



Malzahn, Melanie, Fellner, Hannes A. & Illés, Theresa-Susanna (2022, eds.), *Zurück zur Wurzel. Struktur, Funktion und Semantik der Wurzel im Indogermanischen. Akten der 15. Fachtagung der Indogermanischen Gesellschaft von 13. bis 16. September 2016 in Wien*, Wiesbaden, Reichert, ISBN 978-3-7520-0642-1, pp. 339 + vii.

As said in the subheading, the volume gathers the proceedings of the fifteenth Conference of the *Indogermanische Gesellschaft* (Wien, 13th-16th September 2016) and comprises 23 articles, a short introduction and a rich index (of subjects, words and morphemes, and text passages). The aim of the work is overtly declared in the introduction (p. vii): «Back to the root was a programmatic choice. [...] Despite the prominence of the root concept [...] the properties of the root have received little attention in the way of detailed investigation [...]. Our goal for this Fachtagung was to present a first step in this direction and we believe that the paper in the volume collectively achieved this goal».

The anthology comprises two main thematic cores, depending on the perspective from which the prominence of the root concept is analysed. The first thematic core – by far the most explored – comprises 21 case studies concerning the formal or semantic properties of specific PIE roots or groups of PIE roots and their historical outcomes. The root properties that attracted most attention are suppletivism and verbal aspect or actionality, which featured in many papers in the anthology. A wide interest in adjectival roots and their relation with Caland suffixes can also be mentioned as a qualifying feature of this *Fachtagung*. The second thematic core comprises two papers that critically discuss the *Natur der Wurzel*, that is, the descriptive utility and the function of the root concept and its status in our contemporary theory of language.

Since the papers of the first thematic core are numerous, they can be divided into four groups depending on the type of property and the type of root discussed in each of them. The first group of works focuses on the formal properties of PIE roots in general. Adiego discusses the syllabic law that forbids the presence of two non-syllabic resonants at the end of the root (e.g. *\*kelm-*, *\*d<sup>h</sup>eyr-*, etc.): the law explains forms such as *\*ph<sub>2</sub>tér-m* (acc.) > *\*ph<sub>2</sub>tér-ṛ* > Gk. πατέρα, with the vocalisation of the *nasalis sonans*, or *\*dyéw-m* > *\*dyém* > Skt. *dyám* and PIE *\*g<sup>w</sup>ów-m* > *\*g<sup>w</sup>óm* > Skt. *dyám*, with assimilation *\*-wm* > *\*-mm*, simplification *\*-mm* > *-m* and compensatory lengthening. Melchert analyses the PIE roots of structure *\*(C)aC*, arguing that, despite Lubotsky's traditional claim (1989), there is a quantity – though limited – of Hittite materials that ensure the presence of PIE roots with primary *\*a* and quantitative ablaut *\*a/ā/Ø*: e.g. PIE *\*kwas-* 'to kiss' > Hitt. *k(u)wašš-*, but *\*kus-* > Gk. κυνέω, or PIE *\*math<sub>2</sub>-* > scr. *pra-mat<sup>h</sup>-* 'to steal', but Gk. Προμηθεύς 'Prometheus', lit. 'thief' from *\*māth<sub>2</sub>-*. Not as certain as the former, though possible according to Melchert, is also the presence of PIE roots of type *\*CaC* with qualitative ablaut *\*a/o/ē*: e.g. PIE *\*kaput-* 'head, horn' > Lat. *caput*, long grade in Hier.Luv. (CORNU) *ki-pu-tā-/ki-pu+ra/i-* 'horn' < *\*képut-o-*. Zair reconstructs a new PIE root with primary *\*a*: PIE *\*h<sub>1</sub>aw-* 'to perceive' > Hitt. *au<sup>i</sup>-* 'to see', Ved. *uvé* 'I see', O.Ch.Sl. *umъ* 'mind' and Lith. *aumuō* 'understanding, intellect' < *\*h<sub>1</sub>aw-mōn-*; with enlargement *\*-d<sup>h</sup>h<sub>1</sub>-*, see Gk. ἡσθόμεν 'I perceived' and Lat. *audio* 'I hear' (on this word, see also Giura 2016); with *\*-o-* grade, see Gk. ὁτομαι 'I believe', Lat. *omen* 'omen'. According to Zair, the terms 'bird' in the IE languages (Lat. *avis*, Arm. *haw*) can be traced back to this root, given the close relation between birds and omens in PIE culture. The results of both articles are convincing and the sections on PIE primary *\*a* and on the outcomes of *\*h<sub>3</sub>-* in Anatolian (Melchert, p. 197; Zair, p. 306) question Klockhorst's traditional view (i.e. absence of root initial primary *\*a-* in PIE, see Klockhorst 2006), arriving at results fairly similar to those in Alfieri (2010) and Pooth (2015: 122-124) – on the topic see also Di Giovine (2006). Steer discusses the so-called *Parallelwurzeln*, that is, PIE roots that show the same meaning and similar forms which diverge by one phoneme, typ-

ically the sonority of the root final stop or the alternate presence of an *\*y*-diphthong: e.g. *\*h<sub>2</sub>eng-* ‘to bend’ vs. *\*h<sub>2</sub>enk-* ‘id.’ and *\*b<sup>b</sup>leg-* ‘to shine’ vs. *\*b<sup>b</sup>leyg-* ‘id.’. In the first case, the allomorphy is imputed to the voice assimilation of the root final stop to the first consonant of the suffix: e.g. *\*h<sub>2</sub>ep-b<sup>b</sup>is* ‘in waters (loc.pl.)’ > *\*h<sub>2</sub>abb<sup>b</sup>is* > O.Pers. *abiš* with degemination and Skt. *adb<sup>b</sup>is* with dissimilation, but also *\*nog<sup>w</sup>-t-* ‘night’ > Lat. *nox, noctis*. In the second case, the allomorphy is supposed to depend on the presence of an infix *\*ey/y-* or *\*ye/y-*, which might originate from the metathesis of the verbal suffix *\*ye/o-* in the roots ending in laryngeals: i.e. *\*CeH-ye-* > *\*CeyH-e-*.

