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Baltic and Slavic present a bewildering variety of forms for ‘gravel’, among them Lith. *žviřgždas*, *žviřždas*; *gařgždas*, Latv. *zvirgzdi*, OPrus. **zvir(k)stan* (Mažiulis IV 174 f.), Rus. dial. *зверсмá*, *зресмá*, and Pol. *żarstwa*; there is a single non-Balto-Slavic cognate which Būga (II 684) includes here: Avestan *zarštva-* n. ‘stone’. Although these (and related) forms are phonetically similar enough to suggest a common ancestor, the reconstruction of such a form has thus far eluded specialists. Vasmer (I, 398 s. v. *зверсмá*) says of the set, “затруднительна фонетическая сторона” and according to Brückner (1957, 668 s. v. *żwir*, which he includes here), “nie ma drugiego słowa o równie chwiejnej postaci”. In this paper, I address the phonetic difficulties connected with the comparanda and suggest a PIE etymon.

The most thorough treatment of the Baltic forms in this set remains Urbutis (1983), who attempts to derive both Lith. *žviřgždas*, together with its Baltic and Slavic cognates, and Lith. *žvỹras* ‘gravel’ from a Balto-Slavic **žuir-*, representing the reduced grade of a PIE verbal base **ǵuer-* ‘to shine’ (= Pokorny 479 *ǵuer-*, *ǵuerǝ-* ‘leuchten, heiß sein’). In this approach, *žviřgždas* is seen as an older, Balto-Slavic derivative in suffixal *-st-*, while *žvỹras* is presented as a considerably later deverbal derivative with lengthened grade (167).

But this analysis, which is endorsed by Mažiulis (IV 175 s. v. *swixtis*) and Karulis (II 574 s. v. *zvirgzdi*), falls short on both semantic and formal grounds. Semantically, a connection between ‘gravel’ and the verbal notion ‘shine’ is not obvious, whatever the secondary associations of the latter (Urbutis suggests a semantic development ‘shine’ > ‘crumble, fall apart’, which is difficult to follow). Moreover, an Indo-European **ǵuer-* ‘shine’ is itself not well-established: the etymon is represented outside of Balto-Slavic only in Indic, and a number of the Indic comparanda (in *-l-*) are reassigned by LIV 170 to a base **ǵuelH-* ‘brennen, flammen’. On the phonetic side, Urbutis follows Trautmann (1923, 375, *žuirsta-* masc. ‘Kies’) in treating the *-zd-* suffix (which occurs in both Baltic and Slavic) as resulting from the assimilation of an original *-st-* to the word-initial voiced segment, a process which seems to have no precedent. More fundamentally, the analysis fails to account in a convincing way for the apparent cognates, both Baltic and non-Baltic, which lack a *-v-*

before the root syllabic (e.g., Rus. *зрества́*, Pol. *zarstwa-*, Avestan *zarštva-*; Lith. *gařgždas*).

Before proceeding to an alternative analysis, it would be useful to present the full set of comparanda, arranged according to stem shape, with critical notes. Unless otherwise noted, all terms are glossed as ‘gravel’:

***ǵvr̥s(-sn-)**: Couronian (kursenieku) *zvirksnis* (ME IV 778).

***gv̥rs(-i-)**: Rus. dial. *звршь*, *-и*. (ПООС VI 148): “То же, что гверздá”.

***ǵvr̥st-**: OPrus. **zvir(k)stan* Mažiulis (IV 174f.), following Bezenberger (1897, 309; 1922, 197), corrects EV 350 *swixtis* ‘clay pot’ to **swirxtis*, which he interprets as the relative adjective **zvir(k)stīs* to a neuter substantive **zvirkstan* ‘gravel, sand’, with reference to the admixture of gravel to pottery clay. An OPrus. **zvirkst-* is supported by the place name *Swyrxten* (1414), *Schwirgstein* (Būga III 523).

***gv̥rst-**: Rus. dial. (Novgorod, Pskov) *зрестá* (ПООС VI 148; СРНГ VI 158; Vasmer I 398 f.; Dal’ I, 852; ООВЯ 36). ORus. *зрестá* (СРЯ IV 13f.), *зврста* (Zaliznjak 2004, 45).

