1264, Beekes 8) that this word is a compound, ἀγά-πη, where –πη is the care and feeding denoted in the PIE root, *peh₂- (Haynes 2020: Table 68). The first element of this compound is conjectured to be the Greek intensive prefix ἀγά, but I suggest that it is more likely a reflex of the resonant series described above. Thus ἀγάπη is the care that a shepherd shows for his flock. The numerous instances in the scriptures where God is compared to a shepherd and human beings to his flock, would tend to support this hypothesis.[129]

Some of the following terms were, in later times, commonly applied to human social behavior but probably originally referred to aspects of animal husbandry. This type of adaptation of language is well-attested, for example:

- NE *kid* 'young goat' applied to human children.
- PIE *u̯rētos 'flock, herd,' in OE *wrǣþ* 'herd of swine,' Skt *vrā́ta-* 'flock, swarm' applied to war bands of young men (NG *Männerbünde*) in ancient Indian society (*vrātya*).[130]
- Lat *grex* 'assembly of animals, flock, herd, group of sheep, a litter, a brood,' was later expanded to include "a group of people assembled together, band, troop, company, dense mass of people, crowd, or (contemptuously) the undistinguished crowd, the ruck."[131]

14. *ĝi̯eH- 'steal, deprive someone of property, overpower, rob, grow old'
Ved *jināti* 'grow old, rob, deprive of,' YAv *zināt* 'rob, deprive of.'[132]

15. *ĝeu̯H- 'drive, rouse, impel, be quick, animate, inspire'[133]
Ved *junā́ti, jávati* 'press forwards, hurry on, be quick, impel, urge, rouse, drive, incite, excite, promote, animate, inspire,' *apī-jū́* 'impelling,' *dhī-jū́* 'inspiring the mind, rousing devotion,' *yatú-jū́* 'incited or possessed by a *yatú*,' *vayo-jū́* 'exciting or increasing strength,' *viśva-jū́* 'all-impelling,' *sánā-jū́* 'nimble or active from of old.'[134]

16. *ĝemH- 'mate, marry, copulate, breed'
Grk γαμέω 'marry, copulate, have sexual intercourse,' Skt. *jārá* 'a paramour, lover, become old,' *jā́mātṛi* 'maker of new offspring.'[135]

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[129] See, for example, Pss. 44.22; 100.3; Isa. 53.6; Jer. 23.1-4; 50.6; Ezek. 34.2-23; Matt. 10.6; Jn. 10.2-4, 7-8, 14-16, 25-27; 21.17; Heb. 13.20. Compare also Skt *ajapa* 'goat herd,' in root number 10, above.
[130] Mallory and Adams 136; EIEC 268; Haynes and Witzel, "Of Dice and Divination," 2, 21-24, https://www.academia.edu/44802729/Of_Dice_and_Divination.
[131] OLD 777.
[132] Monier-Williams 426; LIV 167; IEW 469.
[133] Note: this root was included in Haynes (2020: Table 21). Meanings overlap somewhat.
[134] LIV 166; IEW 399; Monier-Williams 424.
[135] Mallory and Adams 206-207; LSJ 337; IEW 369; Monier-Williams 419; Beekes 259.

17. *ǵi̯eu̯H- 'eat, consume, devour, chew, masticate'

TochB śuwā-, śāwā-, TochA śuwat-, śuwaṃ 'eat (at), consume, devour,' TochB śwātsi- 'food,' eśuwatte 'not having eaten, having gone hungry,' NE chew, Rus žujú 'chew,' ževat' 'to chew,' NPers ǰāvīdan 'chew.'[136]

18. *ǵerh₂- 'ripen, cause to grow old, become old'

Ved járanti 'allow to become old,' OCS –zoriti 'let ripen,' –zъrěti 'ripen,' Grk γηράω 'become old, ripen, bring to old age,' γηράσκω 'to get old.'[137]

In Modern English we say, "I raise cattle for a living." This means that I breed cattle and nurture the young animals until they are mature (old) enough to sell in the market. I would suggest that the application of this root to old human beings is secondary.

19. * ḱemh₂- 'carry off as prize or booty, care for animals or men, toil, calm, soothe, settle'

Grk κομέω 'attend to, take care of (horses or men),' κομίζω 'take care of, provide for, attend, give heed to, carry off as a prize or booty,' κάμνω 'work, labor, toil, be weary from toil,' ἱπποκόμος 'who takes care of horses, groom,' Ved śamáyati 'pacify, calm, soothe, settle,' śaśamé 'toil at, become tired, rest, be quiet or calm or satisfied or contented,' śama 'tranquility, calmness, rest.'[138]

20. *ḱleu̯H- 'wipe, sweep, brush, clean'

Lat cluere, cloare 'purify, Lith žemait 'wipe, sweep, brush, clean' OE hluttor 'clean, pure.'[139]

21. *ḱei̯h₂- 'arouse, set in motion, urge on, drive'

Lat cieō 'move, set in motion, rouse to exertion, urge on, excite, stir up,' Grk κίω 'set in movement, move away,' κῑνέω 'drive away, set in movement, move to and fro, shake.'[140]

22. *ḱrh₂-, *ḱerh₂- 'horn, head, deer, stag, cow, goat, horn for blowing and drinking'

Myc ke-ra 'horn (material),' Hit karāwar 'horn,' Grk κέρας 'the horn of an animal,' κάρα 'cattle, tame goat,' TochB karse 'deer, stag.'[141]

23. * ḱʷeh₂- 'gain, obtain, acquire, earn, possession'

Grk ἐπασάμην 'gain, obtain, acquire, earn, win,' πέπαμαι 'possession.'[142]

[136] Adams 98, 631-632, 645; LIV 168; IEW 400; Mallory and Adams 255.

[137] Monier-Williams 423-424; LIV 165; IEW 390-391; Mallory and Adams 163, 189, 190; LSJ 348; Beekes 271; EIEC 248, 410; Illič-Svityč (No. 165) I 297.

[138] LSJ 872, 975; Beekes 632, 743; LIV 323; IEW 557; Monier-Williams 1053-1054; Mallory and Adams 195.

[139] LIV 335; IEW 607; OLD 338.

[140] OLD 313-314; Beekes 700, 707; Mallory and Adams 391; LIV 346; IEW 538.

[141] Beekes 641, 676; Mallory and Adams 137; LSJ 877, 941; Adams 145; IEW 574-577; Alan J. Nussbaum, *Head and Horn in Indo-European.*

[142] LIV 375; IEW 593.

24. *h_2ek-h_3- 'lead or drive to pasture, consume, eat up, tend, feed, graze'

ON *eja* 'lead or drive to pasture, tend, feed, graze,' *agn* 'bait food for fish,' *ǣja* 'lead or drive to pasture, tend, feed, graze, rest, repose,' Ved *āśayati* 'cause to eat, feed,' *aśnāti* 'eat, consume,' *āśa* 'food, eating.'[143]

25. *$Hmel\acute{k}$- 'stroke lightly, touch, soothe, appease, caress, fondle'

Ved *mṛśáti* 'touch, stroke, handle,' Lat *mulceō* 'touch lightly, stroke, caress, soothe, pacify, quiet, appease.'[144]

26. *$h_2er\acute{k}$- 'keep, keep away, fend off, shut up, guard, ward off, defend'

Hit *harzi, harkanzi* 'have, hold, keep, retain,' Lat *arceō* 'keep close, contain, hold in, control, prevent from approaching, keep away, repulse, protect,' *arca* 'box, chest,' Grk *ἀρκέω* 'ward off, defend, keep off, assist,' Arm *argehum* 'hinder, restrain, hold back.'[145]

27. *$Hól\acute{k}$-is 'elk, wild sheep, antelope'

NE *elk*, Lat *alcēs* < West Germanic 'elk,' Grk *ἄκλη* < from West Germanic 'elk,' Rus *losĭ* 'elk,' Khot *rūś* 'sheep (*Ovis poli*),' Skt *ṛśya* 'male of antelope.'[146]

28. *$h_2e\acute{k}$- 'sharp, pointed, sharpen, sour, needle, grinding stone, hunting spear, prick'

MCymr *hogi* 'sharpen, hone,' OHG *eggen* 'harrow,' Lat *aceō* 'be sour,' *acus* 'needle,' Lith *aš(t)rùs* 'sharp,' OCS *ostrŭs* 'sharp,' Alb *athët* 'sour,' Grk *ἀκή* 'point, sharp,' Arm *aseln* 'needle,' NPers *ās* 'grinding stone,' Skt *áśri* 'sharp edge.'[147]

29. *$h_2ei\acute{k}$-(smeh_2) 'spear, pointed stick, point of spear, arrow, impale, put on a spit'

Lith *iẽšmis* 'spit, spear,' Grk *αἰχμή* 'point of a spear, spear, point of an arrow, war, battle,' Lat *īcō* 'wound, injure, hurt, strike with a weapon.'[148]

30. *$h_2e\acute{k}$-s 'axis, axle, literally: *leads or drives (the wheels)*'

Lat *axis*, OE *eax* 'axle,' Lith *ašìs* 'axle,' OCS *osĭ* 'axle,' Grk *ἄξων* 'axle, axis,' Skt *ákṣa-* 'axle, axis.'[149]

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[143] LIV 261; IEW 18; Monier-Williams 112, 157; de Vries 102, 681.

[144] Monier-Williams 831; LIV 226; IEW 724; OLD 1140.

[145] LIV 273; IEW 65-66; OLD 162; Mallory and Adams 271; DELG 105; LSJ 242; EIEC 270.

[146] Mallory and Adams 139; OLD 94; Beekes 71; LSJ 67; Monier-Williams 226.

[147] LIV 261; IEW 18-22; Mallory and Adams 147, 298; NIL 287-290; EIEC 418, 509; Watkins 2; Bomhard 738; Beekes 50-51; LSJ 49; Greenberg no. 18; Illič-Svityč (1965: 353); Illič-Svityč (1971: 251 no. 113). Less certain because of the ambiguous laryngeals, are the following three roots which probably belong to this series: (a) *$\acute{k}eH$-(i) 'sharpen' Lat *cōs* 'whetstone,' NE *hone*, NPers *san* 'whetstone,' Skt *śāna* 'whetstone,' *śān* 'whet, sharpen.' (Mallory and Adams 244; EIEC 510; Monier-Williams 1064; de Vaan 139; LIV 319; LIV Add. 45); (b) *$\acute{k}úH$-los 'spear, spit, pike, dagger, arrow, javelin' Arm *slak* 'pike, spear, dagger, arrow,' Skt *śū́la* 'sharp iron pin or stake, spike, spit, lance, pike, spear, javelin' (Watkins 2, Mallory and Adams 271); and (c) *$\acute{k}el(H)$- 'spear, arrow, staff, point of shaft, nail, spike, arrowhead' ON *hali* 'point of shaft, tail,' OPrus *kelian* 'spear,' Alb *thel* 'big nail, spike,' Grk *κῆλον* 'arrow, shaft of an arrow,' Skt *śalyá* 'spear, arrowhead' (Mallory and Adams 245; LSJ 947; IEW 552-553; Beekes 685). Also note that this root occurs in 12 IE language families, indicating very wide distribution (Bird, *The Distribution of Indo-European Root Morphemes*, 16.

[148] LIV 259; Mallory and Adams 246; IEW 15; Beekes 91; LSJ 45; OLD 818.

[149] Mallory and Adams 248; NIL 259-260; Watkins 2; Beekes 111; EIEC 39-40, 516; de Vaan 66-67. I suggest that this root may have originally been a compound of *$h_2e\hat{g}$- 'drive' plus *sel-, *su̯el- 'post, beam' (Mallory and Adams 227; EIEC s.v. "plank" 431; IEW 2*sel-, *su̯el- 898), hence *$h_2e\hat{g}$-sel- (or *$h_2e\acute{k}$-*sel-) 'drive post, drive shaft, axle.'

31. *$h_2ei\acute{k}$- 'possess, property, earnings, rule over' (animals as wealth)

    OE *āgan* 'possess,' ME *own*, Av *ise* 'is lord of,' Skt *īśe* 'owns, possesses,' TochB *aik-* 'know.'[150]

Semantic Development of *$h_2e\hat{g}$- and its Variants

Languages experience phonetic change over time, but the semantic fields to which words refer are more persistent. Clearly those fields expand to encompass innovations and newly encountered geographical and social elements, but the older lexical items often survive the changes. Not only do old words continue in use, but the many neologisms are cobbled out of their substance.

    Given its semantic range, the evidence suggests that the root *$h_2e\hat{g}$-, whatever phonetic transformations it has undergone over the millennia, goes back semantically to the earliest stages of language development. What could be more primal than hunting? What combination of sounds (aagh!) could be more fundamentally expressive of the agony of combat with wild animals? When but at the earliest stages of language, would that primitive guttural expression of anguish have come to express the whole range of the semantic field connected with hunting and killing animals?

Stages in the Semantic Development of *$h_2e\hat{g}$- and its Variants

Original Semantic nucleus: hunt

Original Semantic Field: hunt, fight and kill animals, drive hunted animals, hunting tools, hunting grounds, hunted animal, hunter.[151]

Diachronic Semantic Field: See table below.

Table 8: Three Stages in the Semantic Development of *$h_2e\hat{g}$- and Its Variants

Hunter-gatherer Stage					
hunt, track, pursue animals; hunter	hunted animal	fight and kill wild animals	drive animals into nets, pits, or ambush	tools for hunting: spear, net, arrow	hunting grounds, countryside
Pastoral Stage					
collect, round up animals; cattle-raider	domestic animals	fight	herd flocks, raid for and lead away stolen animals	sharp tools	pastures
Agricultural Stage					
breed, care for, raise, feed, eat, milk & protect animals; shepherd	farm animal names and characteristics	fights, wars, battles, contests	lead army, drive or command soldiers and slaves; leaders in general	sharp tools, weapons	cultivated fields, animal markets, general markets and gatherings

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[150] Watkins 2; Mallory and Adams 271; EIEC 270.

[151] Compare the unrelated PIE root *$\hat{g}^h u\acute{e}r$ 'wild animal, bear, hunter, hunt, wild, bold, fierce, uncultivated land, hunting device, net,' which exhibits a parallel and similarly broad semantic field (EIEC 23; de Vaan 215; OLD 693; Mallory and Adams 136; Beekes 547; ALEW 1545; Derksen 549; IEW 493; Ringe 106).

Table 9: Semantic Map of *h₂(R)eǵ-

Semantic Map for *h₂(R)eǵ-* and Its Root Variants

Semantic Value	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Hunt, fish, chase, track, scent, hunter		X			X								X																		
Fight, battle, contest, battlefiled, carnage,		X																											X		
Wild game, prey, goats, sheep, cattle, stag, animal organs and characteristics, herd of animals, band of men	X	X							X	X	X											X					X				
Hunting tools: net, spear, spit, pike, dagger, arrow, arrowhead, sharp, sharpen, antler, horn, claw, talon		X																										X			
Drive, lead, drive off cattle as booty, guide, manage, keep, command, steal or possess property, set in motion, gather, capture	X		X		X		X					X	X	X	X				X		X		X	X						X	X
Countryside, field, plain, pasture, assembly place, gathering, market			X	X																											
Look after, care for, feed, milk, clean, be concerned about, breed, raise up, eat, protect from harm, mature					X	X	X	X						X		X	X	X	X	X				X	X	X					

Table 10: Summary of the Semantic Map of *h₂(R)eĝ- and Its Root Variants

Ref	Root	This root shares some semantic values with ? other roots in this series	Semantic Values (abbreviated)
1	1.*h₂eĝ-	19	drive animals, lead, carry, fetch, drive, command, herd, battle
2	*h₂eĝ-reh₂	10	hunt, fish, game, battle, net, catch, battlefield
3	*h₂(ĝ)-er-	14	collect, take, seize, capture, place of assembly, marketplace
4	*h₂eĝ-ros	1	countryside, field, pasture, plain, land
5	*h₂le(ĝ)-	22	look after, care for, gather up, follow the track of
6	*h₂melĝ-	12	squeeze out, press out, milk animals
7	*h₂merĝ-	21	squeeze out, gather up, wipe clean, drive and graze animals
8	*h₂reh₁(ĝ)-	12	help, support, be concerned about, pay attention to, care for
9	*h₂erĝ-	6	white, color of sheep, white metal (silver), wool clothing
10	*h₂eiĝ-(s)-	6	goat, kid, sheep, cattle
11	*h₂eĝ-inom	6	hide, leather, goat hide
12	2.*h₂eĝ-	13	proclaim, order, command, say ("verbally lead or drive men")
13	*s(e)h₂(ĝ)-	14	track, scent, trail, seek, search, lead, direct, attack
14	*ĝieH-	21	steal, deprive someone of property, overpower, rob, grow old
15	*ĝeuH-	13	drive, rouse, impel, be quick, animate, inspire
16	*ĝemH-	12	mate, breed, marry, copulate
17	*ĝieuH-	12	eat, consume, devour, chew, masticate, food
18	*ĝerh₂-	12	ripen, cause to grow old, become old, mature
19	*ḱemh₂-	21	carry off as booty, care for animals or men, toil, calm, soothe
20	*ḱleuH-	12	wipe, sweep, brush, clean
21	*ḱeih₂-	13	arouse, set in motion, urge on, drive
22	*ḱrh₂-	6	horn, head, deer, stag, cow, goat
23	*ḱ(ʷ)ueh₂-	13	gain, obtain, acquire, earn, possession
24	*h₂eḱ-h₃-	21	lead or drive to pasture, consume, eat up, tend, feed, graze
25	*Hmelḱ-	12	stroke lightly, touch, soothe, appease, caress, fondle
26	*h₂er(ḱ)-	12	keep, keep away, fend off, shut up, guard, ward off, defend
27	*Hólḱ-is	6	elk, wild sheep, antelope
28	*h₂eḱ-	2	sharp, pointed, sour, needle, grinding stone, hunting spear
29	*h₂eiḱ(smeh₂)	2	spear, pointed stick, point of spear, arrow, impale
30	*h₂eḱ-s	12	axle, axis, (literally: leads or drives the wheels)
31	*h₂eiḱ-	12	possess, property, earnings, rule over (animals as wealth)

*bʰe(R)g- and Its Root Variants

Table 11:   *bʰe(R)g- 'food: its desirability, its preparation, its sharing, and its satis-faction'

PIE Root	Initial	R1	R2	Final	Ref	Semantic Value
*bʰ(R)g-						
*bʰag-,\n*bʰeg-	bʰ			g	1	get a portion, share with, partake, enjoy, wish, desire, long for
*bʰeh₃g-	bʰ		h₃	g	2	wish for, desire, long for, want, crave, roast, toast, bake
*bʰeu̯g-	bʰ		u̯	g	3	eat, feed, drink, enjoy, nourish, support, maintain, use, possess
*bʰreu̯H⁽ĝ⁾-	bʰ	r	u̯H	⁽ĝ⁾	4	need, want, require, use, enjoy, be blessed with, delight in, roast, fry`
*bʰrei̯⁽ĝ⁾-	bʰ	r	i̯	g	5	roast, cook, bake
REDUCED VARIANTS						
p(R)k⁽u̯⁾-						
*pek⁽u̯⁾-	p			k⁽u̯⁾	6	cook, boil, bake, ripen, become ready for eating, cook a decoction, bubbles given off by boiling liquid, stew, concoct, distribute largess of cooked food, produce a meal by boiling or baking, melt, extract metal by smelting
*perk-	p		r	k	7	fill, satisfy, sate, satiate, mix, put together with, bestow richly, food, nourishment, refreshment, quench, allay thirst and hunger
METATHESIS VARIANTS						
*k(R)p-						
*ku̯eh₁p-	k	u̯	h₁	p	8	boil, simmer, seethe, bubble, froth over, steam, smoke, fume, boil up
*ku̯ep-	k	u̯		p	9	be fragrant, smell, aroma, scent
*ku̯Hp-	k	u̯	H	p	10	cup, beaker, goblet, big-bellied drinking vessel, milk vessel
*kelp-	k		l	p	11	jug, pot, pitcher, drinking vessel

1. *bʰag-   'get a portion, share with, partake, enjoy, wish, desire, long for'
    Grk ἔφαγον, φαγεῖν 'eat, devour, Ved *bhájati* 'divide, distribute, allot, share with, receive a portion, obtain as one's share, partake of, enjoy, possess, have, prefer, choose,' *abhakṣayam* 'enjoyed, drank,' *bhíkṣate* 'wish, desire, long for,' YAv *baxšaiti* 'divide out,' *baxšaite* 'get a share.'[152]

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[152] LIV 65; IEW 107; LSJ 1911; Monier-Williams 743. The PIE root *bhāg(o)-* 'oak, beech, tree with edible fruits' should probably be included here. For an interesting treatment of that subject, see Blažek, "The Ever-green 'Beech'-argument in Nostratic Perspective," 83, https://www.mother-tongue-journal.org/MT/mt6.pdf.