The second group of works focuses on the formal properties of some groups of roots in PIE or in historical IE languages, rather than on the structure of the PIE root in general. Bock and Ziegler discuss Germanic roots in *-p*, which can arise from PIE roots ending with the rare phoneme *\*b-*, or – but less likely according to the Authoresses – to PIE roots ending in *\*p-* or in *\*b<sup>b</sup>-* through the so-called Kluge’s law (i.e. *\*Cn-’* > *\*CC-’*, see PIE *\*h<sub>1</sub>erb<sup>b</sup>-nó-* > PGerm. *\*erpp<sup>a</sup>-* ‘red-brownish’ > O.Nor. *jarpr*, O.H.G. *erpf*): two interesting examples of PGerm. *\*p-* < PIE *\*b-* are found in PGerm. *\*χupi-* ‘hip’ < PIE *\*k/<sup>k</sup>ewb(h<sub>2</sub>)-* ‘to lie down’ and PGerm. *\*χrōpe-* ‘to call’ < PIE *\*k/<sup>k</sup>reh<sub>2/3</sub>b-*. Kim proposes an insightful review of Tocharian verbal roots with internal *a*, which can be traced back to PIE roots with a primary or secondary internal laryngeal: see PT *\*t<sup>a</sup>aka-* ‘to pierce, bite’ < PIE *\*d<sup>b</sup>eyHg<sup>w</sup>-* and PT *\*(s)taka* ‘to be’ < *\*sth<sub>2</sub>-k-* < PIE *\*steh<sub>2</sub>-*. The model for this phonetic change is represented by Tocharian roots with final *-a*, which can derive from PIE roots *ultimae laryngalis* (e.g. TB *śala*, md. *klāte* ‘he led, brought’ < PIE *\*kelh<sub>1</sub>-*), but also from analogical changes that took place within the Tocharian verbal system (e.g. TA *rāpā* ~ *rāpā* ‘to dig, plough’ with secondary *a* restored in the preterit to distinguish it from the *ə*-present). Plötz addresses the reconstruction of PIE *tenues adspiratae* and especially the so-called Siebs’ law (i.e. PIE *\*sb<sup>b</sup>-* > *\*sp<sup>b</sup>-* > Arm. *p<sup>b</sup>-*) and the Armenian outcomes of PIE *\*p-* > Arm. *h/zero*, PIE *\*sp-* > Arm. *sp-*, PIE *\*sb<sup>b</sup>-* and *\*(s)ph<sub>2</sub>-* > Arm. *p<sup>b</sup>-*. The discussion is detailed and well conducted, but recalling the results obtained by the other scholars who discussed the outcome of PIE voiceless aspirated stops

in Armenian (Belardi 2006: II, 234-235 and 221-223), Indo-Iranian (Joseph 2013) and Greek (De Decker 2015) could have made the research even more far-reaching. Svensson analyses the ablaut of PIE roots of structure *\*TReT*, *\*(T)REH-* and *\*RET* in the Balto-Slavic verbal system, especially the restructuration of the PIE ablaut that characterised the PIE roots with this phonological structure in single Slavic or Baltic languages, with special regard for the outcomes of the zero grade *\*TRT*.

The articles on the suffixes *\*-went-* and *\*-b<sup>h</sup>o-* are thematically more peripheral than the other works in this group, but they are highly insightful for the specialist. Oettinger is concerned with the suffix *\*-went-*, which is thought to arise from the merger of two homophone suffixes: the possessive suffix *\*-went-* (only rarely *\*-wont-*), which originated from the merger of the suffixes *\*-wen-/ \*-w<sub>n̥</sub>-* and *\*(e)t-* (see Lat. *locuplēs* ‘rich’, lit. ‘whose place (*locus*) is full (cf. *plē-nus*)’); and the comparative suffix *\*-wont-*, held to arise from the merger of the pronominal suffix of contrastive meaning *\*-wo-* and the “individualising” suffix *\*-ent-*. Suffix etymologies are never as certain as full word etymologies, given the small phonological body of suffixes, but Oettinger’s proposal is insightful and further elaborates on the sound results obtained in the analysis of the suffix *\*-wo-* (Oettinger 2017a). Pinault discusses the PIE suffix *\*-b<sup>h</sup>o-* which occurs in names of animals and colours and arose from the grammaticalisation of two PIE root nouns: *\*-b<sup>h</sup>o-* ‘having the look of X’ from the root *\*b<sup>h</sup>eh<sub>2</sub>-* ‘to shine’ (see Ved. *b<sup>h</sup>ā-* ‘shining, light (fem.)’), and *\*-b<sup>h</sup>wh<sub>2</sub>-ó-* ‘which is (become) X’ from the root *\*b<sup>h</sup>ewh<sub>2</sub>-* ‘to be, to become’ in the form *\*-b<sup>h</sup>wh<sub>2</sub>-ó- > \*-b<sup>h</sup>wó- > \*-b<sup>h</sup>ó-*. According to the Author, quite a few Tocharian roots in *-p* arose from old compounds with *\*-b<sup>h</sup>ó-* as second member, which underwent lexicalisation and were stored in the lexicon as non-compositional wholes: e.g. TA, TB *tsälp-* ‘to pass away, be released, be redeemed’ < PIE *\*dl̥h<sub>1</sub>-b<sup>h</sup>ó-*, a governing compound meaning ‘becoming distant, remote → moving to a different place or status, passing away to the released status’. A further case of this compound type is TB *kwīpe*, TA *kip* ‘shame, modesty’ < TC *\*kwäyipa* < *\*kwäñi-pa* ‘having regard, watching for penalty, atonement’: a former governing compound built on the abstract noun

\**kwi-néy-* ‘expiation, punishment’ and the suffix \**-b<sup>h</sup>ó-*, or at least the suffix \**-ph<sub>2</sub>ó-* arisen from the grammaticalisation of the *Wurzelnomen* \**-ph<sub>2</sub>ó-* < PIE \**peh<sub>2</sub>-* ‘to watch, to protect’. Pinault’s research idea is original and the new etymologies proposed are convincing.