***gv̥rst(-i-)**: ORus. *зресть* (fem.) (СРЯ IV 13f.). SCr. *zvřst* (masc.) ‘eine Art weichen Steins’. Skok (1973, 668) suggests that this is Slavic secondary palatalization (of *gv-* clusters before a front vowel) rather than an original palato-velar.

***ǵr̥st-stv-**: Avestan *zarštva-* ‘stone’.

***ǵr̥stsv-**: Rus. dial. *жрстvá* (СРНГ IX 144; Dal’ I 1332); Rus. dial. *жёрстvá* (ПООС X 214). Also *жрстvéц* (ПООС X 214). BRus. *жарстvá* (Urbutis 1983, 157). Ukr. *жорстvá*. (O?)Pol. *zarstwa*, *żerstwa* (Brückner 1957, 668) ‘coarse sand’.

***gv̥rstsv-**: Rus. dial. (Novg.) *зрестvá* (СРНГ VI 158).

***grestv- (*gr̥stsv-?)**: Rus. dial. (Pskov) *зрестvá* (ПООС VIII 16; СРНГ VII 134 (also *зрестá*); Dal’ I 970; ООВЯ 42; Vasmer I 456).

***ǵvr̥zd-**: Žem. *žvirždas* ‘gravel, coarse sand’ and E. Aukšt. *žviřgdždas*; also Daukša *žvirzdas* (4), Sirvydas *žvirždai*; Lith. *žvirgžda* (LKŽ XX 1140 = *žvirgždas*), *žvirgždos* (pl.) (Kurschat 1883, 529 s. v. *žvizdra*), *žviržda* (Vidugiris 1998, 815), Latv. *zvirgzdi*, *zvirzda* (= *zvirzde* ‘kiesiger Boden’ ME IV 777). Here also is Lith. *žvizdra* (Kurschat 1883, 529) and *žvizdras*, with metathesis of the *-r-*, from *žvirždas*.

***gv̥rzd-**: Rus. dial. *зврздá* (ПООС VI 147); *зврзда* ‘галька’ (СРНГ VI 158); ONovg. *зврзда* (Zaliznjak 2004, 45).

***ǵr̥st-**: *жёрста* (ПООС IX 143). Fraenkel (I 137) mentions Pol. *żerśc* ‘Sandstein’.

***grest- (*gr̥st-?)**: *грестли́вый*, *грестля́вый* (to a **зрестá*) (ООВЯ доп. 37).

***gv̥rd-**: *звердá* (ПООС VI 147); *зверди́вый*: гвердивый камень “род рассыпающегося камня” (СРНГ VI 157).

B ū g a (I 442 f.) includes among these forms Lith. *gaĩgždas* ‘gravel’ and Latv. *gargzda* ‘grauer, sandiger Boden’ (ME I 602), which would give us an *o*-grade base ***gorzd-** (with epenthetic *-g-*). Finally, F r a e n k e l (II 1329) adduces a Russian *жверсть* as a synonym to *зверста́* ‘grober Sand’, and directs us to Vasmer. V a s m e r (I 398), however, has *хверсть*; Fraenkel apparently misread the *x* as a *ж* and so in effect has added a “ghost form” to the literature. Vasmer’s citation can be compared with D a l’ (IV 1175) *хвершь, хверша* “мелкий природный щебень или хрящ”.

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Several generalizations can be drawn from these data. First, with the exception of *gaĩgždas*, *gargzda*, the Baltic forms, like the Avestan, show a satem treatment of the initial velar, while the Slavic forms have a centum reflex; note that the Novgorod-Pskov dialectal data characteristically lack secondary palatalization of the velar in *зверста*, etc. (Z a l i z n j a k 2004, 45). Secondly, the internal Baltic *-g-* (~ *-k-*) is an epenthetic velar, rather than an integral part of the root, since we have the alternation Lith. *žviĩgždas* (with a post-velar *-ž-*: B ū g a I 280): *žvirzdas*. And thirdly, while the bases typically occur as *ā*-stems in Slavic, the latter are also known in Baltic: Latv. *zvirgzda* is (except for the satem treatment of the initial, and the epenthetic *-g-*) an exact match for Rus. dial. *зверзда́*. In fact, the various similarities across both Baltic and Slavic, considered in more detail below, oblige us to seek a single solution which will satisfactorily account for the entire set of Baltic and Slavic data.