2. *bʰeh₃g-   'wish for, desire, long for, want, crave, roast, toast, bake'
Rus *bažítь* 'wish, desire, long for, want, hanker after, crave,' Grk *φώγω* 'roast, toast, parch,' OE *bacan* 'bake,' Czech *bažiti* 'to long for something.'[153]

3. *bʰeu̯g-   'eat, feed, drink, enjoy, nourish, support, maintain, use, possess'
Ved *bhójate* 'have eaten, have enjoyed,' Arm *bowci* 'nourish, feed,' Ved *bhunákti* 'enjoy, use, possess, enjoy a meal, eat, eat and drink, consume, take possession of,' *bhuñjáte* 'enjoy,' Arm *bowcanem* 'nourish, feed, support, maintain.'[154]

4. *bʰreu̯Hg-   'need, want, require, use, enjoy, be blessed with, delight in'
Goth *brūkjan* 'need, want, require, use,' OE *brūcan* 'need, want, require, use,' Lat *fruor* 'avail oneself of, enjoy, to have as one's lot something good, to be blessed with, to derive pleasure from, delight in.' To these I would add Grk *φρύγω* 'roast, fry.' Formally, it is equivalent, and semantically, it parallels other roots in this series.[155]

5. *bʰrei̯(ĝ)-   cook, bake, roast'
Lat *frīgō* 'to roast,' MPers *bryz, brēz* 'to roast.'[156]

6. *pek^(u̯)-   'cook, boil, bake, ripen, become ready for eating, distribute cooked food, smelt'
Av *pačaiti* 'cooks,' OCS *pek* 'bake, roast,' Alb *pjek* 'bake,' Skt *pácati* 'cook, bake, roast, boil, ripen, melt,' Grk *πέσσω* 'ripen, cook, bake, concoct, distribute largess of cooked food,' TochAB *päk* 'become ready for eating,' Lat *coquō* 'prepare food, boil, bake, brew, concoct, smelt ore, extract metal by smelting,' Lith *kepù* 'bake,' Latv *cepu* 'bake.' Note the metathesis forms of the Baltic attestations.[157]

7. *perk-   'fill, satisfy, sate, bestow richly, food, nourishment, refreshment, quench,
Ved *pr̥ṇákti* 'mix, put together with, fill, sate, satiate, give lavishly, grant bountifully, richly bestow,' *pŕ̥ksh* 'refreshment, satiation, nourishment, food,' Lat *compescō* 'confine, close, hold in, restrain, calm, subdue undesirable things and qualities, quench, allay thirst and hunger.'[158]

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[153] LIV 70; IEW 113; L&S 1967; Bosworth and Toller 65.
[154] LIV 84; IEW 153; Monier-Williams 759.
[155] LIV 96; IEW 173; OLD 739-40; Bomhard 52; Beekes 1593.
[156] de Vaan 243; OLD 736; Watkins 11; IEW 137; LIV Add. 16, (footnote no. 1 of this entry suggests a possible cognate in *bʰerĝ- 'roast, bake') LIV 78.
[157] LIV 468; EIEC 125; IEW 798; Mallory and Adams 259; Monier-Williams 575; Adams 368, 407; ALEW 550-551; LSJ 1396; OLD 443; de Vaan 134; Greenberg no. 76. Möller, *Vergleichendes indogermanisch-semitisches Wörterbuch*, 136 puts Grk *ἀρτο-κόπος* 'bread-baker' (LSJ 250, *ἄρτος* is 'bread') as a metathesis-form parallel to Lith *kepù* 'bake' with this root. He then compares them to Semitic forms in χ-b as, for example, Arab./Ethiop. *χabaza* 'prepare bread.' Neither Beekes, Frisk, nor DELG provide an etymology for *ἀρτο-κόπος*. Beekes, *Etymological Dictionary of Greek*, 748 cites *κόπος* 'stroke, pain, trouble, labor' as a derivative of *κόπτω* 'pound, strike' but this is questionable.
[158] LIV 476; IEW 820; Monier-Williams 645; de Vaan 445; OLD 375, 1294-1295. The LIV citation of Lat *parcō* is disputed on semantic grounds by de Vaan 445.

8.   *$k\underset{.}{u}eh_1p$-   'boil, simmer, seethe, bubble, froth over, steam, smoke, fume, boil up'
OCS *kypě* 'bubble, simmer, boil, seethe,' Lith *kūpėti* 'bubble, boil up, froth over,' Latv *kûpu* 'smoke, fume, steam,' possibly Grk *Κύπρος* 'Cyprus,' Lat *Cyprius* 'of Cyprus,' *cuprium* 'Cyprian copper,' OE *copor* 'copper (loan from Latin?),' Latv *kapars* (loan from Low German?).'[159]

A Greek name with unknown etymology, *Κύπρος* 'the island Cyprus,' was famous for its copper in antiquity, and may be related to *$k\underset{.}{u}eh_1p$- in this resonant-group. Copper was one of the first metals discovered and utilized by humans that usually required smelting from mineral ores in order to render it pure enough to work. Could that smelting (which is a form of boiling) be the link to PIE words denoting *bubble, boil, seethe* as seen in the Baltic forms analyzed here? The metathesis-form *$pek^{(u)}$*- has, as one of its explicit semantic values, 'melt, smelt ore, extract metal by smelting.' Was the copper (literally, *the smelted*) and the island (literally, *smelter island*) named for this process? This suggestion is supported by an unrelated but parallel word for copper, Greek *πυρίτης* 'copper ore, ore.' The root of this word, *πῦρ*- 'fire,' probably refers to the use of fire to smelt the copper metal.[160]

9.   *$k\underset{.}{u}ep$-   'be fragrant, smell, aroma, scent'
Lith *kvepiù* 'be fragrant, smell,' *kvimpù* 'aroma, scent.'[161]

10. *$k\underset{.}{u}Hp$-   'cup, beaker, goblet, big-bellied drinking vessel, milk vessel'
Lat *cūpa* 'cup,' OE *hýf* > NE 'hive,' Grk *κύπελλον* 'cup, beaker, goblet,' Skt *karpara*- 'cup, pot, bowl.'[162]

11. *kelp*-   'jug, pot, pitcher, drinking vessel'
OIr *cilorn* < *kelpurno*- 'pitcher,' Grk *κάλπις* 'pitcher, cup, kind of drinking vessel.'[163]

These last two roots carry a closely related semantic value. Such vessels would have been instrumental in performing the cooking and boiling operations referred to in the roots *$k\underset{.}{u}eh_1p$- and *pek^u*- and so fit tightly into a narrow semantic field along with them.

    In the aforementioned root, *pek^u*- 'cook, boil, bake, ripen,' the structure consists simply of initial and final consonants without intervening medial resonants. This root can be compared with the semantically equivalent but inverted root *$k\underset{.}{u}eh_1p$- 'boil, simmer, seethe.' The presence of the sequence /$k\underset{.}{u}$/ in one root, as opposed to the labiovelar /k^u/ in the other, could naturally result from the transposition of this element from initial to final position or vice versa.

    The medial resonant (in this case the laryngeal h_1) acted as a vowel modifier but did not affect the semantic value of the root. As described above, the presence or absence of such resonants is semantically neutral.

[159] LIV 374; IEW 596; EIEC 379; Illič-Svityč no. 240.
[160] LSJ 1012; Beekes 805, 1260; Watkins 38; Mallory and Adams 241; OLD 482.
[161] LIV 376; IEW 596; ALEW 629-630.
[162] Mallory and Adams 240; IEW 591; Beekes 804; LSJ 1011; Monier-Williams 258.
[163] Mallory and Adams 240-241; Beekes 627; LSJ 870.

Semantic Commonality in this Series

Root Ref. Number:	1	2	3	4	5	6	7	8	9	10	11
Semantic Values of Roots											
cook, boil, bake, prepare food, ripen, brew, refreshment, nourishment		x	x	x	x	x	x	x		x	x
mix, concoct, put together						x	x			x	x
distribute largess of cooked food, bestow richly, give lavishly, grant bountifully	x	x				x	x			x	x
be pleasing, find favor, calm, soothe, appease passions and appetites, fill, satiate, allay thirst and hunger, wish for, long for	x	x	x	x			x		x		
instruments for preparing and serving food, cup, bowl, pot											
smoke, fume, steam, smell, aroma, scent, be fragrant								x	x	x	
melt, smelt ore						x		x		x	x

Table 12:   Semantic Map of the Roots Shown in Table 11

Table 12 illustrates the large degree of semantic overlap that each root shares with the other roots in this resonant series. These can be summarized as follows:

1. *bʰag-   shares some semantic values with 8 other roots in the series.
2. *bʰeh₃g-   shares some semantic values with 10 other roots in the series.
3. *bʰeu̯g-   shares some semantic values with 10 other roots in the series.
4. *bʰreu̯Hg-   shares some semantic values with 10 other roots in the series.
5. *bʰrei̯(ĝ)-   shares some semantic values with 7 other roots in the series.
6. *pek(ʷ)-   shares some semantic values with 9 other roots in the series.

7.   *perk-*   shares some semantic values with 10 other roots in the series.
8.   *kṷeh₁p-*   shares some semantic values with 9 other roots in the series.
9.   *kṷep-*   shares some semantic values with 6 other roots in the series.
10. *kṷHp-*   shares some semantic values with 9 other roots in the series (as instr.)
11. *kelp-*   shares some semantic values with 9 other roots in the series (as instr.)

Note that pots, bowls, cups, pitchers, and such receptacles are instrumental in preparing, mixing, cooking, and distributing food. No doubt some type of pot was also used as a crucible for smelting metals. In the semantic map above, the assumption was made that *kṷeh₁p-* 'bubble, simmer, boil, seethe' was also used in the sense 'smelting.'

* * *

pe(R)t- and Its Root Variants

Table 13: *pe(R)t-* 'spread out, stretch out, be wide, be open, attack (with outstretched arms), fly, rush; a road or path that is open and without obstacles'

PIE Root	Initial	R1	R2	Final	Ref	Semantic Value
(s)pet-h₂-	p			t	1	spread out, stretch out the arms, be open, extend, deploy troops, a road
plet-h₂-	p	l		t	2	spread, extend, become wider, broaden, spread itself out, a street
pet-	p			t	3	fly, fly up, run, move toward, reach out for, attack, flight, path, road, fall, fall upon, hurry, overthrow, ruin, destroy
pert-	p		r	t	4	to fight, to combat, battle, contest, strife, army, rush in to fight
pért-us	p		r	t	5	passage, way, ford, bridge
pent-	p		n	t	6	walk, tread on, find a path, dwell in, path, way, platform, floor
plṷt-	p	l	ṷ	t	7	plank, board, wide and broad piece of wood, roof rafter, beam

1.   *(s)pet-h₂-*   'spread out, stretch out the arms, be open, extend in space'
   Grk πίτνημι 'spread out, stretch out the arms, open,' πετάνυμι 'spread out, unfold, open, the open sea, spread wide, opened wide,' πέταλον 'leaf, metal or gold plating,' Lat *pandō* 'to spread out, splay, extend the hands, open, open out, to deploy or extend troops,' Osc *patensíns* 'open,' Lat *pateō* 'to be open, to extend in space, cover a wide field, of a road: to offer unimpeded passage,' *spatium* 'expanse of ground, area, space.'[164]

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[164] LIV 478; IEW 824-825; LSJ 1396, 1409; Beekes 1181; DELG 858-859; OLD 145, 1289, 1307, 1798-1799; Buck 227, 321; EIEC 539; Bomhard 121. For this series in general, see: Dočkalová, Lenka & Blažek, "On Indo-European Roads," 299-341.

2. *plet-h₂-   'spread, extend, become larger or wider, broaden, spread out'
    Ved *práthate* 'spread, extend, become larger or wider,' YAv *fraθa.sauuah-* 'the spreading power,' Lith *plečiù* 'to broaden, spread itself out,' Grk *πλατύς* 'broad, wide, flat, level, wide-spread, a street.'[165]

3. *pet-   'run, move toward, reach out for, attack, fly, fall, fall upon, fly, hurry, attack, overthrow, ruin, destroy'
    Hit *piddāi* 'run, flee, fly,' Arm *ən-t'ac'aw* 'ran,' *t'ert'* 'leaf,' Grk *ἔπτατο* 'fly up,' *πέτομαι* 'fly, rush, fall' *πίπτω* 'to fall, fall violently upon, attack,' *ποτάομαι* 'fly hither and thither,' *πωτάομαι* 'fly about,' Lat *petō, -ere* 'to direct one's course to a person or place, to reach out for, go in the direction of, move towards in falling, to attack, to make for with hostile intent, to attack or menace with actions, words, etc., to make an attempt on the life of someone, to aim at or strike with a weapon, to go after, chase, pursue, to go in quest of, to hunt out,' NWels *hedeg* 'fly,' Ved *pátati* 'fly, soar, rush on, fall, bring down, overthrow, ruin, destroy,' Skt *páttra* 'wing, feather, flight,' *pátman-* 'flight, path, road,' YAv *pataiti* 'fly, hurry.'[166]

LIV (479n1) suggests that this root may be related to the first root listed above, *(s)pet-h₂-*, since *to spread the wings* is identical to *fly*. This is very likely to be the case because,

- The semantic value *to reach out*, recorded for *pet-*, corresponds to the sense 'stretch out the arms, extend the hands' noted for *(s)pet-h₂-*.
- The semantic value, 'leaf,' attested in the Armenian *t'ert'* corresponds to the general concepts, 'broad and wide,' that are explicit in the root *(s)pet-h₂-*.
- Skt *páttra* 'wing, feather,' refers to objects that are also broad and wide.
- As remarked in LIV, the act of flying, a concept that is strongly represented in *pet-*, requires that wings be 'spread out, extended, opened up, and stretched out,' which is the primary sense of *(s)pet-h₂-*.
- When a flock of birds is disturbed, it both 'takes flight (*pet-*),' and 'spreads out, covering a wide field' (*(s)pet-h₂-*).
- Semantically, *attack* (*pet-*) and *deploy or extend troops* (*(s)pet-h₂-*) both refer to the hostile engagements of combat.
- Both roots refer to roads, streets, or paths.

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[165] LIV 486; IEW 833; Monier-Williams 678; EIEC 83, 133, 539; Mallory and Adams 388; LSJ 1413-1414; Beekes 1205; ALEW 910; Bomhard 88.

[166] LIV 477, 479; LIV Add. 63-64; LSJ 1397, 1406, 1453, 1562; OLD 1369; IEW 825-826; Mallory and Adams 399-400; EIEC 208; de Vaan 464; Beekes 1193-1194; Monier-Williams 580. The de Vaan citation referenced here makes the following comment, "It is generally assumed that the root is laryngeal-final, but a simple thematization of *pet-* would also yield the attested Lat. present… [and according to some authorities]… the Greek, too, points to a mere root *pet-*." Note: while this root was formerly divided into the roots *peth₁* and *2.*peth₂* in LIV, LIV Add. 63-65 brings them together as *pet-*. De Vaan further makes the observation that, "The etymology of the verb as 'to fly' is not self-evident, but may be defended by assuming a shift 'to fly' > 'fly up towards' > 'make for, try to get'." I suggest that this rather tortured chain of semantic shifts is implausible, and that the notion 'fly' is more likely to have been derived from the outstretched wings of birds as they are extended in flight. See also EDHIL 659 for identity of roots #1 and #3.

4. *pert-   'to fight, to combat, battle, contest, strife, army, rush in to fight'
    YAv *parətəṇte* 'fight, battle,' *pāpərətāna* 'being in battle,' Ved *pr̥t,* 'battle, contest, strife,' *pr̥tanā* 'battle, contest, strife, a hostile armament, army, rushing to or in battle,' *pr̥tanājya* 'rushing together in battle, close combat, fight.'[167]

This root conforms phonetically to the paradigm. It also shares semantic values with *pet-* ('attack...') and with *(s)pet-h₂-* ('deploy or extend troops...'). This semantic overlap suggests that *pert-* should also be included in this resonant series. After all, the most successful strategy in any attack would be for fighters to 'spread out' and attack the enemy from all sides. This also conforms to the meaning, 'run,' given for the Armenian attestations of *pet-*, especially considering that, in many languages, *fly* can mean either *fly through the air* or *run quickly*.

Perhaps it should not be surprising that, in the semantic development of this resonant series, 'stretching out the arms' is linked with combat. No doubt, the first fights between early humans involved striking with the fists and out-stretched arms.[168]

5. *pértus   'passage, way, ford, bridge'
    OWels *rit* 'ford,' Gaul *ritu-* 'ford,' Lat *portus* 'harbor,' *porta* 'city gate,' ON *fjǫðr* 'estuary,' OHG *furt* 'ford,' NE *ford*, Av *pərətu-* 'ford, bridge.'[169]

6. *pent-   'walk, tread on, find a path, dwell in; path, way, platform, floor'
    Goth *finþan* 'find, learn, discover,' Grk *πατέω* 'walk, tread on, dwell in,' *πάτος* 'way, path, floor, dirt, field,' Arm *hown* 'ford,' Lat *pōns* 'bridge,' Skt *pathin* 'road, way, path, reach,' OCS *pǫtь* 'road,' OPrus *Pintis* 'road.'[170]

This root overlaps in semantic value with Lat *petō, -ere* (*pet-* above: 'to direct one's course to a person or place, to reach out for, go in the direction of, move towards'). Furthermore, paths are said to 'extend in space or stretch for long distances. Most importantly, the concept *path* suggests a course of travel that is open and free of obstacles. This corresponds semantically to the sense of *(s)pet-h₂-* ('of a road: to offer unimpeded passage'). In addition to this root, three of the previous roots (*(s)pet-h₂-*, *plet-h₂-*, and *pet-*) refer to roads, streets, or paths. Grk *πάτος* also refers to objects that are 'wide' such as floors or fields.

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[167] LIV 477; IEW 818; Monier-Williams 645.
[168] Compare Calvert Watkins, Appendix I of the *American Heritage Dictionary*, fourth edition, s.v. "*ar*", page 2021 where *arm* and *army* are derived from the same PIE root.
[169] Mallory and Adams 250; EIEC 487-488; IEW 816-817. In the handbooks, this root is typically derived from *per-* 'to cross over.' But given the large number of roots in this series with semantic values 'road, path, way, bridge, street,' the final /t/ is more likely to have been intrinsic to the root.
[170] LSJ 1347-1348; Beekes 1221; OLD 1402; LIV 471-472; IEW 808-809; Monier-Williams 582; EIEC 202, 487. Compare also the PIE root *pant-* 'belly, paunch, guts, stomach' Lat *pantex* 'belly, paunch, guts,' Hit ᵁᶻᵁ*panduha* 'stomach' (EIEC 2). A belly or paunch expands the girth and so conforms to the semantic field of *plet-h₂* (#2 above) 'spread, extend, become larger or wider.'

7. *plu̯t-* 'plank'

Lat *pluteus* 'movable penthouse, shed,' Lith *plaūtas* 'plank,' Latv *plāuts* 'wall plank,' ON *fleyðr* 'roof rafter,' Norw *flauta* 'cross beam.'[171]

This root refers again to objects that are broad and wide.

Table 14 illustrates the large degree of semantic overlap that each root shares with the other roots in the resonant series. These can be summarized as follows:

1. *(s)pet-h₂*   shares some semantic values with 6 other roots in the series.
2. *plet-h₂-*   shares some semantic values with 6 other roots in the series.
3. *pet-*   shares some semantic values with 6 other roots in the series.
4. *pert-*   shares some semantic values with 5 other roots in the series.
5. *pertus*   shares some semantic values with 5 other roots in the series.
6. *pent-*   shares some semantic values with 5 other roots in the series.
7. *plu̯t-*   shares some semantic values with 3 other roots in the series.

Table 14: Semantic map for *pe(R)t-* 'spread out, stretch out, be wide, be open, attack, fly, rush; an open road or path that is without obstacles'

Root Ref. Number: Semantic Value	1 *(s)pet-h₂-*	2 *plet-h₂-*	3 *pet-*	4 *pert-*	5 *pertus*	6 *pent-*	7 *plu̯t-*
stretch out arms, extend hands, reach out, spread out, broaden, extend in space, became larger or wider, cover a wide field, be open, flat, wide and flat object	x	x	x				x
fly (spread out wings), fly up, flight, wing, feather		x	x				
deploy or extend troops, attack, rush in to fight, move toward, contest, strife, battle, army, combat, fall, fall upon, run, hurry, overthrow, ruin, strike with weapon, destroy	x	x	x	x			
street, road, path, way, platform, floor, to offer unimpeded passage, walk, tread on, dwell in, ford, bridge, field, find a way, direct a course toward	x	x	x	x	x	x	

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[171] Mallory and Adams 226; IEW 838. Compare Lat *prātum* 'meadow,' which should probably be included in this resonant series (de Vaan 487; OLD 1450). This is a word of dubious origin that fits tightly both formally and semantically with the notions of *spreading out*, *be wide*, *be open*, *be extended*.