The third group of works analyses the morpho-semantic properties of PIE roots and of their outcomes in single IE languages, rather than their formal properties. Becker and Roth discuss the suppletive roots \**derǵ-* and \**speǵ-* and their outcomes in Vedic, suggesting that Skt. *darś-* refers to a more phenomenal seeing, similar to Engl. ‘to see’ and It. ‘vedere’, while Skt. *paś-* refers to a more intentional seeing, similar to Engl. ‘to watch’ and It. ‘guardare’. García Ramón studies the PIE roots \**ǵ<sup>h</sup>er-* ‘to enjoy, desire’ and \**ǵ<sup>h</sup>ews-* ‘to taste’, which are both defective but have a different destiny in Greek and in Vedic: namely, both roots remain defective in Vedic (pres. *hárya-*, aor. *juṣá-*, pf. *ju-jóṣ-*), while each root develops a full, independent paradigm in Greek (χαίρει/o- vs. γέυει/o-). The philological analysis of the passages – especially of collocations – is commendable and the idea that two roots must not only share the same meaning to be considered as suppletive, but they also have to be in complementary distribution and show a single constructional pattern is sound. Ittzés offers an insightful study on the Vedic root *kr-* ‘to do, make’ in the typological perspective of “generalised action verbs”, that is, pro-verbs (or light verbs) used in contexts in which the nature of the event is underspecified or is referred to by a complementing noun phrase: e.g. Engl. *What have you done?* or NPers. *goft kardan*, lit. ‘to make speech → to speak’: starting from Schultze-Berndt’s semantic map of generalised action verbs (2008) and an in-depth analysis of Vedic passages, the Author discusses the functions of the Sanskrit root *kr-* (e.g. verb of manufacturing and creation, causative marker, verbaliser with ideophones, quotative verb, etc.). Jasanoff investigates the PIE root \**ǵ<sup>wh</sup>en-* ‘to kill’: unlike most PIE roots, which build root presents if durative and atelic (e.g. \**h<sub>1</sub>ey-* ‘to go’ > ved. pres. *éti*), but root aorists if punctual and telic (e.g. \**ǵ<sup>wh</sup>eh<sub>2</sub>-* ‘to go’ > ved. aor. *ágāt*), the PIE root \**ǵ<sup>wh</sup>en-* builds the root present \**ǵ<sup>wh</sup>én-ti* > Skt. *hánti*, but also a series of non-present root-based formations (e.g. reduplicated aorist *ǵ<sup>wh</sup>e-ǵ<sup>wh</sup>ne/o-* > Gk. ἔπεφνον, perfect \**ǵ<sup>wh</sup>eǵ<sup>wh</sup>(ó)n-* > Skt. *jag<sup>h</sup>āna*,

etc.). Rieken and Yakubovich discuss the Anatolian outcomes of the PIE pronominal-like root *\*al-*, which is continued in different forms: the form *\*al-yo-* ‘other’ is found in many IE languages (Lyd. *alā* ‘other’, Lat. *alius*, Gk. ἄλλος, Goth. *alja*), while *\*al-o-* is continued only in Anatolian and Tocharian (Luw. *ala/i-* ‘far’, TB *aletstse* ‘enemy, stranger’, *ālo* ‘differently’); and *\*al-wo-* and *\*al-osyo-* appear only in Anatolian (H.Luw. *\*alwann(i)-* > *alunn(i)-* ‘enemy’, Luw. *alašša/i-* ‘wild’) – to the forms discussed in the paper also *\*al-i-* > Skt. *arī-* ‘stranger’, Lat. *alis* ‘other’ might be added (LIPP 21-27). Inglese applies Croft’s cognitive-constructionist approach (2001, 2012) to the study of lexical aspect in Hittite verbal roots with middle inflection: while some Hittite verbs are compatible with a single aspectual value (e.g. *ar-ta(ri)* ‘to stand’, *iya-tta(ri)* ‘to march’, etc.), others are compatible with several values (e.g. *lāizziye/a-tta(ri)* ‘to be/become good’, *zāb-i* ‘to hit (act.)’, to fight (md.)’, etc.). The presence of lexical roots that are compatible with more aspectual values (that is, “labile verbs” in Kulikov 2014 or verbs “a doppia inzializzazione” in Benedetti 2002) represents an important feature of the Hittite lexicon and a possibly productive standpoint for studying causative alternation in PIE and Vedic discussed by Lazzeroni (2004, 2014, 2017). Luraghi tackles the relation between valency and diathesis in PIE, based on a selection of Greek, Hittite, Gothic and Sanskrit data: according to the Authoress, after a first phase in which diathesis was lexically determined and PIE was basically a “transitivising” language (that is, a language with mainly intransitive roots, which can be transitivised through derivational processes), the middle voice developed the new function of “detransitivising” transitive-causative predicates (i.e. “oppositional middle”). In this second phase, neither diathesis was primary, as happens in Classical Greek or post-Vedic Sanskrit, where the middle voice is often derived from the corresponding active. The hypothesis underlying Luraghi’s paper is certainly stimulating. However, discussing the presence of quite a few PIE roots with transitive meaning in LIV<sup>2</sup> or considering the results obtained by Lazzeroni in his works on the PIE middle (1990, 2002) could prove useful with a view to future research. Zorman analyses the PIE root *\*deh<sub>3</sub>-* ‘to give’ and its Anatolian reflexes in Hitt. *da-*, which is usually glossed as ‘to

take' in dictionaries, but is also compatible with the meaning 'to give', according to the Author (see, e.g., KBo 8.35 iii 6 and KUB 3.1 ii 49).