Among the more striking features shared by both Baltic and Slavic is the alternation between an internal voiceless cluster (**zvir[k]stan*, *зверста́*) and a voiced cluster (*žviĩzdas*, *зверзда́*), and the correlation of a “mobile *-v-*” with these clusters: while the voiced cluster is never followed by a *-v-*, the voiceless cluster often is, at least in Slavic: *зверста́, žarstwa-*; note also Av. *zarštva-*. In fact, this *-v-* seems to “float”, appearing either as part of this voiceless cluster, as above, or before the root syllabic (*žviĩzdas*, *zvirgzdi*, *зверста́, zvrst*), or in both places (Rus. dial. *зверста́*).

The question of the “mobile *-v-*” in our data set can be resolved in a rather straightforward fashion if we assume that this *-v-* was originally part of a suffix; indeed B ū g a (II, 684) analyzes Slavic **žbrstva* (of Rus. dial. *жверста́*, Ukr. *жорста́*, Pol. *żarstwa-*) together with Av. *zarštva-* [sic] as **g^h_r-s-tuā*, separating out a suffix *-tu-* without further comment. Forms like *зверста́*, beginning with *gv-*, *žv-*, would then show an anticipatory displacement of the *-v-* from the suffix to the root, with Rus. dial. *зверста́* representing an intermediate stage in which the *-v-* is preserved in the suffix. This same development is seen in SCr. *čvrst*, *čvrsta* and Slovene *čvrst* (also *črstav*) ‘solide’, Bulg. *чврѣст, чврѣст* from **čbrstvā* (cf. Rus. *чѣрствый*),

from a base **čbrst-*, an enlargement in *-t-u-* of the root **krt-* of **čbrte-* ‘to cut’, Lith. *kiřsti*. Crucially, an unrelated word for ‘gravel’ in the Slavic languages shows precisely the same development: standard Russian *дзесчá* (17th c. *дзесчá*: СРЯ IV 355) ‘gravel’ is attested dialectally (Pskov) as both *дзесчá* and *дзесчá* (СРЯ VII 283) with the same anticipation or displacement of the suffixal *-v-* in **дзесчá* (\approx OPol. *dziarstwo*); the Russian examples find a parallel in OPol. *dźwiarstwo* (SłStp II 343) (i.e., **dvbrstvo* \approx Rus. *дзесчá*) from OPol. *dziarstwo* (SłXVIw VI 323) (**dbrstvo*) and in SCr. dial. *dvřsta*, *dvřst* f. to *dřstva* ‘rodzaj drobnego wapienia używanego w garncarstwie jako domieszka do gliny’ (SłPS V 53; note Mažiulis’ explanation of OPrus. **zvirkstīs*, above). SłPS *loc. cit.* establishes the protoform of the latter set as **dřsty*, *dřstve* ‘piasek, żwir’, derived by a *-tū* suffix, with an inorganic *-s-*, from **dřti* (**dbrati*, *derō*).

On the model of the parallel **dřsty*, *dřstve*, we can assume that forms such as *зресчá*, *жесчá*, *żarstwa*, Av. *zarštva-* reflect the original position of the *-v-*, as part of a *-tu-* (?-*tū*) suffix. The addition of this suffix (presumably a collective, which would accord well with this typically mass noun) to a root ending in *-zd-* will give, with devoicing, the desired set of alternants in *-st-*, with or without the mobile *-v-* (i.e., **g^(h)řzd^(h)-tu-* > **g^(h)řstū-*). In this way we can account for the forms with a voiced cluster (which is original) alongside forms in a voiceless cluster (resulting from devoicing of the former before a suffix beginning with *-t-*).