Semantic Change

Semantic development ordinarily proceeds in the following three logical steps:

1. The Personal: body, body parts, bodily functions, close personal relations
2. The Natural: animals, plants, human social relations, geographical characteristics
3. The Abstract: general concepts such as width, extension, height; kindness, indifference

The semantic development of *pe(R)t-*, beginning from the primitive root underlying all these resonant variants, may have proceeded in something like the following manner:

- Individuals extend hands and stretch out arms. The leader stretches out his arm to direct the migrating tribe toward the path to be taken. The leader of the hunt stretches out his arms to direct the hunting band's course. The war leader silently directs warriors to their positions with his outstretched arm.
- Paths extend into the distance. They are open, unimpeded, and passable, stretching far out into the fields and the spreading pasture-lands.
- Raptors spread their wings, fly up, and then fall upon their prey.
- Hunters run and spread out to surround the hunted animal and fall upon it from all sides.
- Warriors spread out and attack the enemy. They run as they spread out, then fall upon the enemy like a bird of prey falls upon the animal it hunts. They stretch out their arms and attack the enemy with their fists or with weapons.
- The huts in the village spread out from the center. The fields spread out from the village. The pastures spread out from the cultivated fields.
- The territory of the tribe stretches to the river, to the mountain range, to the sea.
- The plain extends to the horizon. The earth extends forever.
- Extension, breadth, and width become abstract concepts that can be applied to spatial relations.

* * *

me(R)dʰ- and Its Root Variants

Table 15: *me(R)dʰ-* 'mead, honey, honey bee, rob (rob a hive/collect honey), chew'

Root	Initial	R1	R2	Final	Ref.	Semantic Value
medʰ-u̯	m			dʰ	1	mead, honey, intoxicated, wine
REDUCED VARIANTS 'Steal, rob, take honey from hive, honey bee, honey'						
ml̥it-ós	m	l	i̯	t	2	honey, honey bee, rob a hive (< "gather honey")
mei̯t-h₂-	m		i̯	t	3	take away, rob, cohabit sexually, release, change
met-h₂-	m			t	4	steal, rob, snatch sway, chew

1. *medʰ-u̯ 'mead, honey, wine, intoxicated'
    OIr *mid* 'mead,' Wels *medd* 'mead,' OIr *medb* 'intoxicated,' ON *mjǫðr* 'mead,' OE *meodo* 'mead,' OHG *metu* 'mead,' OPrus *meddo* 'honey,' Lith *medùs* 'honey,' Latv *medus* 'honey, mead,' OCS *medŭ* 'honey, wine,' Grk *μέθυ* 'wine,' Av *maδu-* 'berry wine,' Oss *myd* 'honey,' Sogd *mðw* 'wine,' Skt *mádhu* 'honey, wine, mead, milk, butter, ghee, sweet, delicious, charming, delightful,' TochB *mit* 'honey.'[172]

2. *ml̥i̯t-ós 'honey, honey bee, rob a hive < gather honey'
    OIr *mil* 'honey,' Wels *mêl* 'honey,' Lat *mel* 'honey,' OE *mildēaw* 'mildew,' Goth *miliþ* 'honey,' Grk *μέλι* 'honey,' *μέλισσα* 'honey bee,' *βλίττω* 'rob a hive, gather honey,'
    Arm *mełr* 'honey,' *mełui* 'bee,' Hit *militt-* 'honey,' Luv *mallit-* 'honey,' Iranian *μελίτιον* 'a kind of Scythian drink.'[173]

3. *mei̯t-h₂- 'take away, rob, cohabit sexually, change, exchange'
    Ved *mithatí* 'unite, pair, couple, copulate,' *mithuná* 'pairing, copulation, honey and ghee (lex.),' *mithunī* 'become a pair, cohabit sexually,' OAv *mōiθat̰* 'rob, be deprived of,' Lat *mittō* 'release, let go, emit,' *admissārius* 'stallion or ass kept for breeding,' *admissiō* controlled mating,' *admissūra* 'copulation, breeding,' *committere* 'to entrust to, commit, join,' *ēmissus* 'emission,' *prōmittere* 'to send forth, promise, guarantee,' *mūtō* 'change,' Goth *maidjan* 'change, falsify,' TochB *mit-* 'go, set out.'[174]

This root presents some confusion in its many and diverse semantic values. I propose that two different roots have fallen together here. One of these is cognate to the previous cited roots in this resonant series relating to robbing bee hives, honey, and sweetness. There then seems to have been a semantic jump from notions of honey and sweetness to the more abstract notion of a male and female pair "becoming sweet" on each other, leading to extended notions of cohabitation and emissions of fluids. Whether this led further to notions of mutual exchange, promises, and trust, or whether these were a semantic contribution from another root (poss. 2. *mei̯- 'exchange, barter, change'[175]) it is difficult to say.

Monier-Williams lists honey and ghee as one definition for Skt *mithuná*, but this appears only lexographically. The Old Avestan *mōiθat̰* 'rob, be deprived of' links this root to Greek *βλίττω* (*βλ* < *μλ*) 'rob a hive, gather honey' and that concept is further attested in the following root.

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[172] EIEC 271; IEW 707; Adams 461; Monier-Williams 779; Mallory and Adams 262. Möller, *Vergleichendes indogermanisch-semitisches Wörterbuch*, 157, compares Assyr *m-t-ḳ-* 'sweet, honey,' Hebrew *mæθæḳ* 'sweetness.' See also Starostin, "Indo-European – North Caucasian Isoglosses," 123-124.
[173] EIEC 271; IEW 723-724; Mallory and Adams 262.
[174] IEW 715; LIV 430; Adams 461; Monier-Williams 816-817; de Vaan 383-384; OLD 1119-1120; EIEC 184.
[175] LIV 426, see also footnote #1 under that heading; Mallory and Adams 272; EIEC 184.

4.   *met-h₂- 'steal, rob, snatch away, chew'
   Ved *máthīt* 'rob, steal,' *mathnắti* 'rob, snatch away,' Lat *mandō* 'chew, bite, glutton,' *man-dūcāre* 'chew, eat,' *māsūcius* 'voracious,' Grk *μασάομαι* 'chew, bite.'[176]

* * *

*h₂e(R)bʰ-   and Its Root Variants

It has been suggested that the combination of attested meanings of the PIE roots *h₂ep- 'water' and *h₂ebʰ- 'water' specifically denote "living water, i.e. water on the move."[177] If this is correct, it may be because such water typically shows a characteristic white color, as in English: *white water rafting*.[178] This observation leads to the possibility that *h₂ep- and *h₂ebʰ- may have originally referred to the color *white* rather than to the element we call water. That this is likely the case is confirmed by comparing these roots with other roots also denoting the concepts *white* or *white objects* as shown in the table below.

Table 16: *h₂e(R)bʰ- 'white, light, shine, fire; white objects: swan, cloud, elf, rushing water, snowy mountains, barley'

Root	Initial	R1	R2	Final	Ref.	Semantic Value
*bʰeh₂-	bʰ			h₂	1	light, bright, shine, light up, make visible, white
METATHESIS VARIANTS						
*h₂ebʰ-	h₂			bʰ	2	river, moving water (white water?), white, white objects
*h₂elbʰ-ós	h₂		l	bʰ	3	white, cloud, swan, rivers
*h₂(e)l̥bʰ-	h₂		l	bʰ	4	elf (the shining one)
*h₂elbʰ-it	h₂		l	bʰ	5	barley (white grain)
REDUCED VARIANTS						
*peh₂-u̯er	p			h₂	6	fire
METATHESIS VARIANTS						
*h₂ep-	h₂			p	7	river, living or moving water (white water?)
*h₂elp-	h₂		l	p	8	white, the Alps (snowy white mountains), snowy mountain meadow (Proposed Root)

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[176] IEW 732; LIV 442; de Vaan 361; Mallory and Adams 257.
[177] Mallory and Adams 126; Witczak 12-17.
[178] AHD, 1963, defines *white water* as "Turbulent or frothy water, as in rapids or surf."

1. *b^heh_2- 'light, bright, shine, light up, make visible, white'
   OIr *bān* 'white,' Ved *bhā́ti* 'shine, be bright or luminous, to be splendid or beautiful,' YAv *fra-uuāiti* 'shine forth,' Grk *φάντα* 'shine, bring to light, appear,' *φάσις* 'appearance of stars above the horizon,' Arm *banam* 'open, reveal, allow to be seen.'[179]

2. *h_2eb^h- 'river (white water?), white, white objects'
   Hit *hapa-* 'river,' OIr *ab* 'river.'[180] In addition to these, I suggest that the following Greek words with dubious etymologies are reflexes of this root: *ἀφρός* 'foam,' *ἀφρέω* 'to foam,' *ἄφρα* 'a kind of plaster,' *ἀφύω* 'to become white or bleached,' *Ἄφριος* 'an epithet of Zeus in Thessaly,' *Ἀφροδίτη* 'the goddess Aphrodite ('the white goddess').'[181]

3. *h_2elb^h-*ós* 'white, swan, white-barley, white leprosy, (white) river'
   Lat *albus* 'white,' *albēscere* 'become white,' Hit *alpā* 'cloud' (possibly from *h_2olb^h-o-), Grk *ἀλφούς* 'white,' *ἀλφός* 'white leprosy,' OHG *albiz* 'swan,' OCS *lebedĭ* 'swan,' Umbr *alfu* 'white,' possibly the following toponyms: Lat *Alba* 'a town,' *Albula* 'an earlier name for the Tiber River,' *Albis* = 'NHG Elbe,' ON *elfr* 'river,' Grk *Ἀλφιός* 'a river-name.'[182]

4. *$h_2(e)l̥b^h$- 'elf (< the shining one)'
   ON *alfr* 'elf,' Skt *r̥bhú* 'one of a group of gods, divine craftsman.'[183]

5. *h_2elb^h-*it* 'barley (the white grain)'
   Grk *ἄλφι* 'barley-groats,' *ἄλφιτα* 'barley meal,' Alb *elb* 'barley,' Pashto *ōrbaš* 'barley,' Wakhi *arbəsi* 'barley.'[184]

6. *peh_2-(*u̯er*) 'fire, fever, digestion, ashes'
   Umb *pir* 'fire,' NE *fire*, OPrus *panno* 'fire,' Grk *πῦρ* 'fire,' *πυρετός* 'fever,' Arm *hur* 'fire,' Hit *pahhur* 'fire,' TochB *puwar* 'fire, digestion,' and Czech *pýř* 'ashes.'[185]

PIE *$peh_2u̯er$* (or *$peh_2u̯r$*) contains two syllables, and so would typically be composed of two separate monosyllabic roots. The first, *peh_2-, may be a reduced variant of *b^heh_2- 'light, bright,

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[179] IEW 104-105; LIV 68; Monier-Williams 750; LSJ 1912, 1918; Mallory and Adams 330; NIL 7; EIEC 513; Bomhard 13; Dolgopolsky 177a, 179. Numerous other roots, apparently related to *b^heh_2-, show the medial resonant in /l/, as do some of the roots in this series. See Haynes (2020): Table 7.

[180] EIEC 636, s.v. "*h_2ep-"; Mallory and Adams 126; IEW s.v. "*ab-1*"; EDHIL 294-295.

[181] Beekes 178-180; LSJ 293-294. The name Zeus itself is based upon the root *$d̯i̯eu̯$ 'bright, shining,' so an epithet signifying 'the white one' would not be unexpected. There is evidence that Zeus, as well as Aphrodite, were originally identified with the galaxy, which was particularly noted for its white appearance (as in "Milky" Way). See Haynes (2009: 211-213).

[182] Mallory and Adams 55, 332; EIEC 114, 641; de Vaan 32; Beekes 77; IEW 30; OLD 93; LSJ 74; Bomhard 690. Note that the laryngeal notation adopted by LIV is used in this paper (Mallory and Adams h_2, h_4, h_a = h_2).

[183] EIEC 177; Mallory and Adams 411; IEW 30. Note that Mallory and Adams analyze this root as *$h_4(e)l̥b^h$-, and EIEC as *(*a*)*l̥b^h$- and suggest that these words are related "originally as 'the shining one' or the like."

[184] IEW 29; Beekes 77. EIEC 51 suggests that this root is a derivative of the word for 'white,' and points out that Germanic languages derive the words for grain from the word for 'white' as, for example, ON *hveiti*, OE *hwǣte*, ME *wheat*, OHG *weizzi*, Goth *ƕaiteis*.

[185] Mallory and Adams 123; IEW 828; NIL 540-545; EIEC 202; Adams 392-393; Beekes 1260-1261.

shine, light up, make visible, white,' while the second could be from, *u̯er 'warm, burn, cook, boil.' If this is correct, the full compound could be glossed as, 'that which shines and warms.'[186]

7. *h₂ep- 'river, living or moving water (white water?)'
    OPrus *ape* 'river,' Lith *ùpė* 'river,' Av *āfš* (gen. *apō*) 'water,' Skt *ā́p-* 'water,' TochAB *āp-* 'river.'[187]

8. *h₂elp- 'white, the Alps (snowy white mountains)' Proposed Root
    Sabine *alpus* 'white,' Lat *Alpis* 'the mountain range of the Alps,' Occitan dialect *alp* 'mountain,' *alpage* 'meadows in high altitude that are covered in snow in winter and where herds are sent in summer.'[188]

*dʰéǵʰ-om- and Its Root Variants

Early humans built dwellings out of mud bricks. The craftsmen who mastered this art were the first *technicians* (*teḱ-s* < *dʰéǵʰ-* 'earth' through reduction). Later, construction methods incorporated the mud and wattle system, where earth (mud) was daubed onto a lattice created by twisting withies (wood) into a woven pattern. At that point, a technician was someone who had mastered the use of both raw materials: earth and wood. When buildings began to be fashioned out of wood alone, the former terminology was again applied to the workers who became experts in this craft (Grk τέκτων 'carpenter, craftsman, artist'). The pattern of terminology continues to this day, where computer workers are employed in *high-tech* industries or in the *technology* sector.

Because earth was the first building material, PIE words for building, making, and fabricating were derived from words signifying *earth*, as were the words for various types of (initially earthen) constructions: walls, enclosures, fences, houses, towns, etc.

The great mass of common folk and slaves who were often employed in gathering and assembling the various forms of earth (mud, clay, stones) or in the cultivation of the earth (soil) were called "earth workers," and this term became, in time, the generic word for "man" as in Lat *homo*. It is doubtful whether this word was initially ever applied to the rulers and aristocracy. A parallel development can be seen in the Grk γεωργέω 'to be a husbandman, farmer' (modern name *George*, literally 'earth worker' from γῆ + ἔργον). References to 'man' in this resonant series therefore probably reflect, not man in general, but rather man as 'earth worker, commoner, vassal, slave (as in the Phrygian attestation below).'[189]

The process of colonizing, settling an area of land, building dwellings, and cultivating crops was also designated by a derived term *tḱ-ei̯-*, as was also the control and dominion of the earth, as in the term *land holders*.

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[186] For *u̯er, see EIEC 88; IEW 1166; Mallory and Adams 260.
[187] EIEC 636; IEW 51-52; Mallory and Adams 126.
[188] de Vaan 32; Pierre Bancel, personal communication.
[189] The distinction continues to the present day where, in the military, the officers are a class apart from "the men."

Table 17: $*d^h\acute{e}\hat{g}^h$-om- 'earth, earth works, fabrication, earth workers, cultivation of soil, domination of earth'

PIE Root	Initial	R1	R2	Final	Ref	Semantic Value
$*d^h\acute{e}\hat{g}^h$-om-	d^h			$\hat{g}^h$	1	earth, ground, land, man (as earth worker), human being, slave
$*d^hei\hat{g}^h$, $*d^h\mathring{i}\hat{g}^hs$	d^h		i̯	$\hat{g}^h$	2	work clay, fashion, stroke, knead (clay, mud, dough), build, build wall; wall, earthen wall
$*d^heu\hat{g}^h$-	d^h		u̯	$\hat{g}^h$	3	make, build, produce something useful, knead, fit into place, strong; common or vulgar men
$*d^her\hat{g}^h$-	d^h		r	$\hat{g}^h$	4	make firm, strong, tough, tenacious, enclosure, garden, yard
METATHESIS VARIANTS						
$*\hat{g}^herd^h$-	$\hat{g}^h$		r	d^h	5	fence, enclosure, house, town, city
REDUCED VARIANTS						
$*tek\text{-}s$, $*te\text{-}t\acute{k}$-	t			ḱ	6	establish, produce, hew, cut, fabricate, fashion, axe, craft, skill
$*t\acute{k}\text{-}ei$-	t			ḱ	7	cultivate soil, settle, dwell, linger, build on, work land, settlement, people a country
$*t\acute{k}\text{-}eh_1$-	t			ḱ	8	gain control of, possess, gain power over, rule, kingdom, dominion
$*tuer\acute{k}$-	t	u̯	r	ḱ	9	carve, cut, form, fashion, mold, shape, maker, creator

1. *$d^h\acute{e}\hat{g}^h$-om-*   'earth, ground, man (as earth worker), slave'
   Hit *tēkan* 'earth, ground,' Ved *kṣám-* 'earth, ground,' Grk *χθών* 'earth, ground, land,' Lat *humus* 'earth,' *homo* 'human being,' OE *guma* 'man, (bride)groom,' Lith *žēmė* 'earth,' OCS *zemlja* 'earth, land,' Phrygian *zemel* 'slave,' TochA *tkaṃ* 'earth, ground.'[190]

2. *$d^hei\hat{g}^h$-, $d^h\mathring{i}\hat{g}^hs$-*   'form, build, mold mud or clay, knead, smear, plaster; wall of mud'
   Skt *dĕhmi* 'spread, fill,' *dĕhī* 'wall, rampart, dam,' Goth *digan* 'form, fashion, knead, make pottery,' ON *deig* 'dough', *digr* 'thick,' NE *dough*, Lith *žiedžiù* 'form from mud,' TochB *tsikale* 'to form,' Lat *fingō, finxī* 'form, shape,' *figūra* 'form, shape, figure,' *fictilis* 'fashion out of clay, made of earth or clay,' *figulus* 'potter,' Av *pairi-daēza-* 'enclosure' (> NE *paradise*); Grk *τεῖχος, τοῖχος* 'wall, embankment,' possibly Grk *θιγγάνω* 'touch with the hand,' OIr *digen* 'build, firm, solid, hard, strong, fixed.'[191]

Mallory and Adams (223-224, 371) write, "The underlying semantics of *$dhei\hat{g}h$* indicate that it was specifically associated with the working of clay (e.g. Lat *fingō* 'fashion,' Skt *dĕhmi* 'smear, anoint,' TochAB *tsik-* 'fashion [pots, etc.],' hence the English cognate *dough*; in Greek and Indo-Iranian it is also associated with building walls, e.g. Av *pairi-daēza* 'build a wall around' ... but

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[190] IEW 414-16; EIEC 174; NIL 86-88; Mallory & Adams 120; Watkins 20; DELG 143; Ringe 19; EDHIL 858-862; Bomhard 145; EIEC 247-48; Illič-Svityč no. 69; Ruhlen and Bengtson 323-326; Fortson 461 (*zemel*).
[191] LIV 140; IEW 244; NIL 118; de Vries 194; Mallory & Adams 223-224, 228; Watkins 18; EIEC 283, 649; Bomhard 166.

there are also cognates of more general meaning, e.g. OIr *con-utainc* 'builds,' Lith *diežti* 'whip, beat,' Arm *dizanem* 'heap up'." And in EIEC (629) they write: "The substance from which the walls were made, [earth] came to be applied both to the finished product, e.g., Grk τοῖχος 'wall', Av *uz-daēza-* 'wall', and clay-like substances, e.g. Germanic *dough*."