The fourth group of works focuses on adjectival roots, that is PIE roots which refer to a quality meaning and may or may not show a verbal component. Höfler offers a rich and detailed analysis of the PIE roots *\*mewk-* '(to be, become, make) slimy' and *\*dlewk-* '(to be, become, make) sweet' and their derivational structure, which is largely based on the use of Caland suffixes. Lühr analyses adjectival roots with polar meaning in Hittite (long/short, big/small, wide/narrow, etc.) and concludes that the positive member of Hittite polar couples of adjectives is of PIE origin far more often than its negative counterpart: e.g. Hitt. *ta-luki* 'long' < PIE *\*delh<sub>g</sub>ʰ-* vs. *man(n)i(n)nkuwant-* 'short', which lacks any agreed PIE etymology. Nussbaum offers a skilful analysis of some adjectival roots in PIE and the derivational chains that these roots build up in PIE or in single IE languages by means of Caland suffixes. Not unlike Höfler, who reconstructs the verbal component of PIE adjectival roots within brackets, Nussbaum shows that distinguishing "true" adjectival roots from verbal roots is difficult in PIE, especially when the adjectival roots in question build non-denominative verb stems. A common assumption shared by Nussbaum and Lühr, though not by Höfler, is that the so-called basic adjectival notions (long/short, wide/narrow, thin/fat, high/low, etc., see Dixon 2004: 3-5) should be coded by primary adjectival lexemes across languages, and thus also in PIE (Lühr, p. 168). However, it might be worth noting that Bozzone (2016) claimed that Pre-PIE was a language with verb-like adjectives in the lexicon and Caland suffixes were the main tool for building derived adjectives starting from verbal roots of quality or near-quality meaning. As a confirmation, the relation between Caland suffixes and root-based verbal morphology has been recalled by many Authors in recent years (e.g. Rau 2009, 2013, 2017); Höfler's adjectival roots show a verbal component; and the classification of Rig-Vedic Sanskrit as a language with verb-like adjectives at the level of lexicon, but with noun-like adjectives at the level of syntax, is at the bottom of Alfieri's functional-typological definition of the notion of root in Sanskrit and PIE (2009, 2016, 2021, see below for discussion).



The second thematic core of the anthology is smaller than the first and includes two articles, one by Bertocci and one by Keydana, which tackle directly the *Natur der Wurzel*, that is, the “reality” of the PIE root concept, its descriptive utility and its status in contemporary theory of language. Since I have explored the topic in former works (see below), I would like to discuss it here in a little more detail. On the whole, the works by Bertocci and Keydana represent the latest outcomes of a complex chapter in 19th-century linguistics, which Belardi rightly labelled as «the root controversy» (2002: I, 256-272, 2008) and which, unfortunately, was left in shadow in the volume<sup>1</sup>. In a nutshell, the controversy is simple. Some of the most important Indo-Europeanists of the 19th century, such as Humboldt, Pott, Benfey, Delbrück, Brugmann and Hirt, thought that the PIE root was a useful unit of analysis in practice, but, rigorously speaking, it was an unreal unit: a scientific fiction and an abstract notion that resulted from the method of morphemic parsing employed by Indian grammarians in the case of Sanskrit roots, or from the comparative method in the case of PIE roots<sup>2</sup>. However, this idea did not gather general consensus. Other, highly distinguished, scholars such as Bopp, A. Schlegel, Saussure, Meillet and Pagliaro thought the exact opposite: they believed that the PIE root was not an invention of grammarians; it rather was «a reality for the speaking subject», as Saussure said (1922: 256) – but this, obviously, only in the case in which the speaker in question really spoke a language “with roots”, like Sanskrit and Arabic, or at least PIE, and not a language in which standard nominal, adjectival or verbal words were stored in the lexicon, like Latin or English<sup>3</sup>.

<sup>1</sup> On the root controversy in 19th-century IE linguistics, besides Belardi’s works, see JUQUOIS (1976: 1-70); MORPURGO DAVIES (1996: 204-205, 360-363); BERTOCCHI (2006); BOLOGNA (2008); ALFIERI (2014a, 2017) and BOLOGNA & DEDÉ (2022).

<sup>2</sup> See HUMBLDT (1936: 75-6); POTT (1833: 147); BENFEY (1852: 71); DELBRÜCK (1888: 75); BRUGMANN (1906: II.1, 5-6) and HIRT (1927: 147); for a comment on these passages, see BELARDI (2002: I, 256-272) and ALFIERI (2014a, 2016: 129-136).

<sup>3</sup> See BOPP (1833-1859: 105, but also 1824: 126, 1827: 71-2); for a comment on these passages, see ROUSSEAU (1984) and ALFIERI (2014, 2017). The “reality” of the PIE root claimed by Meillet directly descends from Saussure’s view, while PAGLIARO’s root concept (1962: 24) is the result of a personal elaboration (see BELARDI 2002: I, 265).



The success of theoretical morphology from the mid 20th century onwards made the root controversy more complex, without solving it. The detractors of the reality of the root relied on word-based morphological theories for claiming that the input form for all PIE word-formation rules was, rigorously speaking, a simple verbal stem, not a root (e.g. Kuryłowicz 1935: 131, 1977: 35, 102). And they also claimed that the PIE lexicon was made up of full words, neither roots nor morphemes, since in general «ein Wortschatz besteht jedoch nicht primär aus Wurzeln, sondern aus Lexemen», as Wachter (1998: 199) said in the proceedings of the X *Fachtagung* of the *Indogermanische Gesellschaft*. On the other hand, the supporters of the reality of the PIE root leaned upon morpheme-based theories for proposing a definition of the PIE root modelled on that in Semitic: a pure consonantal template of shape *\*CeC* which was “moved” by vowel patterns (accent and ablaut) and discontinuous affixes, as proposed by Meillet (1934<sup>7</sup> [1903<sup>1</sup>]: 116), followed by Belardi (1985, 1990)<sup>4</sup>. Moreover, they also showed that a change in the structure of the proto-typical PIE word – the linguistic sign par excellence in Saussure’s view – took place in the history of the IE family: the proto-typical PIE word passed from an inside structure of type “root-suffix-ending”, like the one that is customarily reconstructed in PIE and often found in Sanskrit, to a structure of type “stem-ending” or “word-Ø”, like the ones commonly found in Latin, in English and, more in general, in modern and Western IE languages<sup>5</sup>.