The Avestan *zarštva-* ‘stone’ (**gřstv-*), which we surely would not want to separate from *жесчá*, *żarstwa*, has been analyzed by Charpentier (1910, 167) (cf. also Būga II 684) without reference to the Slavic forms as the *z*-less **gřher-d-tu-*, a conflation of the *d*-final base (with nasal infix) of Gr. *χέραδος* (**gřher-ŋ-d-o-*) ‘the gravel and silt brought down by rivers, shingle’ and the *tu*-final base (again with nasal infix) of Germ. **grundu* (**gřhr-ŋ-tu-*): Engl. *ground*. While this analysis, if supportable, could easily be extended to the corresponding Baltic-Slavic forms with an internal *-st(v)-*, it cannot directly account for the *-z-* in those forms which have internal *-zd-* clusters. If we wish to avoid appealing to a wide-ranging contamination of stems (i.e., internal *-z-* introduced under the influence of Charpentier’s *-s-*), an appropriate PIE base for the *-zd-* forms must be sought.

In the present analysis, the internal *-zd-* would represent the final element of a root of the approximate shape **g/g^(h)řzd^(h)-*. In purely formal terms (the semantics are dealt with below), the most obvious candidate for such a root is PIE **gřerzd^(h)-* ‘barley’ (Pokorny 446), **g^(h)řsd^(h)-* (Beekes 1995, 35), the zero grade of which is found in Lat. *hordeum* (**gřřsdhejom*) and OHG *gersta*. The corresponding base in Slavic would be **gbrzd-* > **žbrzd-* and in Baltic **žirzd-*, the difference simply being a centum or

satem treatment of the initial velar. These forms are represented in Slavic by Rus. *зверзѡá* and in Baltic by Lith. *žvirzdas* / Sirvydas *žvirždai*, dial. *žviržda*, and (with epenthetic velar) Lith. *žvirgždas*, Latv. *zvirgzds*, dial. *zvirgzda*, all with intrusive *-v-* from parallel forms with an *-tu-* suffix. Baltic also shows the *o*-grade **g^horzd^h-*, this time with a centum treatment of the initial velar, in Lith. *gařgždas*, Latv. *gargzda*, and without the *-v-*.

Most of the remaining forms can be explained by appealing to the aforementioned *-tu-* suffix (**g^hrzd^h-tu-*), giving Slavic **žbrstu-*, which in fact is the form with the broadest distribution throughout this family: Rus. dial. *жерствá*, BRus. *жарствá*, Ukr. *жерствá*, (O)Pol. *żarstwa*, *żerstwa*. With an anticipatory metathesis of the *-v-* (which must be quite early, since the Slavic forms lack first palatalization of velars), we get Rus. dial. and ORus. *зверствá* and OPrus. **zvir(k)stan* (representing an earlier **zirstva-* > **zirsta-*). Other forms, such as ORus. *зверствь* and SCr. *zvřst*, would be explained as a contamination with the originally more widespread **grstv-* variant, analogous to the above-mentioned SCr. dial. *dvřst* f. to *đřstva*.

While the semantic relation between ‘barley’ and ‘gravel’ may not at first seem obvious, the metaphoric extension of terms for cereal grains to granular referents is familiar enough: many European languages use ‘barley’ to denote a sty (on the eye): Germ. *Gerstenkorn*, Fr. *orgelet*, Rus. *ячмень*. With reference to granular aggregates such as gravel, Koivulehto (1999, 236 ff.), citing SKES (IV 1077), presents the instructive example of Fi. *sora* ‘Kies, Grieß’ and Ersä Mordv. *šuro*, Mokscha Mordv. *šorã* ‘Getreide, Korn’, representing a Finnic-Volgaic **šora* (SKES, *loc. cit.*), ultimately a borrowing (according to Koivulehto), presumably Baltic, from PIE **koro-*, the source of Lith. *šaras*, *pašaras* ‘fodder’ (the same root, in the shape **ker-s-ion*, underlies OHG *hirso* ‘millet’). Koivulehto’s justification for this connection is worth quoting: “gerade die Hirsekörner sind klein und rund, sehen wie Sand-, Grießkörner aus” (237). Koivulehto similarly derives Fi. *hieta* ‘sand’ from a pre-Germanic **sēda-/sēto-* ‘seed’. Finally, in the English phrase “pea gravel”, we apply the name for another type of kernel to specify a type of gravel, based on shape. Along these lines, we can imagine the original term for barley being extended to describe types of gravel in both Baltic and Slavic, then become restricted in meaning to ‘gravel’, with neologisms, differing in each language family (Baltic **maiž-*, Slavic **ječьту, ječьтен-*), eventually replacing the original word for ‘barley’.

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