3. *$d^{h}eu\hat{g}^{h}$-*   'make, build, make ready, prepare, produce something useful, suitable, fit, touch, knead, big, strong; common or vulgar men'
Grk τεύχω 'make, prepare, build, produce by work or art, form, create, well made, of fields: tilled,' Grk τυγχάνω, ἔτυχον 'gain one's end or purpose, succeed, attain, obtain a thing, of men: common, every-day, vulgar' (compare *$d^{h}é\hat{g}^{h}$-om* above), Goth *daug* 'be useful,' OIr *dúal* 'suitable, fit,' NIr *dual* (< *$d^{h}ug^{h}$-lo-*) 'right, proper, natural,' ON *duga* 'to suit,' NHG *taugen* 'to be useful or fit,' Slav *dugъ* 'strength,' Pol *duży* 'strong, big.'[192]

4. *$d^{h}er\hat{g}^{h}$-, *$d^{h}ere\hat{g}^{h}$-*   'become hard, strong, firm; garden, yard, enclosure'
Skt *dr̥hyati* 'make firm,' Lith *diržmas* 'strong,' *daržas* 'garden,' Latv *dārz* 'garden, yard, enclosure,' OPrus *dīrstlan* 'powerful,' *diržti* 'tough, tenacious, become hard.'[193]

5. $\hat{g}^{h}erd^{h}$-   'fence, corral, enclosure, granary, house, town, city'
OPrus *sardis* 'fence,' Lith *žardis* 'corral,' *žárdas* 'fence, enclosure,' Rus *zoród* 'granary,' Phryg –*zordum* 'city.'[194]

6. *$te\hat{k}$-s, *te-t$\hat{k}$-*   'establish, produce, hew, cut, fabricate, fashion, axe'
Lith *tašýti* 'hew, trim,' OCS *tesati* 'hew,' Skt *tákṣati* 'fashions, creates, carpenters, cuts,' Grk τέκτων 'architect,' τέχνη 'art, craft, skill, technique,' Skt *tákṣan* 'carpenter,' Hit *taksanzi* 'undertake, prepare, cause, joint,' OHG *dehsa* 'axe.'[195]

7. *$t\hat{k}$-ei̯-*   'cultivate soil, settle a land, dwell in a place'
Ved *kṣéti* 'dwells, lingers,' Myc *ki-ti-je-si* = /kti^{i}ensi/ 'to build on, cultivate, or work land,' Lat *pōnō* 'put, place, sit down,' Grk κτίσις 'settlement,' κτίζω 'people a country and build houses and cities in it,' Av *šiti* 'settlement,' Arm *šēn* 'dwell, build on, farm, town.'[196]

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[192] LIV 148; IEW 271; Mallory & Adams 370; LSJ 1783, 1882.
[193] IEW 254; Mallory & Adams 381.
[194] EIEC 199, 224; LIV 197; IEW 444. According to EIEC, this root is cognate to those non-palatalized forms derived from *$g^{h}órd^{h}os$*: ON *garðar* 'fence, hedge, court,' OE *geard* 'enclosure, yard,' Lith *gardas* 'fence, fold, pen,' Rus *górod* 'town, city;' from $g^{h}r̥d^{h}ó$-: Hit *gurtas* 'citadel,' Luv *gurta-* 'citadel,' Skt *gr̥há-* 'house, habitation, home,' ON *gyrða* 'to gird;' and from *$g^{h}órtos$*: Lat *hortus* 'garden,' *cohors* 'enclosure, yard, court,' Grk χόρτος 'enclosed place, feeding place.' These forms are equivalent semantically and originally stem from the concept of building with either earthen (mud) bricks or with daub (mud) and wattle construction.
[195] LIV *te$t\hat{k}$-* 638; IEW *tek^{u}-* 1058-59; Watkins 92; Mallory and Adams 220, 243, 283; Bomhard 206; EIEC 139; Beekes 1460; EDHIL 813-814.
[196] LIV *t$\hat{k}$ei-* 643; IEW 626; Watkins 95; Mallory and Adams 223; EIEC 622. Compare possible metathesis form: TochB ²*keta* 'parcel of land, estate, field,' Adams, *Dictionary of Tocharian B*, 191; and Adams, *History and Significance of Some Tocharian B Agricultural Terms*, 373.

8. *tḱ-eh₁-   'take hold of a piece of land, gain control of, land allotment, rule, kingdom'
Skt *kṣáyati* 'possess, rule over, govern, control,' Av, OPers *kšaθra* 'dominion, control, command,' Grk *κτάομαι* 'gain, acquire, earn, win,' Myc *ki-ti-me-na-ko-to-na* 'land allotment,' *ki-ti-je-si* 'clear, bring into cultivation.'[197]

9. *tu̯erḱ-   'carve, cut, form, fashion, mold, shape'
YAv *θβərəsaiti* 'carve, cut, form, fashion, shape,' OAv *θβarōždūm* 'have formed, have shaped,' Skt *tváṣṭar* 'maker or creator god,' Grk *σάρξ* 'flesh, piece of flesh.'[198]

gʰebʰōl and Its Root Variants

Table 18: *gʰebʰōl* 'head'

Root	Initial	R1	R2	Final	Ref.	Semantic Value
gʰebʰ-ōl	gʰ			bʰ	1	Head
REDUCED VARIANT						
*kap-u̯t, *kapolo-	k			p	2	Head

1. *gʰebʰ-ōl*   'head, top, skull, gable'
ON *gafl* 'gable, gable-side,' OHG *gibil* 'gable,' *gebal* 'skull, gable,' Goth *gibla* 'gable,' Grk *κεφαλή* 'head, top,' Macedonian (Illyrian?) *κεβ(α)λή* 'head,' TochA *śpāl* 'head,' TochB *śpāl-mem* 'excellent.'[199]

2. *kap-u̯t, *kap-olo-*   'head, skull, cup'
Lat *caput* 'head,' ON *hǫfuð* 'head,' OE *hafud* 'head.' "Related in some fashion are ON *haufuð* 'head,' OE *hēafod* 'head' (> NE *head),* OHG *houbit* 'head,' Goth *haubiþ* 'head,' OE *hafola* 'head,' Skt *kapála-* 'cup, bowl; skull.'[200]

*de(R)h₂- and Its Root Variants

The English word *season* originally signified the act of sowing and is cognate to English *seed*.[201] Thus the sowing time, which is just one of the yearly seasons, is taken for the cycle of seasons in general. Other "seasons" such as the spring thaw, summer heat, or the abundance of the autumn harvest time could serve the same function—marking a recurring memorable point in the divisions of the yearly cycle. Rotations, wheels, especially the wheel of time and its incremental divisions,

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[197] IEW *kp̄ē(i)-* 626; Watkins 95; Mallory and Adams 269; EIEC 490 "…the Greek form suggests that the underlying meaning pertained to 'the procurement of a piece of land' …"
[198] LIV 656; IEW 1102.
[199] lEW 423; EIEC 260; Mallory and Adams 174; Watkins 29; Beekes 662.
[200] IEW 529-530; EIEC 260-261; Mallory and Adams 174; OLD 274; Watkins 38; de Vaan 91; Illič-Svityč no. 195 cites Afrasian *qP* 'head,' Kartvelian *ḳep-a* 'skull, back of the head,' poss. Uralic *koppa* 'cavity, skull,' see Greenberg 92.
[201] AHD 1571, 2045 s.v. "*sē̆*" 'to sow.'

divisions in general, and the sum of the cycles lived (a person's age) are represented by *de(R)h₂*-
and its root variants.

Table 19: *de(R)h₂-* 'Wheel, cycle, year, season of the year, time (conceived as rotation of celestial bodies); a division of time, divisions in general'

Root	Initial	R1	R2	Final	Ref.	Semantic Value
*deh₂-, *deh₂-(i̯)-	d			h₂	1	time and other divisions, cut up, divide, old age
METATHESIS VARIANTS						
*h₂ed-	h₂			d	2	dry, parch, dryness, heat (< hot and dry season, summer?)
REDUCED VARIANTS						
2.*teh₂-	t			h₂	3	thaw, melt (< the season of year when the ice melts, springtime)
*teh₂-ḱ('')	t			h₂	4	Melt (< season of year when the ice melts, springtime)
*telh₂-	t		l	h₂	5	rise of stars, lift up, turn, tolerate, endure, rotate, spin
*terh₂-	t		r	h₂	6	go across, above, over, to transit (< cross the sky in diurnal motion or rotation)
*teu̯h₂-	t		u̯	h₂	7	abundance, fat (< harvest season, autumn)
METATHESIS VARIANTS						
*h₂eu̯t-	h₂		u̯	t	8	autumn (< season of harvest and abundance), year (Proposed root)
*h₂ert-us	h₂		r	t	9	season of the year, epoch, period, division of the year, fixed order
*(H)ret-h₂-	H	r		t	10	Wheel, circle, round, ring, cart, chariot, run
*h₂et-nos	h₂			t	11	Year, revolution of the sun, age
*h₂et-	h₂			t	12	Go, wander
*h₂elt-	h₂		l	t	13	Old, age (< number of cycles lived), a period, high (< tall because old)
*h₂ŕt-ḱos	h₂		r	t	14	Bear, Ursa Major, north, (a compound: *h₂ŕt- 'wheel' + *h₂eḱ-(s) 'axis,' literally: '(located at) the axis of the (cosmic) wheel'

1. *deh₂-, *deh₂-(i̯)-* 'time and other divisions, cut up, divide, division of people'
   Alb *për-daj* 'distribute, divide, scatter,' Grk *δαίομαι* 'to divide, to feast,' *δαίς* 'portion, meal, *δαιθμός* 'division, divided land,' *δῆμος* 'a political subdivision of the people,' Ved *dáyate* 'divide,' OE *tima*, ON *tími* 'hour, time,' OHG *zīt* 'time,' Arm *ti* 'old age, time,' NE *tide* and *time*.[202]

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[202] Mallory and Adams 269, 318; Beekes 297-298; LIV 103; AHD 1809; Watkins 14; EIEC 160-161; IEW 175; EDHIL 805-806. The numerous river names built on a homonymous root (Don, Dniepr, Dniestr, etc.) may, in fact, be derived from this root (IEW 175), either in the sense of "running high at the season of the spring thaw' or in the sense of "rivers being natural divisions of territories."

2. *h₂ed- 'dry, parch, dryness, heat (< season of the year with dryness and heat, summer?)'
    Grk ἄζω 'to dry,' ἄζομαι 'to parch (mostly intransitive),' ἄζα 'dryness, heat,' ἀζαλέος 'barren, arid,' Hit hādu (ḫāt-) 'to dry up, become dry.'[203]

3. *teh₂- 'thaw, (season when the ice melts, spring time?)'
    Arm t'anam 'to wet, moisten,' Oss taj- 'thaw, melt,' OCS tajati 'melt, thaw,' Cymr tawdd 'melted.'[204]

4. *teh₂-(ḱ)- 'melt (season when the ice melts, spring time?)'
    Grk τήκομαι 'melt,' τέτηκα 'is melted.' An extension of the previous root per LIV 617n1.[205]

5. *telh₂- 'raise, lift, cause to rise into the air, uphold, turn, spin, endure, rise (of stars)'
    Lat tollō 'lift, cause to rise into the air, endure' TochAB täl 'uphold, raise,' Grk τέλλω 'come into being, accomplish, turn, to rise (of stars).'[206]

LSJ writes of Greek τέλλω: "The sense *rise* is perhaps derived from that of *revolve* as used of stars." That this is correct can be seen from the name, *Anatolia*, signifying Asia (or more particularly, Asia Minor), as the place (the East) where the stars "up-turn" (ανα 'up,' τέλλω 'turn'), or, as we commonly say in English, "where the stars come up." But the ancients were well-aware that the stars move in a circular motion, i.e. that they turn.[207] Other attestations of this root have drifted into the metaphorical realm: Grk ταλάσσαι 'bear, suffer,' Goth þulan 'bear, suffer, endure,' etc., but evidence that the original sense of this root was, as suggested by LSJ, *turning up, revolving, spinning*, can be seen from the fact that a group of related Greek words indicate just that: ταλασήϊος 'of wool spinning,' ταλασίουργέω 'spin wool,' ταλασίουργός 'wool spinner.'

Another Greek word, Ἄτλας 'the titan, Atlas,' who is said (by Hesychius) to be the "axis of the earth," is often ascribed to this root (ἀ- euphonic, and τλάς from *τλάω). Since "axis of the earth" is, by definition, "axis of rotation," this supports the notion that this root ultimately shares the fundamental semantic value of *revolve, rotate*, as do the other roots in this resonant series.

6. *terh₂- 'pass over or across, above, transit (go across in a diurnal motion)'
    OIr tar 'across, above,' Lat trāns 'across, on the other side,' Av taro 'over, to,' OHG durh 'through,' Hit tarhu-ᶻⁱ 'to prevail,' Ved tṛī, tárati 'to pass across or over, to overcome,' tārá 'carrying across, save, protect, shining, radiant, a fixed star, asterism,' tāraka 'causing to pass over, belonging to the stars,' tārakatvá 'the condition of a star,' tārakāmāna 'sidereal measure, sidereal time,' tārakiṇī 'starry night,' tārā-gaṇa 'a multitude of stars,' tārā-pīḍa 'star-crowned, the moon,' tārā-valī 'a multitude of stars,' stṛī 'a star, a mark or star-like spot (on the forehead of a bull or cow).'[208]

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[203] LIV 255; Beekes 26-27; EDHIL 328-329.
[204] LIV 616; IEW 1053-1054.
[205] LIV 617; IEW 1053.
[206] LIV 622; IEW 1060; Mallory and Adams 406; LSJ 271, 1754, 1772; Bomhard 212; EIEC 352; Haynes (2020): Table 80; Adams 296.
[207] See *Iliad* XVIII, 483-489.
[208] LIV 633; IEW 1074-1075; Mallory and Adams 290; EIEC 4; Friedrich 213; de Vaan 627; OLD 1961; EWAia I 629; Monier-Williams 443-444, 454, 1260.

The evidence suggests that, fundamentally, this root expresses the motion of the stars as they pass over, across, and above the terrestrial plane. In the Polar Regions, these stars never drop below the horizon so that their course is obviously circular; they rotate around the pole. This rotation is in accordance with the basic concept represented in this root series. Later, the idea of this stellar motion was transferred to any movement from one side of anything to the other in analogy to the rising of the stars in the east and their setting in the west.

Monier-Williams suggests that Ved *strī* 'a star' is cognate to other PIE terms denoting stars, i.e., Lat *stella* (< Proto-Latin *stērlā*), German *Stern* (< Germanic *sterzōn*), ME *star* (< OE *steorra*), etc. Most authorities give the original form as *$h_2$ster-* 'star' as in Grk ἀστήρ and Hit *hašter(a)-*.[209] It may be reasonable, however, to further analyze this two-syllable word into component roots: *h_2eh_1s-* 'burn, glow, hearth, altar'[210] plus *$(s)terh_2$-* 'to cross over, to cross above,' yielding something like "glowing embers that cross over above." Forms without the initial syllable may simply be attestations of *$terh_2$-* with the *s*-mobile ("they that rotate and cross over above").[211]

7.   *$teu̯h_2$-* 'abundance, fat (< season of abundance, autumn?), swell'
     Ved *tavīti* 'to be or make strong,' *tavás* 'strong, energetic, courageous,' Av *tav-* 'to be capable of,' ORus *tyju* 'to be fat,' Grk σῶς 'safe, healthy, intact, keep alive, stay alive, saving, preserving,' σωρός 'heap (of corn), that which is heaped up, epithet of Demeter,' NE *thousand,* Lith *túkstantis*, OCS *tysęšta* 'thousand,' (< *$tuHs$-$ḱm̥to$-* 'literally 'fat hundred' or 'abundant hundred'), TochB *tumane* 'ten thousand.'[212]

8.   *$h_2eu̯t$-* 'autumn' (Proposed Root)
     Lat *autumnus* 'autumn, year, harvest,' *autumnitās* 'the autumn season, autumn fruits.'[213]

9.   *h_2ert-us* 'season of the year, epoch, period, division of the year, fixed order'
     Skt *ŕ̥tu-* 'season of the year, any settled point of time, fixed time, time appointed for any action (especially for sacrifices and other regular worship), an epoch, a period, especially a division or part of the year, the cyclical menstrual discharge in women, fixed order, rule,' *r̥tavyà* 'relating or devoted to the seasons,' *r̥tá* 'proper, right, fit, apt, suitable, able, brave, honest,' *r̥tá-van* 'keeping within the fixed order or rule,' *r̥ti* 'going, motion,' *r̥t-víya* 'being in proper time, observing or keeping the proper time, a woman in or after her courses, a woman during the time favorable for procreation,' *r̥tu-nātha* 'lord of the seasons, the spring,' *r̥tu-paryāya* 'the revolution of the seasons,' *r̥tu-vr̥itti* 'revolution of the seasons, a year,' *r̥tu-saṃdhi* 'junction of two seasons, transition from one season to the next one,' Lat *artus* 'joint, limb, juncture,' Av *ratu*

[209] Watkins 89; de Vaan 585; IEW 1027; EDHIL 326.
[210] As mentioned in Mallory and Adams 93, 129; IEW 68; de Vaan 49; OLD 158.
[211] See Václav Blažek, "Indo-European Astronomical Terminology," 141-142.
[212] LIV 639-640; Mallory and Adams 385-386; Beekes 1440, 1456; Monier-Williams 441, 449; IEW 1080-1081; Adams 301.
[213] de Vaan 64; EIEC 504; Watkins 93 s.v. "*temə-*¹"; OLD 220-221. See also: Dočkalová, Lenka and Blažek, "The Indo-European Year," *Journal of Indo-European Studies* 39, nos. 3 and 4 (2011): 431, 437-438.

'section of time, period,' *arəta-* 'order,' Grk ἀρτύς 'ordering, arranging, arrangement,' Arm *ard* 'order,' OHG *art* 'innate feature, nature, fashion.'[214]

10. *(H)ret-h₂-* 'wheel, circle, round, ring, cart, chariot, run'
Lat *rota* 'wheel, wagon' *rotula* 'small wheel,' *rotundus* 'round,' OIr *roth* 'wheel, circle,' OWel, OBret *redec* 'to run, flow,' Lith *rãtas* 'wheel, circle, ring, cart, wagon' Latv *rats* 'wheel, cart,' OHG *rad* 'wheel,' Skt *rátha-*, YAv *raϑa-* 'chariot, wagon,' TochB *retke* 'army (< 'chariotry').[215]

11. *h₂et-nos* 'year, a revolution of the sun, age'
Lat *annus* 'year, the period of the sun's apparent revolution, a unit for expressing age, old age' < Proto-Italian **atno-* 'year,' Umb *acnu* 'year,' Goth *aþna-* 'year,' Ved *atasi* 'travel, wander,' Av *xᵛāϑra* 'well-being.'[216]

12. *h₂et-* 'go, wander'
OHG *ātar* 'quick,' Lith *otrùs* 'lively.' Said to be related to the previous root. (Compare Grk πλάνητος 'wandering stars, planets').[217]

13. *h₂elt-* 'old, an age, a period, high'
OHG *alt* 'old,' OSax *ald* 'old,' Goth *alds* 'age, period, lifetime,' OE *ield*, ON *ǫld*, Goth *alþeis* 'old, period, interval, space of time,' ON *aldr* 'age, lifetime,' OE *ealdor* 'life,' Lat *altus* 'old, high, deep.'[218]

14. *h₂ŕ̥tḱos* 'bear, the constellation Ursa Major, north'
Skt *ŕ̥kṣa-* 'bear, the constellation Ursa Major,' Av *arəša* 'bear,' Grk ἄρκτος 'bear, the constellation Ursa Major, north,' Alb *ari* 'bear,' Arm *arǰ* 'bear,' Lat *ursus* 'bear, the constellation Ursa Major,' MIr *art* 'bear, hero, warrior,' Wels *arth* 'bear,' OBret *Ard-, Arth-* 'bear,' Gaul *Artio* (theonym), Hit *ḫartakka-, ḫartagga* 'wild animal, bear-man.'[219]

The true name of the bear was taboo in the Indo-European languages, resulting in a wide variety of euphemisms: OIr *mathgamain*, literally "the good calf," Lith *béras* "the brown one," Lith *lokys*, Lat *lācis*, OPrus *clokis*, SCr *dłaka* "the hairy or shaggy one," OCS *medvědĭ* "honey-eater." Many authorities believe that PIE **h₂ŕ̥tḱos* was the non-euphemized original term for bear, but the evidence may suggest otherwise. The word contains two syllables and so is most likely a compound consisting of two roots. This compound could be analyzed as: **h₂ert-* 'wheel' + **h₂eḱ-(s)* 'axis,' literally "(at) the axle of the wheel" (see Table 7, ref. 30 above). This would be in reference to the bear (Ursa Major) the constellation located near the axis point of the starry heavens (the north

[214] de Vaan 55-56; Monier-Williams 223-224; Beekes 143-144; IEW 55-56; Mallory and Adams 276; Adams 51; EWAia I 257; Buck 1016.
[215] de Vaan 527; Mallory and Adams 248; IEW 866; LIV 507; LIV Add. 68.
[216] Mallory and Adams 303; LIV 273; IEW 69; de Vaan 43-44; OLD 136; Dočkalová, Lenka, and Blažek, "The Indo-European Year," 435, 440, 445.
[217] Mallory and Adams 303; LIV 273; IEW 69.
[218] de Vaan 35; OLD 110; IEW 26; Dočkalová, Lenka, and Blažek, "Indo-European Year," 461, 466, for "year = old."
[219] Friedrich 61; Mallory and Adams 138; Frisk 141-142; IEW 875; Watkins 74; Ringe 106; Beekes 133; de Vaan 645; Buck 186; Monier-Williams 224; EWAia I 247; KEWA I 118; ALEW 1545; EDHIL 68, 76, 316.

celestial pole) which was regarded in ancient times as a great wheel because of its daily cycle of rotation. If this is the case, then *$h_2r̥tḱos$ would be yet another euphemistic circumlocution for the taboo animal. The Hittite form would seem to most accurately preserve the full compound.[220]

Ringe (2006: 106) suggests an interesting alternative for the Proto-Germanic derivation of *berō > OE bera, OHG bero, ME bear, usually glossed as 'the brown one.' He points out that, "… an actual PIE word of that shape and meaning is not recoverable, whereas 'wild animal' is securely reconstructable." The root that he refers to is PIE *ǵʰu̯ér-, ǵʰu̯ér- > Grk θήρ 'wild animal, beast of prey,' Lith žvėrìs 'wild animal,' Lat ferus 'wild,' and PGmc *berō. If Ringe is correct, then perhaps *ǵʰu̯ér is the original PIE term for bear.