This two-century-long dispute represents the background of Bertocchi’s and Keydana’s works. Bertocchi starts from the idea that the PIE root is a “real” linguistic unit and describes the change from the typical PIE root-based morphology to the stem-based morphology that is typical of Latin within a framework close to Marantz’s *distributed morphology* (1990, 1993). According to the Author, the change began from the

<sup>4</sup> The definition of the PIE root as a consonantal template is implicit in SAUSSURE’s *Memoire* (1878) and is at the bottom of BENVENISTE’s theory of the root (1962<sup>3</sup> [1936<sup>1</sup>]: 149), as well as of POOTH’s definition of the PIE root structure (2004): however, Benveniste and Pooth do not take a final stance on the reality of PIE roots.

<sup>5</sup> Besides Belardi’s works, see CIPRIANO (2001, 2007); DI GIOVINE (2001); DI GIOVINE, FLAMINI & POZZA (2007); ALFIERI (2018). For an independent confirmation of this idea in a different theoretical framework, see COWGILL (1963).

reanalysis of the sequence  $*eh_2-$  > Lat.  $-\bar{a}-$ : however, the reanalysis did not start in the roots *ultima laryngalis* (i.e. PIE  $*steh_2-ye-ti$  >  $*st\bar{a}-e-ti$  > Lat. *stāt*), as proposed by Rix (1999), but in PIE and Proto-Latin denominative verbs built on feminine abstracts in  $*eh_2$ : the denominative verb  $*k^{(w)}oys-eh_2-ye-ti$  >  $*k^{(w)}oys-\bar{a}-e-ti$  > Lat. *cūr-ā-t* was built on the PIE abstract noun  $*k^{(w)}ois-eh_2$ ; in this and its similar contexts, the sequence  $-\bar{a}-$  was reinterpreted as a verbal suffix of agentive meaning; later on, the suffix  $-\bar{a}-$  spread over PIE verbal roots of non-agentive value which had lost their verbal counterpart and had become purely adjectival roots between PIE and Proto-Latin; eventually, the suffix blurred its agentive semantic content, got fused with the verb stem and became a stem vowel in Latin. Whatever etymology is preferred for Lat.  $-\bar{a}-$ , Bertocchi's proposal is original and there is little doubt that the reanalysis of this suffix as a stem vowel represents a key step in the change from root- to stem-based morphology (on this topic, see also Alfieri 2016: 142-144). More in general, casting the research within distributed morphology is a thought-provoking proposal. Many supporters of the reality of the PIE root consider the root as a "precategorial" unit (e.g. Bopp, Belardi, Alfieri) and roots are, by definition, precategorial units in distributed morphology. The matching between the two fields thus seems natural. However, the supporters of the reality of the root consider precategoriality as the distinctive feature that opposes Sanskrit and PIE roots to Latin and English nominal, verbal and adjectival stems, which are "monocategorial" (that is, they are already specified as [+ noun], [+ verb] and [+ adjective] in the lexicon). On the other hand, precategoriality is the general condition of all lexical elements in distributed morphology, where roots represent abstract bundles of semantic-syntactic features, rather than real morphemes. The contrast between the two root concepts does not impair Bertocchi's work, which focuses on his etymological proposal and leaves the theoretical problems in the background, but remains an aspect which is worth reflecting upon<sup>6</sup>.

<sup>6</sup> In *distributed morphology*, the term *root* (or *formative*) refers to a bundle of abstract features which has no phonological content and is totally neutral from the categorial point of view, but is the input form for syntactic rules (BORER 2014): roots obtain their phonological specification only post-syntactically, at a spell-out, when they merge with the functional heads (*n*, *v*, *a*) that make them nouns, verbs and adjectives (ACQUAVIVA 2009; HARLEY 2014). The exact way

Totally opposite to this is Keydana's approach. According to the Author, the root concept and, more in general, all morpheme-based approaches are the product of a theoretical mistake originally made by Indian grammarians, which thence passed to Arabic grammarians and to 19th-century Indo-Europeanists (p. 131-132). In this view, the root concept may be a "convenient tool for reconstruction and analysis" but is in fact only "a façon de parler" (p. 141): an abstract unit that is unreal from the psycho-linguistic point of view and not very useful from the descriptive point of view (p. 132). Thus, Keydana proposes an in-depth critical review of all proofs in favour of the reality of roots, that is, the phonological and morphological processes that are commonly described using the root-morpheme as a significant unit. His main polemic targets, therefore, are represented by the constraints on the type of stops allowed in PIE roots (namely, the absence of PIE roots of type *\*\*deg-* and *\*\*teg<sup>b</sup>-*), which can be imputed to the general rarity of voiced and voiceless stops in PIE phonological system, as suggested by Iverson & Salmons (1992: 304). Then, Grassmann's and Bartholomae's laws, which can be re-written as laws concerning syllable structure in general, rather than the root-morpheme, following the path already marked by Keydana himself (2004) and Byrd (2015). And finally, the Sanskrit word-formation system, which could be better described using a word-based approach: as Keydana says, the identification of roots in the Sanskrit morphological system "relies heavily on phonological identity" (p. 137) of the allomorphs of the roots, but such "identity" is more apparent than real, since the allomorphs of the roots that are needed to build derived nouns, verbs and adjectives are not really predictable, as shown in forms such as 3pl. *g<sup>b</sup>anti* (p. 140) with respect to the root *han-* 'to kill', or the ppp. *ūd<sup>b</sup>á-* with respect to the root *vah-* 'to carry' (p. 132); and when they are predictable they hide stem-based formations basically, as it is shown in adjectives of the *cákri*-type, which are built on the perfect stem (Lazzeroni 2012; Grestenberger 2013), and with agent nouns in *-itar-* built on causative stems (p. 139).

in which the merger is achieved is currently under debate: see DE BELDER & CRAENENBROECK (2015); ALEXIADOU & LOHNDAL (2017) and EMBICK (2021) for discussion. For a recent account on Ancient Greek stem vowels in this framework, see GRESTENBERGER (2022).