III. CONCLUSIONS

1. The foregoing discussion lists twelve examples of root-families that are genetically linked despite surface differences in medial resonants, metathesis, and/or reduction. In every case, the consonant structure is persistent and the semantic core is intact. In the overwhelming majority of cases the number of synonymous roots sharing a given consonant structure far exceeds the number that would be expected from a random sampling of roots in the PIE lexicon. The only reasonable explanation for this statistical anomaly is that of genetic relationship, i.e., the roots share a common ancestor.

2. This list is by no means exhaustive. More could be provided, and many more, no doubt, await discovery. Because so much of the proto-language has been lost over the millennia, there must exist a large number of roots that have persisted into one or another of the daughter languages, but which have left no traces in other branches. These are often dismissed as "substrates," "pre-Greek," or "borrowings from unknown sources." By recognizing the possible root transformations described above, many such words can be assigned secure PIE etymologies.[221]

3. In the physical world, despite the wide diversity of form and structure, everything on earth—animal, vegetable, or mineral—is composed of combinations of only ninety-four naturally occurring chemical elements. By way of analogy, it is not inconceivable that a limited number of primitive roots may underlie the PIE lexicon. If this is the case, then the identification of such primitive roots would be the first essential step in any attempt to relate PIE to outside language families, as for example, with the Nostratic Hypothesis.

4. The semantic fields of the root variations presented here are well within the range normally found in PIE roots in general. The root *kerp-, for example, contains attestations that include actions, instruments, time indications, and objects of actions:

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[220] For an alternative view, see Václav Blažek, "Indo-European Astronomical Terminology," 154-155; see also Václav Blažek, "Indo-European 'bear'," 148-192.

[221] Space here does not permit a detailed analysis of additional examples, but consider: *terk-, *terkᵘ 'to spin' with *kert-, *kᵘert- 'to spin'; *trep- 'turn,' with *derbʰ- 'turn, twist'; *per- 'offspring of an animal,' with *bʰer- 'offspring, bear a child'; *leng- 'bend' with *lenk- 'bend, traverse, divide'; *tu̯éks- 'skin' with *(s)ku̯éHt-is 'skin, hide'; *leh₂p- 'light up' with *leip- 'light, cause to shine'; *meth₂- 'snatch away' with *mei̯th₂- 'remove, take away, rob'; *kend- 'single out for distinction' with *keu̯d-s- (Grk κῦδος 'fame, honor, glory, renown'); *ḱu̯eH- 'throw' with *ḱeu̯H- 'throw, push'; *ḱelH- 'be cold, freeze' with *ḱi̯eH- 'freeze'; Italic smith-god, Vulcan with Lithuanian smith-god Kaleva (see Blažek, "Indo-European "Smith", 41-42, 67-68) among others.

MIr *corrān* 'sickle,' *cirrid* 'mangles, maims,' Lat *carpa* 'pluck,' ON *harfr* 'harrow,' OE *hærfest* 'autumn,' Lith *kerpù* 'cut, shear, clip (of hair or wool),' Latv *cìrpu* 'shear,' *cir̃pe* 'sickle,' OCS *črĭpǫ* 'ladle out,' Grk καρπός 'fruit,' Skt *kr̥pāṇī* 'dagger,' *kr̥pāṇa-* 'sword,' *karpara* 'rind, shard, skull.'[222]

These can be summarized as follows:

Actions:	Pluck, harvest, mangle, maim, harrow, cut, clip, shear, ladle out
Instruments:	Sickle, dagger, sword, harrow
Time indication:	Autumn
Object of action:	Fruit, rind, shard, skull

Many other examples of PIE roots could be cited with a similarly broad semantic range. The semantic diversity within the twelve root families presented above is generally comparable to these.

5. One-word or two-word glosses ascribed to roots in etymological dictionaries are almost always misleading and should rarely form the basis for semantic comparison. It is always necessary to consult the lexica of the individual languages involved because the meaning of the word that demonstrates semantic continuity will sometimes have become, over the millennia, one of its minor meanings, and may therefore have gone unmentioned in the short glosses given in the etymological dictionaries.

Most roots have attestations that span a field of related semantic values. Comparison with the full range of cognates, including those that have undergone root transformations of the kind described above, significantly aids in the identification of the semantic nucleus. This is because those root transformations must have occurred at an early stage of language development and they often better preserve the original core of the semantic field.

The evidence suggests that, in the early stages of language development, words were not used so analytically as at the present. For example, *$\acute{k}(R)e\underset{.}{i}$-*, a word meaning "lie down" did not merely represent the physical act of assuming the horizontal position, rather it was inseparable from the larger context of "who to lie down with," "where to lie down," and "what to do when lying down (rest, sleep, have intercourse, lie dead)."

Similarly, the ancient word *$g^u e(R)b^h$-*, often glossed as 'womb,' did not merely represent the physical organ denoted by that word today, but rather encompassed a larger semantic field that included the feelings of desire, the vulva, the act of conception, the resulting embryo, and the young child (or animal) that was the outcome of this entire process.

The farther back in time that we try to push our understanding of language, and of the relationships between languages, the more we will need to expand our notions of semantics in this way—or so it seems to the present author.

6. Because resonants can vary when not in the root-initial position of open roots (*CR-), it is dangerous to compare them with similar forms in outside language families as is often done in Nostratic studies. Such comparisons are rarely convincing because they rely on what is essentially a single-consonant phonetic correspondence.[223]

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[222] IEW 944; EIEC 258; Mallory and Adams 168.

[223] "With only one relatively firm consonant in common, functional and also structural differences make inter-phyla comparisons too hazardous." —Item no. 128 (page 7) from A. Murtonen, "Comments on the Nostratic Reconstructions of Illič-Svityč."

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APPENDIX

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Notes on Typological Comparisons between Proto-Indo-European and Salish: Root Inversion

Evidence has been presented in the body of this paper suggesting that the radical metathesis of CVC root-consonants is far more common in PIE than is generally believed. If this is correct, then the questions naturally arise: Can such a feature be found in other language families, and if so, which ones? How does it function there, and what is the motivation for this type of inversion?

The literature on metathesis is substantial.[224] All authorities acknowledge that normal metathesis, the inversion of contiguous phonetic elements for euphonic purposes, occurs frequently in language typology. Two frequently cited examples are: *bridd > bird*, and *wæps > wasp*, which occurred in the transition from Old to Middle English.

But the type of radical metathesis, with inversion in the ordering of non-contiguous root-consonants as seen in PIE, is considered very rare. The only widely cited example of this feature occurring in significant numbers is the Salish language family, where such examples of root inversion are common. The Salish languages are/were spoken by twenty-three indigenous ethnic groups located in British Columbia, Washington, Oregon, northern Idaho, and western Montana.[225]

The following are some examples of CVC root-metathesis found in the Salish languages, along with comments and citations from leading Salishists on the subject:

> "Inversion of root-elements (e.g., $C_1VC_2 > C_2VC_1$) is remarkably frequent in Salish. When one or a few languages have a form deviating from all others they are considered the innovators…"[226]

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> "One of the more striking features of the pan-Salish lexicon is the relatively large number of apparent cases of root inversion, i.e., pairs of cognate roots where the order of the consonants is reversed. So, for example, a C_1VC_2 pattern with a given meaning will have a counterpart in a C_2VC_1 pattern with the same or similar meaning in another language, or even within the same language. Thus we find BC *xʷay* 'thaw' alongside Hl *yaxʷ* 'thaw'. Similarly, we find in CA the following items: *xʷał* 'dart' and *xʷił* 'hurry at' alongside *łaxʷ* 'rush' and *łexʷ* 'move with weight and speed.'

> While I have had little difficulty in amassing a considerable list of examples of root inversion in Salish, I had a great deal of difficulty finding even a few plausible examples in other language families with CVC roots whose morphological structures and histories I am sufficiently familiar with to allow me to assess the reasonableness of a potential inverted root pairing. One such family is Tibeto-Burman, in particular the TB languages of Nepal. Hale (1973) is a comparative dictionary of approximately 4,000 entries for each of twelve Tibeto-Burman languages of Nepal (along with Indo-European Nepali). Looking through Hale (1973) and searching for cognate forms in my own dictionary of Chantyal (Tibeto-Burman: Tamangic) (Noonan et al., forthcoming), I was able

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[224] An overview of the subject can be found in Elizabeth Hume and Scott Seyfarth, *Metathesis*.

[225] For relationship to surrounding language groups, see David Beck, "Grammatical Convergence and the Genesis of Diversity in the Northwest Coast Sprachbund."

[226] Aert H. Kuipers, *Salish Etymological Dictionary*, 5.

to find only two plausible cases of root inversion. A search through my comparative Western Nilotic data base of approximately 900 entries yielded no examples. Something unusual seems to be going on in Salish."[227]

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"Before discussing a set of possible explanations for the existence of inverted root pairs, I should make clear one assumption I am making concerning inversion: the phenomenon of inversion does not seem to be a characteristic of a single language or of a single division within the family but seems rather to involve the entire Salish group. Examples can be found in the lexicon of any well-described Salish language. From this we can infer that, if its origins lie in a PROCESS of some sort, the process either affects or has affected the entire family or goes back to Proto-Salish."[228]

The following are some examples of Salish radical metathesis taken from the 100 cited by Noonan. Note that the infixes (ʔ, u, i, etc.) and vowel ablaut are semantically neutral. Note also that any elements following C_2 are suffixal.[229]

1. *q'... w*   'break, open'

Cv	*q'aw*	'crack'
Cm	*q'aw'*	'split'
CA	*q'ew'*	'break stiff object'
Ka	*q'aʔú*	'break'
Ti	*quul*	'crack'
Sh	*q'iw*	'break'

  w ... q'

Sq	*wiq'*	'open' (about container)
Sh	*wiq'*	'undo, wreak'
CA	*qʷaq'*	'spread apart as to part hair'
Ld	*gʷəq'*	'open'
Se	*wəq't*	'open'
Ch	*waq'ł*	'open'

2. *qʷ ... ʔ*   'water, drink'

Ld	*qʷuʔ*	'water'
	qʷúʔqʷa	'drink'
Ck	*qa·*	'water'

[227] Michael Noonan, "Inverted Roots in Salish," 475.

[228] Noonan, "Inverted Roots," 504.

[229] Noonan, "Inverted Roots In Salish, 476-504. Unless otherwise indicated, the abbreviations used in this paper are (per Noonan): BC [Bella Coola] (Kuipers Be), CA [Coeur d'Alene], Ch [Upper Chehalis], Ck [Chilliwack], Cl [Clallam], Cm [Columbian], CS [Coast Salish], Cv [Colville], Cw [Cowichan], Cx [Comox], Cz [Cowlitz], ESh [Eastern Shuswap], Fl [Flathead], Hl [Halkomelem], IS [Interior Salish], Ka [Kalispel], LCh [Lower Chehalis], Ld [Lushootseed], Li [Lillooet], Lm [Lummi], Ms [Musqueam], No [Nooksack], Ok [Okanagan], Pe [Pentlatch], PS [Proto-Salish], Qn [Quinault], San [Saanich] Kuipers Sn, Se [Seshelt], Sg [Songish], Sh [Shuswap], Si [Siletz], Sm [Samish], So [Sooke], Sp [Spokane], Sq [Squamish], StS [Straits Salish], Th [Thompson], Ti [Tillamook], Tw [Twana], We [Wenachee].

		qá·qa	'drink'
Cw, Ms		*qaʔ*	'water'
		qáʔqá	'drink'
Cl		*qʷúʔ*	'water'
Tw		*qʷóʔ*	'water'
Sq		*qʷu(ʔ)*	'water'
Ti		*qœu*	'water'
Th		*qʷuʔ*	'water'
Ch		*qʷó·ʔ*	'drink'
Sg		*qʷáʔ*	'water'
		qʷáʔqʷəʔ	'drink'

ʔ ... qʷ

| CA | *ʔəqʷ-s* | 'drink' |
| Th | *ʔuqʷeʔ* | 'drink'[230] |

3. *t' ... kʷ* 'dig'

| Sq | *t'akʷ* | 'dig' |
| BC | *tkʷm* | 'dig clover roots' |

kʷ ... t'

| Sh | *kʷt'-em* | 'dig wild potatoes' |

4. *χ ... c* 'dig'

| Sp, Ka | *χec* | 'dig roots' |
| Ld | *χəc* | 'pull out, extract' |

c ... χ

| BC | *ciiχ* | 'dig' |

5. *χʷ ... y* 'disappear'

| Sh | *χʷey* | 'disappear' |

y ... χʷ

| Tw | *yəχʷ* | 'disappear' |

6. *k ... ɬ* 'fall'

BC	*kɬ*	'drop'
Sh	*kiɬ, kɬ*	'come off, come apart, be released'
	kɬ-ekst-m-n-s	'drop, let go of'

ɬ ... k

| Cz | *ɬək-iq* | 'fall over' |

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[230] See also Kuipers, *Salish Etymological Dictionary*, 91.

7. *l ... p'* 'bend, wood'

Sh	*lép'*	'bend branch down'
Th	*láp'*	'bend something over'
Cm	*láp'*	'bend'
	sláp'	'stick'
Ok, Cv	*slíp'*	'wood'
CA	*líp'*	'wood'
Sq	*láp'*	'warped, skewed'
Cz	*yap'a*	'bend down' (a branch)

    p'... l

Ld	*p'alq*	'turned out of shape; bent out of line'
CA	*palq'*	'be curved'[231]

Additional examples from other sources are listed below:

8. PS **k'ix^{w}* 'dry'   **x^{w}ik'* 'dry'[232]

9. **p...x^{w}* 'lift up'

Be	*ʔapx^{w}*	'to lift up'

    *x^{w}...p

Li	*x^{w}əpn*	'to lift up'[233]

10. **cəq^{w}* 'to begin, set out'

Be	*cq^{w}*	'begin, start on something'

    *q^{w}əc

Li	*q^{w}əcac*	'set out, leave'
	q^{w}əcəc	'have started on st., be busy with'
	q^{w}əcn	'shake something'
	q^{w}əcpulm'əxw	'earthquake'
Th	*q^{w}əctes*	'activate, operate, make move'
	q^{w}əctem	'have convulsions'
Sh	*q^{w}əcec*	'set out, depart, begin'
	ʔstq^{w}ic	'stir, make movements'
	q^{w}əcpul'əx^{w}	'earthquake'[234]

11. **məq^{ʼw}* 'to pile up, lump, hill, bump'

Cw	*məq^{w}əyiʔyəsm*	'pile up'
Nk	*múq'wenes*	'clenches fist
San	*məq^{w}eyəčt*	'pile up'

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[231] Examples 1-7 are from Noonan, "Inverted Roots," 476-477. Note also the *s*-mobile in the final set.

[232] Aert H. Kuipers, "Towards a Salish Etymological Dictionary," 63. Note: *x°* from the source documents (Kuipers) is here and henceforth transliterated as *x^{w}*.

[233] Kuipers, *Salish Etymological Dictionary,* 18.

[234] Kuipers, *Salish Etymological Dictionary*, 25. Note: The symbol /c/ represents /ts/ in Salish.

Sg	*məqʷé*	'pile up'
Cl	*məqʷəyečt*	'pile up'
Tw	*ʔasbəqʷab*	'piled up' (*b < m*)
Cb	*ʔacməqʷ*	'mountain, hill'
Cv, Ka, Sp	*mqʷ-*	'mountain, bump, lump'
Cr	*maqʷ*	'pl. objects lie, pile'[235]

*qʷum 'top, high, pile, lump'

Be	*qʷum*	'high, large'
Cw	*qʷəmxʷəst*	'wind wool into balls'
Ch	*qʷəmxʷ*	'lumped, humped, scar'
Li	*sqʷum'c*	'ball' (with *s*-mobile)
Sh	*qʷm-*	'higher ground'[236]

*kʷ/qʷəm 'lump, heap'

Be	*kʷm*	'thick, bulky'
Se	*skʷəmʔit*	'piled up in a lump, bulge'
Cw	*qʷəmxʷəst*	'wind wool into balls'
Li	*sqʷəm*	'mountain, pile'[237]

12. **məqʼ* 'to swallow, eat one's fill'

Cx, Sl	*məqʼ*	'full from eating'
Se	*sməqʼit*	'full from eating' (with *s*-mobile)
Cw, Ck	*məqʼət*	'to swallow'
Sm	*məqʼ*	'satiated from food'[238]

qʼəm

Th	*qʼməm*	'glutton'
Cv	*qʼmam*	'greedy'
	sqʼmiltn	'hunger' (with *s*-mobile)
Tw	*kʼəbədasdəxʷ*	'swallow it!' (*b < m*)[239]

13. *pəx / xəp* 'to comb (out)'

Be	*px/xp*	'squeeze water out of wet string'
Sh	*píxm*	'unravel'
Cv	*pixm*	'wool combing'[240]

[235] Kuipers, *Salish Etymological Dictionary*, 69.
[236] Kuipers, *Salish Etymological Dictionary*, 97.
[237] Kuipers, *Salish Etymological Dictionary*, 45.
[238] Kuipers, *Salish Etymological Dictionary*, 69.
[239] Kuipers, *Salish Etymological Dictionary*, 88.
[240] Kuipers, *Salish Etymological Dictionary*, 77.

14. *p'us* 'lungs'

	Be	ʔusp'əs	'lungs'
	Ch	sp'us	'lungs'
	Ka	spuʔús	'heart, mind'[241]

   sup' 'breath'

	Se	xʷəsəp'	'get out of breath'
	San	sap'ət	'suck in, draw in breath'
	Li	súp'um	'breath, air'
	Th	sup'	'breath, air'
	Sh	sup'	'breath'[242]

15. *q'əl* 'to steam cook, sweat bath'

	Be	q'lst	'steam cook'
	Be	q'lstcut	'take a sweat bath'
	Sq	q'əlya	'take a sweat bath'

   ləq'

	Ka	səláq'i(st)	'sweat bath'
	Sp	sláq'ist	'sweathouse'
	Cr	hnléq'ncutn	'sweathouse'[243]

16. *t'ax / *xat'* 'to ladle'[244]

17. *q'əlx̌* 'round, corral, circle'

	Be	q'lax̌	'fence'
	Sq	sq'yáx̌úʔm	'whirlpool'
	Sh	q'lx̌em	'make a circle'[245]

   x̌ələq' 'turn, whirl, roll'

	Be	x̌lq'iix̌ʷ	'turn something around'
	Sq	x̌əlq'm	'roll/fall down'
	Li	x̌əlq'	'roll down'[246]

18. *c'it' / *t'ic'* 'pitch, gum'[247]

19. *mat'áy / *t'amáy* 'horse clam'[248]

[241] Kuipers, *Salish Etymological Dictionary*, 81.
[242] Kuipers, *Salish Etymological Dictionary*, 99.
[243] Kuipers, *Salish Etymological Dictionary*, 87.
[244] Kuipers, *Salish Etymological Dictionary*, 112.
[245] Kuipers, *Salish Etymological Dictionary*, 88.
[246] Kuipers, *Salish Etymological Dictionary*, 125.
[247] Kuipers, *Salish Etymological Dictionary*, 163.
[248] M. Dale Kinkade, "Prehistory of Salishan Languages," 6-7.

Although other Northwest language families show instances of radical metathesis (Chimakuan and possibly Wakashan), in the majority of cases these instances have apparent cognates in Salish, suggesting either common ancestry (unlikely unless very distant) or borrowing.[249]

Possible Explanations for the Inverted Root Phenomenon

Noonan enumerates eight possible explanations for the inverted root phenomenon observed in the Salish language family.[250] Of the eight, he discards seven as implausible and regards the eighth (reduplication) as only remotely influential. A simplified recounting of the possibilities that he considers, along with the objections he raises that weigh against them, are as follows:

- The pairs of roots are only accidentally similar: they are not cognate.

  Objection: The large number of metathesis pairs found in the languages suggest that accident alone cannot account for their existence.

- The inverted root pairs can be accounted for by some grammatical rule of metathesis.

  Objection: Metathesis typically occurs where adjacent consonants and vowels change places for phonetic reasons. But in Salish, root inversion occurs in non-contiguous situations where phonetic motivations are unlikely.

- Inverted root pairs are the product of a lexical composition process.

  Objection: This would be the case if each consonant of a CVC root were an independent semantic element that could be combined in a different order. But the fact that these purported separate elements do not occur elsewhere in the lexicon, argues against this explanation.

- Inversion is the product of a language game or of disguised speech.