The structure of the argumentation is clear and Keydana's proposals are thought-provoking, but the discussion does not always do justice to the arguments of those who consider the root as a real unit. For instance, the PIE root coincides with a syllable: thus, Grassmann's and Bartholomae's laws can be rewritten using the syllable as a significant domain, especially if PIE roots are under scrutiny. But the traditionally morpheme-based account of these laws proposed by De Angelis (2006, 2020) is also perfectly possible and perhaps more fit to describe the single language outcomes of Grassmann's law such as Gk.  $\tau\rho\acute{\epsilon}\phi\omega < \text{PIE } *d^b\text{reb}^b-$ , where synchronic syllabification is  $\tau\rho\acute{\epsilon}.\phi\omega$ , but Grassmann's law follows morpheme boundaries. In the same vein, there is no doubt that irregular derivatives to be stored in the lexicon are found also in Sanskrit and the same holds true as for stem-based derivatives, like those described in the so-called *tadd<sup>b</sup>ita* derivation of Indian grammarians. But these cases are "proofs" against the reality of the root only for those who already follow a word-based approach: for others, they represent the external fringes of a word-formation system which, by and large, is coherently root-based and regular enough to have been described through root-based rules since the 4th century BCE<sup>7</sup>. In other words, for those who consider the Sanskrit root as a "real" unit, its identification does not rely on the *identity* of its allomorphs (or they would not be *allo*-morphs): it is the presence of regular formal changes paired with similarly regular semantic changes that guarantee the *identifiability* of the allomorphs of the root, that is the outbreak of patterns of word-formation based on mental networks between roots, suffixes and derivatives that the speakers can use and re-used productively, as foreseen by Bybee & Slobin (1982) and Bybee & Moder (1983, see Bybee 2007: chap. 5-6).

<sup>7</sup> Besides word-formation, also Sanskrit composition presents some difficulty in word-based approaches (MOLINA-MUÑOZ 2013, replying to KIPARSKY 2009). In constructions of the *asamart<sup>b</sup>a*-type (lit. 'which have not the same meaning', see Patañjali, *Mah.* I.360.20), which are also known as "loose construction compounds" (WHITNEY 2000 [1924<sup>5</sup>]: 515, § 1316) only one member of the compound is modified by a genitive: in *devadattasya gurukulam* [Devadatta(M).GEN.SG teacher-family(N).NOM.SG] 'Devadatta's teacher's family', the genitive *devadattasya* refers only to the compound's member *guru*- 'teacher', not to the full word *gurukulam* 'teacher's family'.

However, besides these aspects, which indeed can present a certain degree of subjectivity, it is a bit strange that Keydana avoids any reference to the template-and-pattern morphology, which is one of the most important proofs of the “reality” of the root concept in Belardi’s and Meillet’s ideas (see Alfieri 2016: 129-136 and 157-159 for discussion). Differently put, if we say that the PIE root has a structure of type *\*CeC*, but the quality and the presence of the vowel are determined by the ablaut *\*e/o/Ø*, as claimed by Benveniste (1962<sup>3</sup> [1936<sup>1</sup>]: 149) and written in LIV<sup>2</sup> (p. 5), we are actually saying that the PIE root is a pure consonantal template no different from the Semitic one, but Indo-Europeanists are used to spelling out the point where the ablaut occurs through an *e*-sign (PIE *\*b<sup>h</sup>er-* ‘to carry’), while Semitists indicate it through an *a*-sign (Ar. *kataba* ‘to write’) or through a dot (Ar. *k.t.b.* ‘to write’). However, if the root is a pure consonantal template, while the word (or, more precisely, the simple verb stem) includes the vowel – Belardi concluded – the root is a different unit from the word formally and the speakers manipulate roots (not words) when they join them to vowel patterns to build words<sup>8</sup>. Needless to say, one may or may not agree with a similar view, but considering it may be worthwhile.

More in general, there are three aspects of the root controversy that were not addressed in the proceeding of this *Fachtagung*, but may be of some interest. The first concerns psycholinguistics. According to Keydana, «psycholinguistic studies offer substantial evidence that roots are not units of storage [...] in the mental lexicon» (p. 141). However, the works by Blevins (2003, 2006), Bergen (2004) and Hay & Baayen (2005) quoted to support this view do show that the word-based approach is useful for describing inflectional paradigms in Russian, Estonian, Georgian, Saami and Western Germanic language-

<sup>8</sup> The definition of the root as a consonantal template is traced back to Arabic grammarians; it was accepted in the first comparative grammar of the Semitic languages in the West (RAVIO 1650, see ALFIERI 2017) and was canonised by Bopp in Hebrew scholarship (ROUSSEAU 1984). Its re-definition in the terms of American Structuralism by HARRIS (1946: 166) and in the terms of European Structuralism by CANTINEAU (1950a,b) is at the bottom of almost all contemporary Semitic scholarship, from FLEISCH (1961-69), to MCCARTHY (1979, 1981) and ARAD (2005), despite the presence of some rare opponents (LARCHER 1995; RUBIO 2005).

es, but do not say anything about root-based approaches to Sanskrit and Arabic word-formation. Rather, Hay and Baayen propose a highly intriguing continuistic approach to morphological analysis which, in principle, is not incompatible with the idea that word-based and morpheme-based approaches can be the two extremes of a continuum. On the other hand, if psycholinguistic works on Semitic languages are looked at more specifically, it emerges that, at present, scholars are divided between those who consider the root as a real unit of lexical storage and those who reject this view. But quite a few scholars believe that the root is a real unit for the brain of Hebrew and Arabic speakers, as claimed by Shimron (2002). Here again, these scholars may or may not be right, but at present psycholinguistics does not seem to offer substantial evidence in either direction<sup>9</sup>.