  Objection: Although there are descriptions in the linguistic literature of word games or disguised speech that scramble the order of sounds, lack of evidence for such a process in the Salish languages renders this explanation possible, but unlikely.[251]

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[249] Noonan, "Inverted Roots," 513.
[250] Noonan, "Inverted Roots," 504-514.
[251] John J. McCarthy, "A Prosodic Theory of Nonconcatenative Morphology," 379. Quoting from that article: "Another argument which supports the notion that the root consonantism is a single unit at some level of representation comes from a language game of Bedouin Hijazi Arabic, a fairly conservative modern Arabic dialect described by al-Mozainy (in preparation). In this game, the consonants of the root may be freely permuted into any order, though non-root consonants and the canonical pattern of the form remain unchanged. Vowel quality, which is subject to regular phonological effects under the influence of neighboring consonants, varies correspondingly. For example, the possible permutations of *difaʕna* 'we pushed' from the root *dfʕ* appear in …*daʕafna, fidaʕna, ʕadafna, faʕadna, ʕafadna*. These permutations can apparently be performed and decoded with some fluency. They clearly demand that the grammar treat the discontinuous string of root consonants as a unit…"

- Inversion is the product of consonant symbolism or word taboo.

Objection: It has been documented that, among Salish communities in the past, word taboo has been operative where, after the death of a high ranking person, any word in the lexicon that sounds like the name of the deceased becomes unspeakable. Consequently, a substitute had to be found for the word that was affected by the taboo. Two examples from Elmendorf (1951: 206-207):

> "The death of x̣a'twas, a man of the Duhlelap Twana village community, changed x̣a'tx̣at mallard duck to hɔ'hɔbšəd red foot. …Many common words in Twana have the appearance of non-original substitute terms, if this inference is correct. An example is sx̣ʷe'ʔšəd deer, analyzable as split foot.

But since root inversion involves only a modification of the root, rather than its substitution, this process cannot adequately explain the metathesis so frequently seen in Salish roots.

- Inverted root pairs are the product of a phonologically conditioned process of metathesis.

Objection: Typically, metathesis reverses two adjacent sounds because they are easier to pronounce in the inverted position. If this were the explanation for the examples of root inversion in Salish, it would require the initial and final consonants to have appeared in a zero-grade formation, and then later be reanalyzed with full-grade vocalization. Additionally, such reversal would manifest only with certain phonetic combinations and not others. This is not seen to be the case, since frequently the metathesis forms are less sonorous than the originals.

- Reduplication is involved in the production of inverted root pairs.

Objection: It is well known that Salish roots often appear in a reduplicated form, either partial reduplication (where only one of the root consonants is repeated) or in full reduplication (where the entire root is repeated). If this process accounted for the many metathesis pairs observed in the lexicon, then two steps would have needed to occur: First, a full reduplication, and second, a selective loss of consonantal elements that would leave a remnant in root-reverse order. Using a PIE example, *(s)pek- 'see' would, through full reduplication, have become *(s)pek-pek. A following secondary loss of the first /p/ and the second /k/ would have resulted in the metathesis-form *(s)kep-, which would account for the differing Latin and Greek attestations of this root. This is quite a convoluted process that probably would not have occurred more than once or twice in the evolution of the language, if at all. It is hardly likely to have been a regular development that could account for the extensive patterns observed in Salish.

- Random metathesis of syllable onsets, one that is neither grammatically nor phonologically conditioned, has produced inverted roots.

Objection: Metathesis of syllable onsets are not uncommon in world languages, but they typically occur randomly. Consequently, this cannot explain the unusually large number of metathesis root-pairs found in Salish as compared with other language groups.

Conclusions Concerning Root Inversion in Salish and PIE

This analysis by Noonan of the Salish root inversions could equally apply to the metathesis seen in the oldest stratum of PIE roots. In seeking a motivation for this feature, Noonan succeeds in considering the most likely possibilities. He concludes that only the process of reduplication could reasonably be expected to have influenced the root inversions seen in Salish, but he further concedes that even such an explanation is not very likely.

Of the alternatives that Noonan considers, the possibility of intentional root inversion through either taboo deformation or disguised speech deserves a further comment. Noonan discards these explanations because, quoting Dale Kinkade, no evidence of such a dynamic is known to have been an operative mechanism in the history of the Salish languages.[252]

One can point, however, to a lexical entry in the Squamish dictionary of Kuipers: Squamish *kʷuí̯* has the meanings 'joke, be funny,' and the related Coeur d'Alene *qʷay* is defined as 'joke, talk backward.'[253] This would seem to constitute evidence that talking backward (presumably reversing the direction of root consonants) was a recognized activity, with a verb in the Salish vocabulary to denote it.

But while wordplay certainly could be a part of this process, it is probable that taboo avoidance would have been an even larger part of the motivation, especially given the large number of word inversions in Salish and because taboo avoidance played a significant role in Salish lexical development.

In addition to root metathesis, the Proto-Indo-European and Salish language families share a large number of typological characteristics. These include: vowel ablaut, vowel color influenced by other phonemes, a favored CVC root structure, reduplication, *s*-mobile, laryngeals or quasi-laryngeals, existence of full and zero-grade roots, variability of medial resonants, correspondence of accent systems, and possible lexical correspondences. These similarities have led some authorities to examine the possibility that PIE and Salish may be genetically related.[254]

The observation that root inversion in PIE is much more prevalent than previously believed adds strength to the arguments for such a relationship. Nater, in his list of linguistic characteristics shared by both Salish and PIE, does not even include root-inversion presumably because he is not

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[252] Noonan, "Inverted Roots," 507.
[253] Aert H. Kuipers, *The Squamish Language*, 343. See also page 404, where Kuipers makes the same observation about "talking backward."
[254] An overview of similarities between Salish and Indo-European is provided in Kuipers, *The Squamish Language*, 401-405; and in Hank F. Nater, "Towards a Genealogy of the Bella Coola language," 225-243.

aware of its presence in PIE.[255] Kuipers mentions "occasional interchange of root consonants" in his list of shared characteristics. Although he is aware that this feature is very common in Salish, he can list only four examples in PIE (*pekᵘ- : *kᵘep- 'cook,' *speḱ- : sḱep- 'see, scrutinize,' *dʰei̯ĝʰ- : ĝʰei̯dʰ- 'mould, build,' and *punkstè : Lith kùmstè 'fist').[256]

I have listed eleven examples of root inversion that are generally recognized in PIE (above, Section I-2.) and have suggested dozens of additional examples in Section II. It appears that this very rare typological feature exists about as plentifully in PIE as it does in Salish.

Kuipers, after carefully noting the many shared features of Salish and PIE, suggests that, if the two languages were spoken in adjacent geographic locations, then the "…parallels and comparisons could be used to suggest a remote common origin." He concludes,

> However, as long as the descriptive spade-work largely remains to be done and intra-Salish comparison has not been worked out, genetic-comparative work must remain speculative where distant, and inexact where closer connections are concerned.[257]

Nater, while referring to the idea of a common origin between Salish and PIE as a "seemingly preposterous claim," proceeds to argue for "new, i.e., hitherto unsuspected, historical (genetic) connections."[258] In other words, he argues that PIE and Salish indeed shared a common ancestor.

While it is beyond the scope of the present investigation to consider this question in detail, without doubt the wide prevalence of root inversion in PIE should, in the future, be seriously factored into the discussion of its parallels with Salish.

ABBREVIATIONS OF LITERATURE

Adams	Douglas Q. Adams, *Dictionary of Tocharian B*
AHD	*American Heritage Dictionary*
ALEW	Hock, Wolfgang, *Altlitauisches etymologisches Wörterbuch*
CLL	Melchert, Craig, *Cuneiform Luvian Lexicon*
DELG	Chantraine, Pierre, *Dictionnaire étymologique de la langue grecque*
de Vaan	de Vaan, Michiel, *Etymological Dictionary of Latin & other Italic Languages*
Dolg	Dolgopolsky, Aharon, *Nostratic Dictionary*
EDHIL	Kloekhorst, Alwin, *Etymological Dictionary of the Hittite Inherited Lexicon*
EIEC	Mallory, James P., and Douglas Q. Adams, *Encycl. of Indo-European Culture*
EWAia	Mayrhofer, Manfred, *Etymologisches Wörterbuch des Altindoarischen*
EWKS	Fahnrich, Heinz, *Etymologisches Worterbuch der Kartwel-Sprachen*
IEW	Pokorny, Julius, *Indogermanisches etymologisches Wörterbuch*
KEWA	Mayrhofer, Manfred, *Kurzgefaßtes etymologisches Wörterb. des Altindischen*
LIV	Rix, Helmut, *Lexicon der indogermanischen Verben*. 2nd edition
LIV Add.	Kümmel, Martin, *Addenda und Corrigenda zu LIV²*

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[255] Nater, "Towards a Genealogy."
[256] Kuipers, *The Squamish Language*, 401, 405.
[257] Kuipers, *The Squamish Language*, 405.
[258] Nater, "Towards a Genealogy," 225.

LSJ	Liddell, Scott, and Jones, *A Greek–English Lexicon*
Mallory and Adams	Mallory and Adams, *The Oxford Introduction to Proto-Indo-European and the Proto-Indo-European World*
NIL	Wodtko, Irslinger, and Schneider, *Nomina im Indogermanischen Lexikon*
OCD	*Oxford Classical Dictionary*
OLD	*Oxford Latin Dictionary*
Watkins	Watkins, Calvert, 2011, *American Heritage Dict. of Indo-European Roots*

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ABBREVIATIONS OF NAMES OF INDO-EUROPEAN LANGUAGES

Alb	Albanian	ME	Middle English
Arm	Armenian	MHG	Middle High German
Av	Avestan	MIr	Middle Irish
Bret	Breton	MPers	Middle Persian
Bulg	Bulgarian	MWels	Middle Welsh
CLuv	Cuneiform Luvian	Myc	Mycenaean Greek
Corn	Cornish	NE	New English
Cymr	Cymric	Norw	Norwegian
Gall	Gallo-Roman	NPers	New Persian
Gaul	Gaulish	NWels	New Welsh
Goth	Gothic	OAv	Old Avestan
Grk	Greek	OCS	Old Church Slavonic
HLuv	Hieroglyphic Luvian	OE	Old English
Hit	Hittite	OFris	Old Frisian
Illyr	Illyrian	OHG	Old High German
Khot	Khotanese	OIr	Old Irish
Lat	Latin	OLat	Old Latin
Latv	Latvian	OLith	Old Lithuanian
Lith	Lithuanian	ON	Old Norse
Luv	Luvian	OPers	Old Persian
Lyc	Lycian	OPrus	Old Prussian
Lyd	Lydian	ORus	Old Russian
Mcymr	Middle Cymric	OSax	Old Saxon

Osc	Oscan		Slav	Slavic
Oss	Ossetic		Sogd	Sogdian
OSwed	Old Swedish		Swed	Swedish
OWels	Old Welsh		TochA	Tocharian A
Phryg	Phrygian		TochB	Tocharian B
PIE	Proto-Indo-European		Ukr	Ukrainian
Pol	Polish		Umb	Umbrian
Rus	Russian		Ved	Vedic
SC	Serbo-Croatian		YAv	Young Avestan
Skt	Sanskrit			

The Dene-Caucasian Macrofamily: Lexicostatistical Classification and Homeland

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Abstract

To test the competing theories about the structure of the Dene-Caucasian (DC) macrofamily, the matrix of lexical matches between 42 extant and reconstructed DC languages (Basque, Burushaski, Yeniseian, Northwest Caucasian, eight Northeast Caucasian, 27 Sino-Tibetan, three Na-Dene) and 39 other languages, based on short (50-item) wordlists from *The Tower of Babel: The Global Lexicostatistical Database*, compiled by G. S. Starostin, A. S. Kassian, and M. A. Zhivlov, was subjected to several multivariate analyses. Rooted networks were constructed, and the quasi-spatial model, which had rarely been used in lexicostatistics, was applied. Results support G. Starostin et al.'s classification while revealing certain details that went unnoticed under a strictly genealogical approach. Basque is connected with Northeast Caucasian, specifically proto-Nakh, not only genealogically but by areal ties as well. The Yeniseian-Burushaski clade appears to have had areal connections with Altaic. Na-Dene may be a Sprachbund rather than a clade. Based on geographic and genetic considerations, especially the distribution of the autosomal component ANE, the DC homeland, like that of Eurasian languages, was located in Southern Siberia or Eastern Kazakhstan. Moreover, the filial branches of both macrofamilies expanded along the same four principal routes: western (toward Caucasus, Anatolia and, in the case of DC, further west into Europe), northern (into the Siberian taiga), northeastern (toward Beringia), and eastern (toward northeastern China). The totality of genetic, craniological and archaeological facts suggests that among the DC speakers were the Okunev and the Karasuk people. Their probable affiliation was Yeniseian, but the relic Okunev population may have been collaterally related also to other DC groups such as Na-Dene and Sino-Tibetan.

KEYWORDS: Lexicostatistics, Dene-Caucasian Macrofamily, Basque, Burushaski, North Caucasian, Yeniseian, Sino-Tibetan, Na-Dene, population genetics.

INTRODUCTION

The idea of the Dene-Caucasian (hereafter DC) macrofamily results from the generalization of several theories. The key hypothesis, Sino-Caucasian in its modern version, was formulated by S. A. Starostin (1984), who adduced facts indicating deep affinity of North Caucasian with Yeniseian and Sino-Tibetan. Then he put forward arguments suggesting that Burushaski, which he believed to be closest to Yeniseian, belongs to the same macrofamily (S. Starostin 2005: 69); earlier, the same conclusion was reached by V. N. Toporov (1971), Blažek & Bengtson (1995), and G. van Driem (2001: 1186–1205).

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S. L. Nikolaev (1991) linked North Caucasian to Na-Dene, and E. Vajda (2010) believes Na-Dane to be akin to Yeniseian. This completed the hypothesis of the Dene-Caucasian macrofamily (hereafter DCM), which includes Sino-Caucasian (Starostin G. 2012). J. D. Bengtson (2017) has done much to demonstrate that one of the DC languages is Basque, which is closest to North Caucasian.

This article is authored by a non-linguist. Being unable to assess the validity of DCM, my conclusions should be taken in the subjunctive: *if* DCM were a monophyletic taxon, what would the implications be? The study has two objectives. First, I apply the models, which had rarely been used in lexicostatistics, to DC languages from *The Global Lexicostatistical Database* by G. S. Starostin, A. S. Kassian, and M. A. Zhivlov (*The Tower of Babel: The Global Lexicostatistical Database.* http://starling.rinet.ru/new100/trees.htm, last accessed 15 April, 2022).[2] The second goal is to discuss certain extralinguistic facts relevant to the issue of the DC homeland and migrations, provided, to reiterate, DCM proves real.

LANGUAGES, MODELS, AND METHODS

The following extant and reconstructed languages belonging to DCM (42) and to other macrofamilies (39), listed in alphabetical order, were used: ***Altaic*** (JAP – Japonic, KOR – Korean, MNG – Mongolic, TNG – Tungusic, TRC – Turkic), ***Basque*** (BSQ), ***Burushaski*** (BUR), ***Chukotko-Kamchatkan*** (CHK – Chukchee, ITL – Itelmen), ***Dravidian*** (BRA – Brahui, GND – Gondwan, KOG – Kolami-Gadba, NDR – North Dravidian, SDR – South Dravidian, TEL – Telugu), ***Eskaleut*** (ALE – Aleut, INU – Inuit, YUP – Yupik), ***Indo-European*** (ALB – Albanian, ARM – Armenian, BLT – Baltic, CLT – Celtic, GRK – Greek, GRM – Germanic, HIT – Hittite, IRA – Iranian, LAT – Latin, SKR – Old Indian, SLV – Slavic, TKH – Tokharian), ***Kartvelian*** (KRT – Narrow Kartvelian, SVA – Svan), ***Na-Dene*** (ATH – Athabascan, EYA – Eyak, TLI – Tlingit), ***Northeast Caucasian*** (AND – Andic, AVA – Avar, CEZ – Cezic, DRG – Dargwa, KHI – Khinalug, LAK – Lak, LZG – Lezghian, NKH – Nakh), ***Northwest Caucasian*** (WCA), ***Sino-Tibetan*** (BGA – Bodo-Garo, CHN – Old Chinese, DHI – Dhimal, DIG – Digaro, HRU – Hrusish, JIA – Jiarongic, JPH – Jingpho, KAR – Karen, KHA – Kham, KIR – Kiranti, KNY – Konyak, KUK – Kuki-Chin, LEP – Lepcha, LOL – Lolo-Burmese, MAG – Magar, MEI – Meithei, MIK – Mikir, NAG – Naga (Kuki-Chin-Naga group), NUN – Nungish, QNG – Qiang, SHL – Sherdukpen-Sulung, TIB – Tibetic, TMG – Tamang-Gurung, TNI – Tani, TSH – Tshangla, TUJ – Tujia, WHM – West Himalayan), ***Uralic*** (BFN – Baltic Finnic, HNG – Hungarian, MAR – Mari, MRD – Mordvinic, OUG – Ob-Ugric, PRM – Permic, SAM – Samoyed, SMI – Saami), ***Yeniseian*** (YEN), ***Yukaghir*** (YUK).

Models mentioned above were already used in my previous studies focusing on three families: Indo-European (Kozintsev 2018a,b, 2019a,b), Eurasiatic, or Narrow Nostratic (Kozintsev 2020a), and Afroasiatic (Kozintsev 2021a; Kozintsev, Militarev 2022). Under the mixed genelogical-areal model, rooted networks were constructed.[3] Under the quasi-areal model, which is akin to J.

Schmidt's Wave Theory, the matrix of pairwise lexical matches was subjected to nonmetric multidimensional scaling (NMDS), and the minimum spanning tree (MST) was drawn, showing the shortest path connecting points in the multivariate space.[4]

When extant and extinct languages are processed simultaneously under the genealogical approach, a problem arises, which in modern glottochronology is solved with the help of corrections (Burlak & Starostin 2005: 142).[5] Because the methods employed here are not based on glottochronological postulates, raw data were used.

CLASSIFICATION
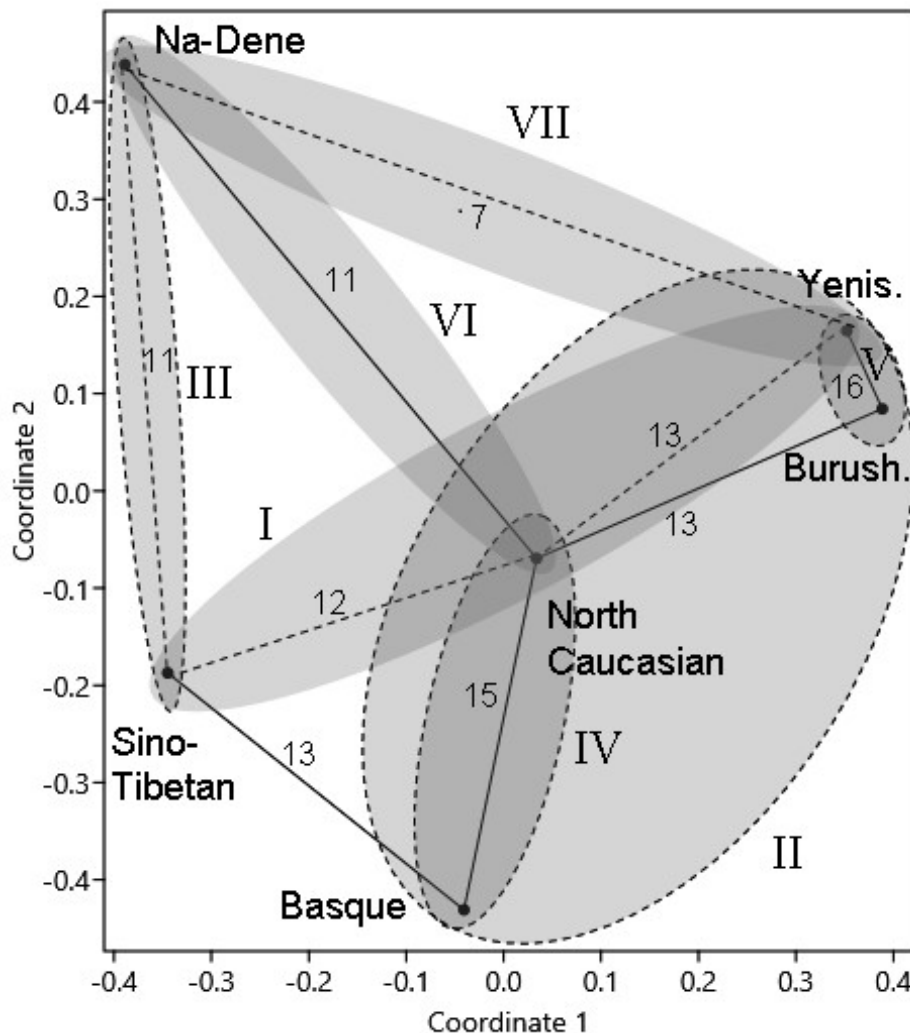
Figure 1

Arrangement of DC families and isolated languages (shown by dots) according to the results of the NMDS of the averaged matches matrix. MST edges are shown by solid straight lines; other links, by dashed straight lines. Arabic numerals refer to average percentages of lexical matches. Presumed groups within DCM are shown by shaded areas and marked by Roman numerals: I, North Caucasian, Sino-Tibetan, and Yeniseian (Starostin S. 1984); II, North Caucasian, Yeniseian, Basque, and Burushaski (Starostin G. 2009); III, Sino-Tibetan and Na-Dene (Starostin G. 2016: 361; see also his unpublished data: https://starlingdb.org/new100/eurasia_short.jpg); IV, North Caucasian and Basque (Starostin G. 2009; Bengtson 2017); V, Yeniseian and Burushaski (Starostin S. 2005; Starostin G. 2009); VI, North Caucasian and Na-Dene (Nikolaev 1991); VII, Yeniseian and Na-Dene (Vajda 2010). Clusters in G. Starostin's glottochronological trees are encircled by dashed ovals.