The second aspect concerns the history of language sciences. The idea of a direct influence of Pāṇini on Sibawayhi and Al-Ḥalil, which Keydana takes for granted (p. 131), is possible, though not certain. It is true that the Sanskrit word scr. *vyākaraṇa*- ‘grammatical analysis’ is found in Pahlavi as *ʔyʔkrn* (*Dēnkart* IV.99-100, see Scharfe 1977: 80, n. 20). Moreover, according to an anonymous treatise on Hebrew grammar of the Karaite school, the birthplace of Semitic grammar was Eṣfahān (Khan 2001: 84), where fathoming a connection with Sanskrit grammar is easy. And, indeed, Danecki has proposed a direct dependence of Arabic phonological theories on Indian ones. However, besides the generic presence of the root, it is difficult to see any specific, systematic connection in metalanguage or terminology (e.g. Skt. *dʰātu*- means ‘base, fundament’, but Ar. *ʾaṣl*- means ‘root, trunk’), in the kind of topics discussed in grammatical treatises and in their ordering within treatises, or in the style of rules between Indian grammar and the Arabic tradition. As a confirmation, Law (1990) considers the similarities between the two fields only as chance resemblances. The topic may seem marginal, but is not: if Arabic grammar stemmed from Indian

<sup>9</sup> On the polemic on the psycholinguistic reality of the Semitic root, see PRUNET *et al.* (2000); BOUDELAA & MARSLÉN-WILSON (2000, 2001, 2004a, 2004b); DAVIS & ZAWAYDEH (2001); IDRISSEI *et al.* (2007) on Arabic; DEUTSCH *et al.* (1998); FROST *et al.* (1997); VELAN *et al.* (2005) and BERMAN & SEROUSSI (2011) on Hebrew.

lore, the discovery of the root may really be the product of a single error. The polygenesis of the same error, however, is less probable. In this case, it would be easier to see the root as the brilliant intuition of two populations deeply interested in linguistic facts which spoke two genetically different languages that showed a similar structure in the units of lexical storage and the functioning of word-formation.

The last aspect of the problem is typological. Since I have discussed it at length elsewhere (Alferi 2009, 2016, 2018, 2019, 2021, and Alferi & Gasbarra 2020), I will not repeat what I have already said. But a few notes may prove useful. Most works on PIE adjectival roots start from the idea that PIE should have a class of adjectives that is basically identical to that in English or in Latin. However, PIE lexicography is not fully consistent with this view. If we consider only “content” lexemes (nouns, verbs and adjectives) and exclude *Wanderwörter* and the like, Pokorny’s IEW (1959) comprises 1,191 primary lexemes, which are so divided: 927 verbal roots (77.8%), 233 primary nouns (19.6%), 31 primary adjectives (2.6%). The picture does not change much if we bring together the lexical entries in LIV<sup>2</sup> with those in NIL: LIV<sup>2</sup> comprises 1,182 verbal roots, while NIL lists 116 verbal roots which are found also in LIV<sup>2</sup>, but also 74 primary nouns and 17 primary adjectives. On the whole, therefore, the two lexica total 1,275 primary lexemes, which are so divided<sup>10</sup>: 1,182 verbal roots (92.7%), 74 primary nouns (5.8%) and 19 primary adjectives (1.5%). See Figure 1a/b:

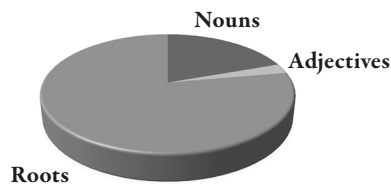


Figure 1a. The structure of PIE lexicon (IEW).

<sup>10</sup> The verbal roots that are present in NIL but absent in LIV<sup>2</sup> are: *\*ǵemH-* ‘to marry’ (which Kümmel would add to LIV<sup>2</sup>, see *Addenda und korrigenda zu LIV<sup>2</sup>* <http://www.indogermanistik.uni-jena.de/dokumente/PDF/liv2add.pdf>) and a few roots that lack primary verb derivatives (namely, *\*dey-*, *\*ǵʰes-*, *\*sendʰh<sub>1</sub>-*, *\*sriHg-* and *\*swedʰh<sub>1</sub>-*).



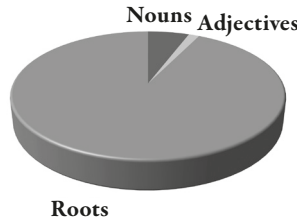


Figure 1b. The structure of PIE lexicon (NIL + LIV<sup>2</sup>).

In short, whatever dictionary is used as a reference, the lexical structure of PIE differs from that in Latin or in English, where adjectives represent a large class of primary lexemes ideally on a par with that of nouns and verbs. But the lexical structure of PIE is not very different from that in Rig-Vedic Sanskrit, barring the fact that nouns are more numerous in this case. As a confirmation, pronouns and particles excluded, Grassmann's WzRV comprises 1,007 primary lexemes, which are so divided: 565 verbal roots (56.1%), 410 primary nouns (40.7%) and 35 primary adjectives (3.2%). See Figure 2:

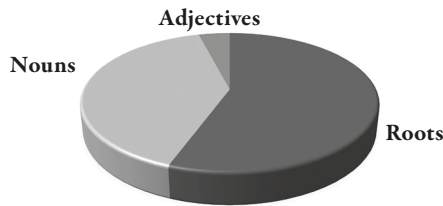


Figure 2. The structure of RV Sanskrit lexicon (WzRV).