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[4] The model was implemented with the PAST package written by Ø. Hammer (https://folk.uio.no/ohammer/past/).
[5] The problem does not arise when the quasi-areal model is used.

Let us first examine the two-dimensional projection of DC languages at the level of families and isolated languages (Fig. 1). As the minimum spanning tree shows, the North Caucasian family takes a central position. MST edges connect it with three DCM members: Basque, Burushaski, and Na-Dene. The strongest links are those between Yeniseian and Burushaski (group V – central), and between North Caucasian and Basque (group IV – western). The eastern group (III), consisting of Sino-Tibetan and Na-Dene, is less certain, and the link connecting Na-Dane with Yeniseian is the weakest. Nearly all DCM subgroups are dealt with by various theories (see caption to Fig. 1). To my knowledge, only the connection between Sino-Tibetan and Basque (in fact, no weaker than those linking North Caucasian with Yeniseian and Burushaski) has never been discussed, evidently because of its striking disagreement with geography.
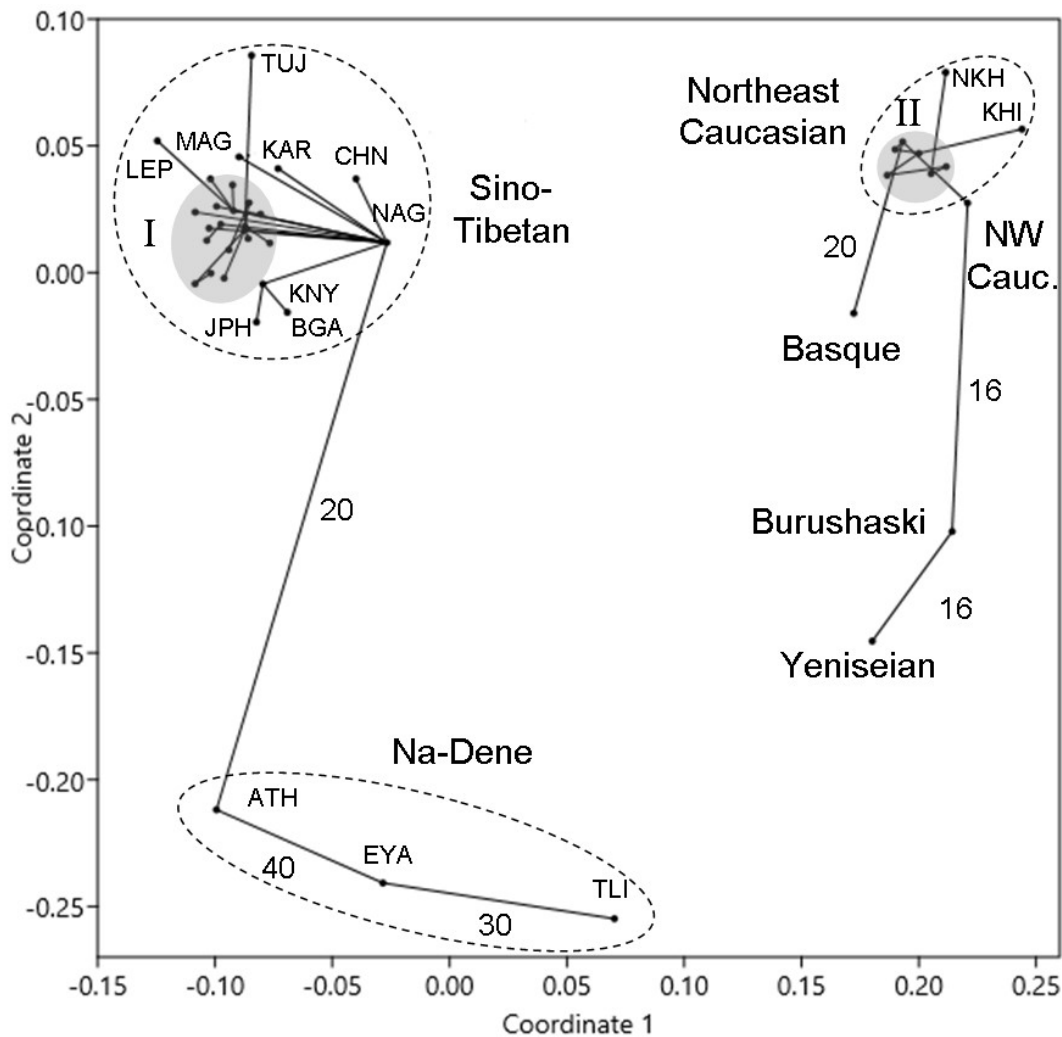
Figure 2

The position of DC languages (shown by dots) according to NMDS of the matrix of lexical matches. Straight lines are MST edges (the weakest link, between Magar and Nakh, is not shown). Arabic numerals refer to percentages of matches. Families are encircled by dashed ovals. See text for abbreviations; clusters of unmarked Sino-Tibetan and North Caucasian languages are shown by shaded areas I and II, respectively.

Let us now look at the two-dimensional projection of the multivariate arrangement of separate DC languages (Fig. 2). The MST method must connect all points most parsimoniously. But the edge connecting Sino-Tibetan with North Caucasian is a very weak link between Magar and Nakh (6%). Given the huge geographic distance between them, the connection must be deemed incidental, the more so because at the higher taxonomic level (Fig. 1) the same method connects Sino-Tibetan with Basque rather than with North Caucasian.

Other ties between separate languages of various DC families are markedly stronger than those between families themselves (Fig. 1), which is also due to random fluctuations. Within the Sino-Tibetan family, we note an unusually high number of edges connecting Naga (of the Kuki-Chin-Naga group) with other languages – nine (see below). Naga is also linked with Athabascan (20% of matches), but another Na-Dene language, Tlingit, has only 9% matches with Naga. Within the Na-Dene family, too, the structure of ties is somewhat anomalous: Athabascan and Eyak have 40% of lexical matches, Eyak and Tlingit, 30%, whereas Athabascan and Tlingit are much less similar (17%). The Na-Dene family, therefore, appears to be heterogeneous, which is mirrored by its marked stretch in the two-dimensional projection (Fig. 2).
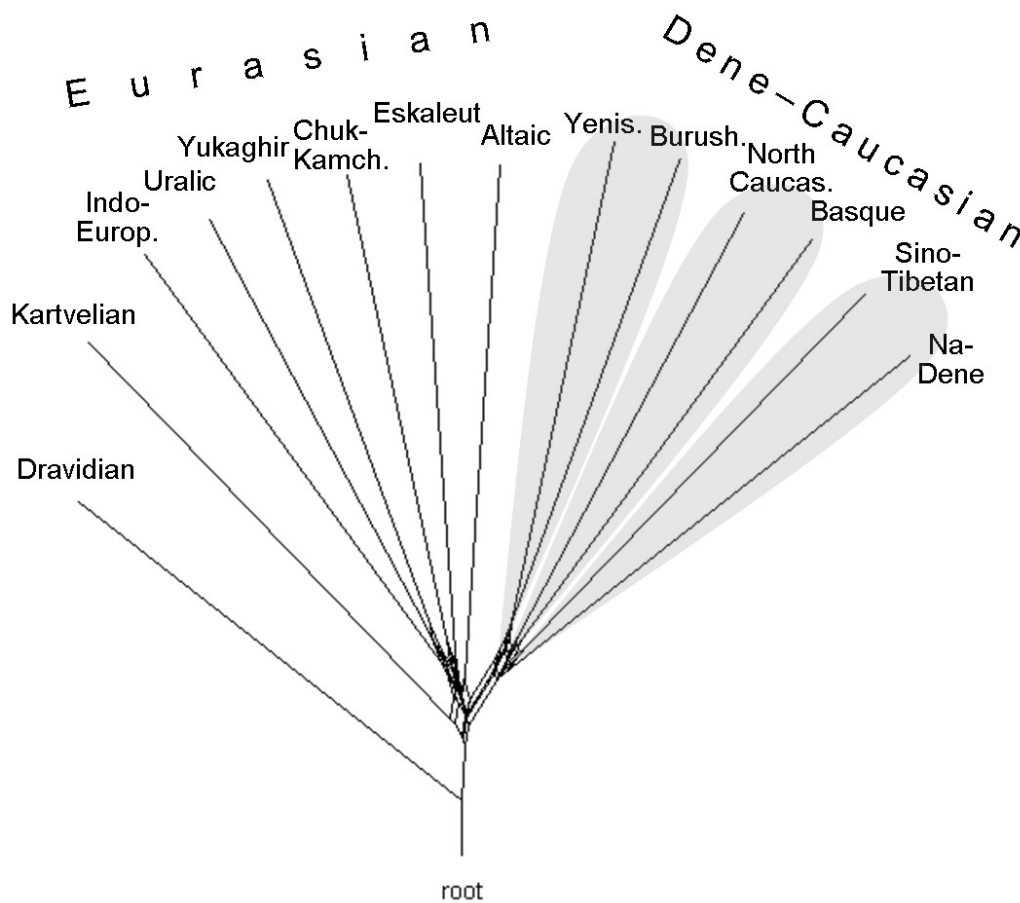
Figure 3

Network of families and isolated languages, rooted by Dravidian. "Petals" are presumed clades.

The network of families and isolated languages, rooted by Dravidian[6] (Fig. 3), shows that the DCM is a no less distinct unity than Eurasian, let alone Macro-Nostratic, which has traditionally included also Kartvelian, Dravidian, and even Afroasiatic. In the graph, DCM appears to be a bona fide monophyletic taxon[7] opposed to Eurasiatic. Within DCM, three pairs are seen, corresponding to hypothetic groups in Fig. 1. The geographically central pair, consisting of Yeniseian and Burushaski (V), is a clade; the western pair, Basque and North Caucasian (IV) may be a clade too. Whether the eastern pair, Sino-Tibetan and Na-Dene (III), form a clade is unclear, maybe because their presumed common ancestor was very ancient and maybe because genetic ties in this case are blurred by areal contacts, shown by "collaterals" at the base of the branches. All the above is in full agreement with the conclusions made by G.S. Starostin (G. Starostin 2009; 2015: 361).

Notably, the geographically central pair, Yeniseian-Burushaski, takes an extreme rather than a central position on the graph. The reason is its connection with the Eurasiatic macrofamily, maybe specifically with Altaic (the most isolated Eurasiatic branch). As to possible connections between DCM and Eurasiatic, we note that Yeniseian and Altaic are neighbors in the graph: "collaterals" may indicate early areal contacts between the common ancestor of Yeniseian and Burushaski, on the one hand, and proto-Altaic on the other.[8] Indeed, of all the non-DC branches, the Altaic shows the highest share of lexical matches with Yeniseian and Burushaski – 3.6%. Small as it is (two words from the 50-word list at most), geographic consideration prevent us from ignoring it.

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[6] The choice of Dravidian as a root was motivated by the fact that unlike Kartvelian, which may have had areal and possibly genetic ties with Indo-European, Dravidian appears to be the most isolated family.

[7] The fact that proto-DC is represented by a band of several edges does not contradict monophyly because the band is narrow and the edges are parallel (see Nichols and Warnow 2008: 812).

[8] Unlike a usual tree, where the order of branches within clusters is arbitrary, network branches are arranged in a definite order, which mirrors possible areal ties between them.
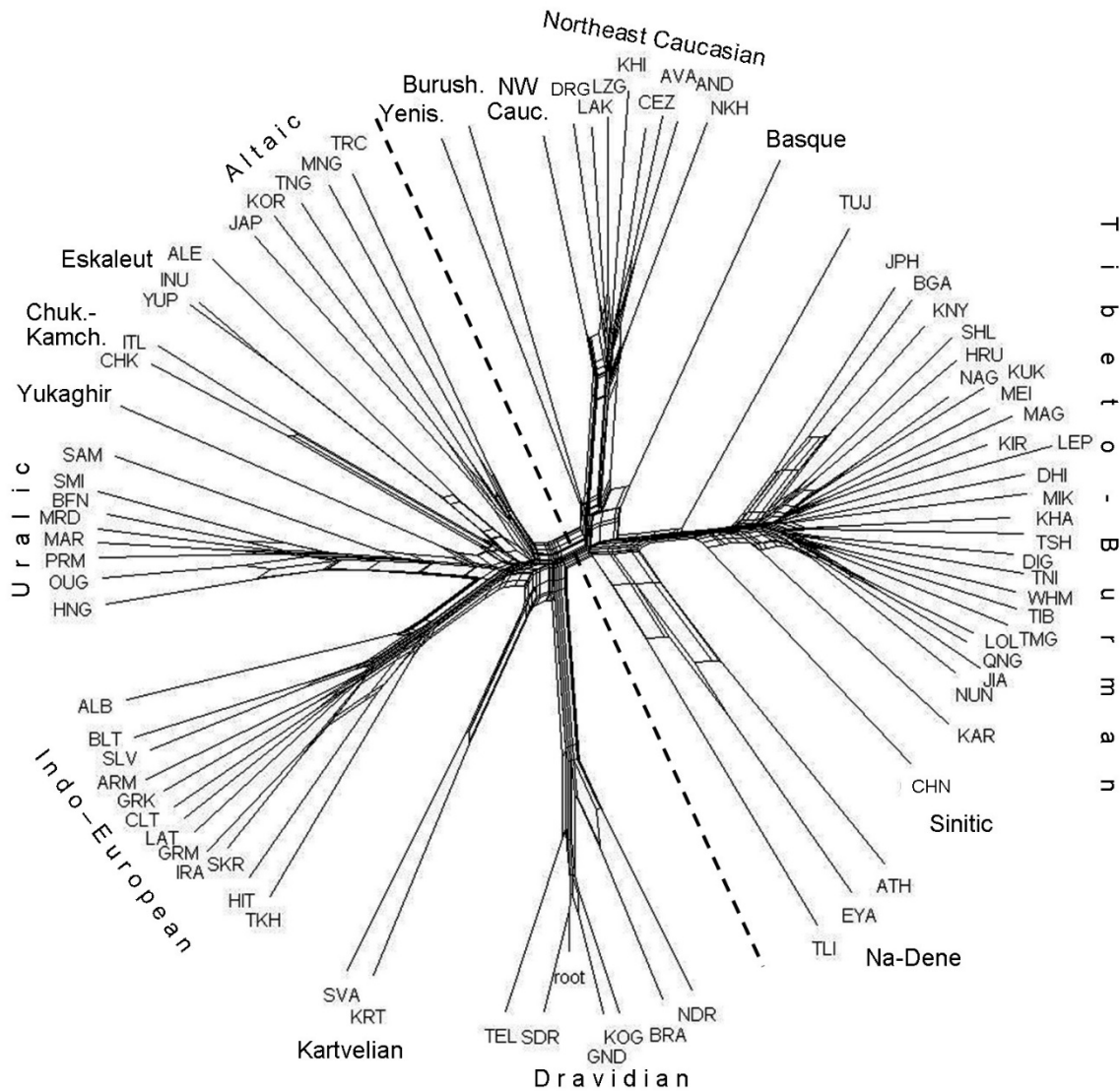
Figure 4

Network of languages, rooted by Dravidian. The dashed line separates DC languages from others. See text for abbreviations.

The network of separate languages (Fig. 4) helps to specify and correct the reconstructed pattern. It shows that both genetic and areal ties link the common ancestor of Yeniseian and Burushaski with proto-West Caucasian whereas East Caucasian languages are closest to Basque. Areal contacts between Basque and proto-Nakh are especially evident. Here too, as in the network of families (Fig. 3), the Burushaski–Yeniseian clade adjoins the Altaic branch and is connected with it by "collaterals."

The most isolated branch of Sino-Tibetan is not Chinese but Tujia, which again agrees with G. Starostin's finding (http://starling.rinet.ru/new100/eurasia_long.jpg.[9] This supports the view that

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[9] Usually Tujia is considered a separate branch of Sino-Tibetan (see, e.g., Matisoff 2003: 164, 188, 694; Blench and Post 2014). In the electronic catalog "Glottolog" it is attributed to the Burmano-Qiangic branch (see below). According

Sinitic is not opposed to Tibeto-Burman, but is part of it (see, e.g., van Driem 1998; Blench and Post 2014; Sagart et al. 2019). However, the idea that Sino-Tibetan is a sister branch of Na-Dene (Bengtson and Starostin 2011), which appeared compatible both with the two-dimensional configuration of separate languages (Fig. 2) and with the topology of the generalized tree (Fig. 3), is not upheld by this analysis. Three Na-Dene languages appear a separate group whose common origin is problematic and whose members are linked by strong areal ties. In other words, it may be a Sprachbund rather than a clade. This idea has already been voiced (Krauss 1976: 341). Within Sino-Tibetan, the Naga branch (of the Kuki-Chin-Naga group) is very short, as in G. Starostin's tree, which may indicate low evolutionary rate. This, in turn, suggests that an unusually high number of ties linking Naga with other languages (Fig. 2) may be due to the retention of a larger share of ancestral lexicon.
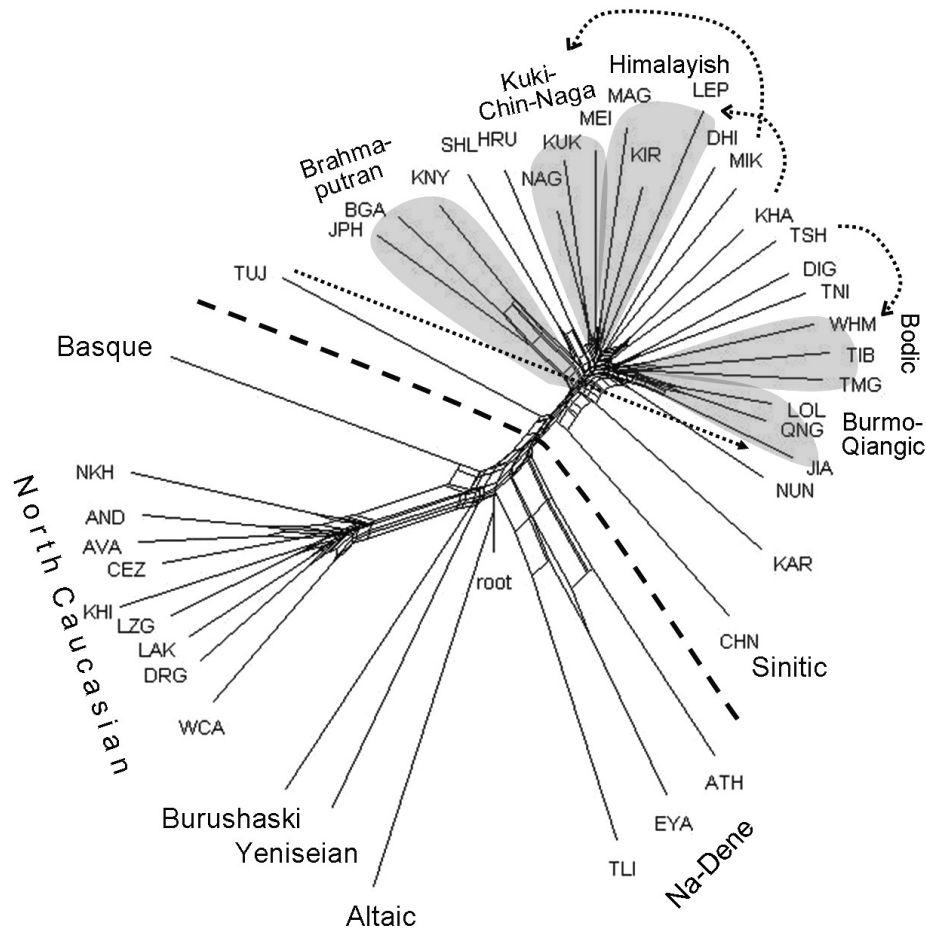
Figure 5

Network of DC languages, rooted by Altaic. The dashed line separates Sino-Tibetan languages from others. "Petals" are families according to Glottolog. Dashed arrows show discrepancies between the network and this catalog. See text for abbreviations.

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to Y-chromosome data, ancestors of Tujia could be related to Di-Qiangic tribes; in addition, they are genetic relatives of the Chinese (Xie et al. 2004). This is confirmed by the study of leukocyte antigens system HLA (Zhang et al. 2012).

The close view of the same classification is presented by the network of DC languages, rooted by Altaic[10] (Fig. 5). The Sino-Tibetan classification shows certain correspondences with that in the electronic catalog "Glottolog" (https://glottolog.org/). Specifically, five families, consisting of three branches each, are supported. Certain discrepancies are observed too: Tujia, which is attributed to the Burmo-Qiangic branch in "Glottolog," is quite distant from it in the network and is generally remote from others; Mikir is separated from the Kuki-Chin-Naga group; Kham and Tshangla, which appear related in the network, are attributed to two branches, Himalayish and Bodic, respectively. Old Chinese, which is an early branch, like Tujia, is less isolated, being connected with Tibeto-Burman branches, specifically Karen, by collaterals.

In sum, one can speak of three groups within DCM. The first includes Yeniseian, North Caucasian, Burushaski and Basque—the relationship between Yeniseian and Burushaski being the most evident (Fig. 1, groups II and V; Fig. 2, right part). The second group consists of the Sino-Tibetan family, which is the most isolated. The third group is Na-Dene (Figs. 3–5). Affinities between these three groups are not clear.

HOMELAND AND MIGRATIONS

I will now focus on the highly contentious issue of the DC homeland. As the latter was hardly situated either in the westernmost or in the easternmost part of the modern distribution area of DC languages (Pyrenean and North American, respectively), basically three options remain. The first is the Near East; the second, East Asia; and the third, some intermediate territory such as Central Asia and/or South Siberia. The Near Eastern theory is advocated by comparativists of the Moscow school. G.S. Starostin (2015: 363–365) and A.S. Kassian (2010: 416–417, 428–432) mention two facts. First, the extreme complexity and, accordingly, archaism of North Caucasian phonology and morphology indirectly suggest that North Caucasian speakers had neither undertaken distant migrations nor maintained intense contacts with speakers of other languages. Second, the split of common DC, dating to mid-11th millennium BC by glottochronology, was followed by the transition to farming in the Near East, resulting in population growth, which triggered the spread of surplus population from that region. The most obvious implication was the introduction of languages spoken by early farmers to Europe via Anatolia. In the 7th millennium BC, according to A.S. Kassian, the paths of proto-Basques and proto-North Caucasians diverged in the Balkans,[11] from whence the latter, having skirted the northern Black Sea cost, arrived in the Caucasus, where the event was marked by the 4th millennium BC Maikop culture (Kassian 2010: 427).[12] Eastward

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[10] Altaic was chosen because other non-DC branches were not included in this analysis. The study of early ties between DC and Altaic might prove of interest in the future (see below). The lesser age of Altaic compared to DCM is irrelevant in this case. The substitution of Dravidian by Altaic had little effect on the topology of the network.

[11] In his view, connection with the Balkans (specifically with the 5th millennium BC Balkano-Carpathic metallurgical center) is evidenced by an unusually large number of words for metals in proto-North Caucasian (Kassian 2010: 425).

[12] While this scenario does not appear plausible in general, there is a grain of truth in it. The Novosvobodnaya culture (which Kassian erroneously considers as but a late stage of Maikop) can indeed be associated with proto-Northwest Caucasians. But Maikop proper, definitely southern by origin, can apparently be attributed to late proto-Indo-Europeans (Kozintsev 2019a,b).

migrations of other DC speakers, reconstructed by the Moscow comparativists, are purely speculative (Kassian 2010: 429–432).

A. A. Romanchuk (2019: 181–181; 2020), on the other hand, believes that the DC speakers migrated in the opposite direction: from eastern Eurasia westward. He draws mostly on genetic data à la G. van Driem's "Father Tongue Theory" and A. A. Klyosov's "DNA Genealogy," trying to establish connection between the spread of the Y-chromosome haplogroup R from Siberia westward and the migrations of DC speakers. He, admittedly, proclaims his disagreement with Klyosov's methods, arguing that the conclusion about the R1b subclade allegedly marking the DC speakers, made by them both, is a "sad coincidence" (Romanchuk 2019: 13; cf., Klyosov 2015: 131–136). This reservation is unnecessary: a cursory glance at the distribution map of R1b (Klyosov 2015: 137) suffices to note its general disagreement with the geography of language families. What one can discern at best are partial correspondences. But Klyosov's "Arbins," marked by R1b and viewed as a people, are as fictitious as his "Aryans" (those marked by R1a).

Romanchuk's observation that the westward migration from Siberia, marked by the ANE (Ancient North Eurasian) autosomal component (Romanchuk 2019: 166–167; 2020), deserves greater attention. Genome-wide components are more informative for tracing migrations than are haplogroups, and it is not incidental that their names, unlike those of haplogroups, refer to geography. What we deal with in this case, too, are not "peoples," of course. Because the reconstructed stages are very ancient, we can expect only partial coincidences with linguistic facts. The ANE component was first described in an Upper Paleolithic boy from Malta near Irkutsk, dating to 24 thousand years before present (BP), and then in a male and a girl from Afontova Gora II near Krasnoyarsk, dating to 15–17 thousand years BP (Raghavan et al. 2013; Fu et al. 2016). Its share is very high in Kets as well as in Selkups, Chukchee, Koryaks, and American Indians. Among the ancient groups, those closest to Kets in this respect are Early Bronze Age Okunev people and Late Bronze Age Karasuk people (Flegontov et al. 2016). Kets may have inherited ANE from any or both of those populations in their Altai-Sayan homeland (ibid.).

ANE spread from Southern Siberia in two directions: westward to Eastern Europe and the Caucasus, and eastward to the New World where it is very frequent in American Indians (ibid.). In Eastern Europe ANE became the principal constituent of the EHG (Eastern Hunter-Gatherer) component, and in the Caucasus (Georgia) it appeared in the late Upper Paleolithic, between 26 thousand years BP (Dzudzuana, where it is absent) and 13–14 thousand years BP (Satsurblia, where it is present, as in the Mesolithic sample form Kotias Klde, Georgia, dating to 12–10 thousand years BP, and in the 8th millennium BC Neolithic sample from Ganj-Dareh in northern Iran (Lazaridis et al. 2018; Jones et al. 2015). In the Caucasus, ANE became part of the CHG (Caucasus Hunter-Gatherers) component, the principal marker of the Yamnaya expansion into Europe. Interestingly, the high content of ANE links Kets with populations of southwestern Central Asia and the Northern Caucasus (see map in Wesolowski 2015). One of the Trans-Beringian migration waves introduced this component to the New World, and one of the migrant populations was the proto-Na-Dene.

Who, then, carried proto-Basque to the Pyrenean peninsula? Clearly, not populations marked by ANE, which was absent in Western Europe before the Yamnaya (i.e., Indo-European) expansion. Theoretically, languages related to Basque could have been introduced to Europe with the autosomal component AF (Anatolian Farmers) in the process of Neolithization. However, being common in Anatolia and partly in the Caucasus, AF was quite rare in the steppe and in Southwestern Central Asia (Damgaard et al. 2018; Wang et al. 2019), consequently, its connection with DC speakers was secondary. Recently, a notable fact was discovered: AF resulted from the admixture of two components, one autochthonous, typical of the pre-agricultural population of Anatolia, the other introduced by a migration from Iran approximately in the 11th millennium BC (Chintalapati et al. 2022). This estimate coincides with the split of proto-DC, as estimated by glottochronology.

The general correspondence between genetic and linguistic facts is indistinct. The situation with the Eurasiatic macrofamily is similar. The same disagreement is observed even at a much lower taxonomic level, as in the case of Turkic peoples and languages.

The same applies to the Burushaski-Yeniseian clade. Although according to glottochronology, these languages diverged in mid-7th millennium BC (G. Starostin's unpublished data, cited by Kassian 2010: 424), their relationship is still apparent (Figs. 1–5).[13] Certain facts suggest that the ancestors of Yeniseians had migrated northward from the Altai-Sayan highland during the Karasuk era (Chlenova 1969). This is confirmed by genetic data, demonstrating that the population closest to Kets are the Karasuk people (Flegontov et al. 2016). V. Blažek (2017) has found presumably Yeniseian toponyms in the steppes of Kazakhstan and Southwestern Central Asia. G. van Driem believes that a macro-Yeniseian language ancestral to Burushaski had been introduced to the Himalayas by a group related to the Karasuk people (van Driem 2001: 1201–1206).

However, this could have happened much earlier, as demonstrated by petroglyphic masks of the Okunev type in Kashmir and Ladakh (Jettmar 1985; Devlet 1997; Sokolova 2012). Because no such petroglyphs were found in Southwestern Central Asia, whereas Early Bronze Age cultures of Xinjiang display Okunev parallels, this artistic style was apparently introduced to the Himalayas not from the north but from the east (Bruneau and Bellezza 2013). According to Y.E. Berezkin, Okunev petroglyphic masks "doubtlessly belong to the imagery typical of the pre-Yin cultures of China" (Vasiliev et al. 2015: 469). To this one should add parallels between Okunev petroglyphs and those of the Angara, and between Okunev ceramics and the Neolithic pottery of the Baikal area and even the Late Pleistocene pottery of the Amur (Sokolova 2007). From East Asia, the iconographic tradition related to the Okunev style was introduced to the natives of the Northwest coast of North America, specifically to Eskimos and Tlingit, and eventually further south to Indians of Mesoamerica and the Andes (Vasiliev et al. 2015: 489–538). In Western Eurasia, no such parallels are known.[14]

Judging by the Y-chromosome haplogroups, the Yeniseian-Burushaski linguistic relationship was established without biological admixture: the Burusho evidently speak a borrowed language.

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[13] A.S. Kassian (2010: 430) believes that this group includes also proto-Hurro-Urartian and Hattic.
[14] Certain publications refer to an Okunev petroglyphic mask allegedly discovered in the Gegam Mountains, Armenia. To all appearances, this reference is erroneous.

Genetically, they are unrelated to Kets and resemble their Pakistani neighbors (Qamar et al. 2002). As concerns the genetics and physical type of Yeniseians themselves, their well-known "southern" ties do not reach further than the Altai-Sayan highland. The genetic resemblance between Kets and the Okunev population is quite distinct (Flegontov et al. 2016). Cranial studies suggest that Okunev people can be described as "collateral relatives" of Native Americans (Kozintsev et al. 1999; see Kozintsev 2004, 2020b, 2021b, for references to genetic studies upholding our finding). At the genome-wide level, the connection manifests itself in the high content of the ANE component. These facts suggest that the Okunev people may be tentatively regarded as the ancestors of Yeniseians and, at the same time, "collateral relatives" of Na-Dene, in parallel with E. Vajda's hypothesis (Vajda 2010). G. Starostin's lexicostatistical data admittedly do not support this (see above), so a more moderate (and, in my view, quite plausible) proposal would be that Okunevans spoke one of DC languages (Kozintsev 2023). This idea is upheld by Eastern Siberian, Far Eastern, and Chinese parallels to Okunev culture, suggesting that these people could be collaterally related to Sino-Tibetans as well. Indeed, lexicostatistical data indicate a relationship between Sino-Tibetan and Na-Dene (Starostin G. 2015: 361 and his unpublished data at https://starlingdb.org/new100/eurasia_short.jpg; see Figs. 2 and 3). Maybe the language spoken by Okunev people was a link between both? This question appears incompatible with the fact that the split of proto-DC occurred in the 11th millennium BC whereas Okunevans lived in the late third–early second millennium BC and therefore could have spoken only one of the filial DC languages. The contradiction, however, arises only under the strictly genealogical model. Networks, which make allowance for areal ties (Figs. 4 and 5), demonstrate that this model is inadequate because contacts between filial branches could have persisted for a long time after their divergence.

Because, for chronological reasons, Okunevans could take part neither in the peopling of the New World nor in the proto-Sino-Tibetan migration to China (see below), they must be regarded as a relic group, which survived for several millennia in places from whence their ancestors had migrated in various directions. As to the Karasuk people, they might be related only to Yeniseians. A similar suggestion with regard to Xiongnu received no support (Savelyev and Jeong 2020).

Interestingly, the content of ANE is high in a population associated with so-called Steppe Maikop (Wang et al. 2019). Genetically it has little in common with Maikop proper, but displays ties with the Botai population of Northern Kazakhstan and Western Siberia, sometimes considered ancestral to Okunev (Jeong et al. 2019). This means that migrants from the east borrowed elements of the Maikop culture without hybridizing with the local population.

If, as I tried to demonstrate, the Maikop people were late proto-Indo-Europeans (Kozintsev 2018, 2019a,b), could the Steppe Maikop people have spoken proto-North Caucasian? There are indications that North Caucasian dialects were spoken by people associated with two cultures, Novosvobodnaya (possible ancestors of Northwest Caucasians) and Kura-Araxes, or Early Transcaucasian (likely ancestors of Northeast Caucasians and possibly of Hurro-Urartians) (Kozintsev 2019a,b; Kassian 2010: 423). Steppe Maikop could hardly be ancestral to any of them. Could it be associated with proto-Kartvelians? Or with people speaking a DC language that eventually went extinct? These questions cannot be answered. The only thing one can say is that in this case, too,

the migration was directed from the east to the west. Migrations in the opposite direction began later, only in the Yamnaya-Afanasievo age, and they were definitely related to the spread of Indo-European languages (Kozintsev 2021b).

I will finally touch upon certain geographic patterns in the distribution of DC languages that are relevant to the homeland issue. We note a number of parallels with the spread of Eurasiatic languages (Kozintsev 2020a). The reason is that the distribution areas of both macrofamilies largely overlap, and in both cases it is reasonable to assume that the source of migrations (or of demic diffusion or even of language spread alone) was situated neither in the westernmost nor in the easternmost parts of the area but in its central part. Such an assumption makes it easier to interpret parallels between languages vastly separated from one another, such as Indo-European and Eskaleut in the case of Eurasiatic, or Basque and Sino-Tibetan in the case of DCM (Fig. 1).

Discussing the ANE component, I have pointed to South Siberia, but this idea is based solely on the earliest find: Malta. In the case of Eurasiatic languages, certain considerations, admittedly indirect, suggest that the homeland was located either in the Trans-Caspian or, more likely, in Southeastern Kazakhstan or Zhetysu (Kozintsev 2020a). But wherever the presumed center is placed, the route of one of the filial branches (Indo-European in the case of Eurasiatic; North Caucasian-Basque in the case of DC) passed in the east-to-west direction: across Kazakhstan, Southwestern Central Asia, and northern Iran to the Caucasus, from there to Anatolia and, in the case of DC, further west, to Western Europe. The fact that the ANE component spread also along the northern route, across Western Siberia to Eastern Europe, suggests that some part of the pre-Indo-European and pre-Uralian population of those regions might have spoken now extinct DC languages.

Another direction is northward, down the great Siberian rivers: the Irtysh, the Ob, and the Yenisei. These were the routes whereby Uralians and Yeniseians arrived in the taiga zone. The third route passed in the northeastern direction, down the Lena and toward Beringia. In the case of Eurasiatic speakers, this was the route taken by proto-Yukaghirs, proto-Eskaleuts, and proto-Chukotko-Kamchatkans; in the case of DC speakers, by those who spoke proto-Na-Dene.

The fourth direction was eastward, along the corridor between the Tien Shan and the Mongolian Altai to Northern China. Among the Eurasiatic populations, this route was chosen by ancestors of the Altaic speakers. Among those speaking DC languages, proto-Sino-Tibetans migrated along the same path. Eventually both secondary homelands became close both in time and in space: the Altaic (or *Transeurasian*, as M. Robbeets calls it) homeland was likely situated in southern Manchuria in the 7th–4th millennia BC (Robbeets 2017), and the Sino-Tibetan homeland somewhat further south, in the middle Yellow River basin in the 6th–5th millennia BC (Sagart et al. 2019; Zhang et al. 2019).

CONCLUSION

What are the implications of all that? In the view of G. Starostin (2015: 366), while the age of both macrofamilies, Eurasiatic, or Narrow Nostratic, as he calls it, and DCM, is quite comparable, the latter's expansion began earlier, possibly much earlier, which accounts for the patchy distribution

pattern of DC languages. However, the most apparent, if not the only fact indicating an earlier spread of DC languages, is the Na-Dene migration. But the relative chronology of the arrival of, say, proto-Sino-Tibetan and proto-Altaic/Transeurasian in China is not known (see above), and it is not at all certain that the early appearance of the ANE component in the Caucasus suggests that DC languages appeared there likewise early or at least earlier than proto-Indo-European (Kozintsev 2019a,b). "Avalanche-like" migrations such as Andronovo (apparently Indo-Iranian) or the spread of Turkic languages across Eurasia, like a less impressive but still intense Uralization of the forest belt of Western Siberia and Eastern Europe are relatively recent events unrelated to the initial spread of Eurasiatic. These events may account for the patchy distribution of many DC languages.

As concerns the initial stages of the spread of Eurasiatic and DC languages, their relative chronology is unknown; moreover, their migration routes could be the same. Wasn't this parallelism caused by a deep relationship between the two macrofamilies and by their interlinked histories?

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THE ASSOCIATION FOR THE STUDY OF LANGUAGE IN PREHISTORY, INC.

Minutes of Meeting of the Board of Directors
October 22, 2023

The following members of the Board of Directors met on October 22, 2023 by means of a video conference call: Václav Blažek, John Bengtson.

The meeting was joined by the following officers: Peter Norquest, President; Gregory Haynes, Secretary; and Saundra McInnis, prospective Treasurer.

The meeting was also joined by the following members of the Council of Fellows: Irén Hegedüs (University of Pecs), Roger Blench (McDonald Institute for Archaeological Research).

And the following took place:

(1) Quorum. A quorum of the Directors of The Association for the Study of Language in Prehistory, Inc. ("ASLIP") was not recognized. John Robert Gardner, Michael Puett, and Michael Witzel were not able to attend. For this reason the decision was made to proceed with the meeting, but to later ratify any and all official decisions that are taken by conducting a meeting by unanimous written consent of the Board of Directors, as provided in the Corporation by-laws quoted below:

> 4.8 Action by Writing.
>
> Any action required or permitted to be taken at any meeting of the directors may be taken without a meeting if all the directors consent to the action in writing and the written consents are filed with the records of the meetings of the directors. Such consents shall be treated for all purposes as a vote at a meeting.

(2) Call to Order: Peter Norquest, as President, called the meeting to order at 11:35 am MST.

(3) Approval of Prior Minutes: On a motion by John Bengtson, seconded by Václav Blažek, the Board approved the minutes of the prior meeting with no one in opposition. That meeting was held by written consent, with all members of the Board of Directors having sent their

approval of the minutes. A record of these consents has been filed by the Secretary in the records of the meetings of the Board of Directors as required in the by-laws.

(4) Election of Directors: On a motion by John Bengtson, seconded by Václav Blažek, and without further discussion or objection, the Directors voted to elect the following individuals to serve as Directors: John Bengtson; Václav Blažek; John Robert Gardner; Michael Puett; Michael Witzel.

(5) Election of Officers: Peter Norquest introduced Saundra McInnis, an accountant whom he has worked with in other organizations in the Tucson area. Saundra answered questions from some of the officers and expressed her willingness to serve as ASLIP Treasurer. She agreed to prepare regular (quarterly) financial statements on a pro bono basis. On a motion by John Bengtson, seconded by Václav Blažek, the following individuals were elected as officers of ASLIP: Peter Norquest, President; Michael Witzel, Vice President; John D. Bengtson, Vice President; Gregory Haynes, Secretary/Clerk; Saundra McInnis, Treasurer.

(6) Financial Statements and Bank Balance: Due to technical difficulties, the financial report sent by John Bengtson was not received by the directors and officers in time for the meeting. John will resend this information as soon as possible, and everyone present agreed that this will be included as part of these minutes. On a motion by John Bengtson and seconded by Václav Blažek, the board agreed that the funds in the current ASLIP bank account will be moved to a new bank located in Tucson, AZ (bank to be determined). The signers on the account will be Peter Norquest, President, Saundra McInnis, Treasurer, and Gregory Haynes, Secretary. Following the meeting, John Bengtson sent a copy of the latest ASLIP bank statement showing a current balance of $25,129.98.

(7) Editor Report: John Bengtson reported that he, along with co-editor, Pierre Bancel, are in process of preparing the next issue of Mother Tongue Journal (MT24). They expect that the issue will be ready to publish by the end of the present calendar year. The number of submissions has been large and this will allow for some of these articles to be scheduled to be included in the following year's issue (MT 25). Both John and Pierre have been experiencing some health issues and so will be assisted by Greg Haynes where needed in preparing the files for publication. Several of the members present offered to help compiling obituaries for some prominent linguists who will be mentioned in the upcoming volume of Mother Tongue Journal.

(8) Council of Fellows: The unfortunate deaths of Vladimir Dybo and Raimo Anttila have reduced the membership of the ASLIP Council of Fellows to eight persons. The members agreed to leave this as is for the present, but to consider appointing additional members at the next annual meeting. Nominations will be accepted over the course of the coming year.

(9) Discussion about a possible ASLIP conference: The possibility of holding an ASLIP conference sometime in the future was discussed. Peter Norquest suggested Tucson, Arizona as a possible venue because he has access to a facility there that could accommodate up to 50 participants. It seemed agreeable to the members present that some type of hybrid format, which would include both in-person and remote participation would be the most viable structure for the conference.

(10) Adjournment: The meeting was adjourned at 12:21 pm.

Submitted by Gregory Haynes, ASLIP Secretary