Needless to say, we can claim that Figure 1a/b is a diachronic illusion, that is a product of the comparative method, and Figure 2 is a synchronic illusion, that is the product of the morpheme-based approach of Indian grammarians. However, the lexical structures above – especially that in Sanskrit, where primary nouns are more abundant – have nothing exceptional on the cross-linguistic level. Rather, they are almost identical to the lexical structures of languages “without adjectives”, which have been deeply studied by typologists since Dixon (1977, 2004), Hengeveld (1992) and Bhat (1994); it is worth remember-

ing that in typological studies languages “without” adjectives include also languages with few adjectives, since in both cases the prototypical “adjectival” meaning (that is, basically the quality concept) is coded through noun-like or verb-like items, and the prototypical “adjectival” function (that is, basically the quality modifier) is coded through complex constructions built on noun-like or verb-like lexemes; and when typologists speak of “adjectives”, they refer to classes of simple morphemes, not to classes of derived stems (Dixon 2004: 2)<sup>11</sup>.

Now, some of the languages “without” adjectives are hyper-analytic (e.g. Lao), others highly polysynthetic (e.g. Koasati). Between the two extremes, there is a group of fairly synthetic languages in which the most typical quality modifier (i.e. the “adjective” in typological terms) is represented by a participle or a participial-like nominalisation built on a verb of quality or near-quality meaning: e.g. Garo, Urarina, Chemehuevi, Yimas, West Greenlandic, etc. (Alfieri 2014b). Arabic can fall into this group, since Arabic adjectives are built on verbal roots of quality or near-quality meaning through the same vowel patterns that build other derived nominals (e.g. *sādiq* ‘true’ like *kātib* ‘writer’, *sa‘b* ‘hard’ like *dars* ‘studying’, etc. see Wright 1979 [1896]: 106). And RV Sanskrit can be cast in this group as well, since the most typical quality modifier construction in a corpus of 52 hymns of the Rig-Veda is a derived adjective built on a root of quality or near-quality (e.g. *śubhṛá-* ‘beautiful’ from *śubh-* ‘to make/become beautiful’, *dāśvāms-* ‘pious’ from *dāś-* ‘to sacrifice, celebrate’, see Alfieri 2016, 2021). If a similar description of Sanskrit and Arabic is accepted, the root in diachronic meaning can also be an abstract notion (that is, a unit of the linguist, which is unreal for speakers), but in its synchronic meaning, the Sanskrit and the Arabic root is only the verbal lexeme of a language with few primary adjectives stored in the lexicon: a real unit which, however, is different from the Latin simple verb stem in its function (it also builds the most typical adjectives) and its categorial status (it represents a “major” lexical class out of two, not of three).

<sup>11</sup> Languages with “small” classes of adjectives range from those with only 2-3 primary adjectives (e.g. Yimas) and those with 30-40 adjectives (e.g. Swahili), but they typically show about 10-20 adjectives (DIXON 2004: 10).

Differently put, the Indo-Europeanist who is also interested in typology tends towards setting up the discussion on the *Natur der Wurzel* asking primarily: do all languages have the same threefold structure of the lexicon (nouns, verbs, adjectives) or can languages differ in both the number of classes that are stored in the lexicon (three vs. two) and the type of unit that are stored (i.e. morphemes vs. words)? And if the lexical structures can vary, do we have to use the same word-based approach to describe all languages? Only after answering these questions can we wonder whether the lexical structure of Sanskrit, Arabic and PIE is more similar to that in Latin or to that in the languages “without” adjectives, and consequently, if the most suitable approach for describing the structure of the lexicon in Sanskrit, Arabic and PIE is the word-based approach commonly employed in the grammars of Latin and the modern European languages or the morpheme-based approach that is commonly used to describe (poly)synthetic languages without adjectives. Needless to say, opinions can vary also in this respect, but considering the problem can be useful also for those who consider the Sanskrit, Arabic and PIE root as an unreal unit.

Last but not least, the typological aspect of the root controversy has an interesting side-effect on PIE reconstruction, which brings us back to the adjectival roots and Caland suffixes discussed in this *Fachtagung*. The literature on the topic is huge and cannot be reviewed here in detail (for a history of the question, see Dell’Oro 2015). However, it is well known that Caland derivation can be interpreted in two ways (already Nussbaum 1976: 4-5, 100-105). It can be a system of “internal” derivation (that is, derivation via suffix “substitution”) that starts from already suffixed adjectives, as Oettinger (2017b) and Nussbaum (p. 211) tend to prefer. But it can also be a system of “external” derivation (that is, derivation via suffix addition) that starts from verbal roots, as suggested by Rau (2009, 2013, 2017) and Bozzone (2016). Clearly, the two hypotheses are not mutually exclusive and scholars discuss at length which derivative is better interpreted within the one or the other scenario – as a confirmation, see the discussion on the proofs for defining a given root as “adjectival” in Nussbaum’s and Höfler’s above-mentioned papers. However, if the input form for Caland derivation is a

PIE adjective, then it is more probable that PIE had “true” adjectives like Latin, that Caland derivation works via suffix substitution and the term *root*, in synchronic meaning, is but a different label for referring to what in fact is a simple verb stem. On the other hand, if the starting point of Caland derivation is a verbal root, then it is more probable that RV Sanskrit and PIE are languages “without” adjectives in the lexicon, that Caland derivation works via suffix addition and the Sanskrit (or Arabic, or PIE) root is a real linguistic unit, which is different from the simple verb stem formally and functionally. As said, the two options are not mutually exclusive, but pointing out the link between the root controversy, Caland suffixes and PIE adjectival typology can be worthwhile whichever idea on the *Natur der Wurzel* is preferred.

In sum, the anthology edited by Malzahn, Fellner and Illés gathers a large number of papers, which are all of a high – in some cases extremely high – level, as often happens in the proceedings of the *Indogermanische Gesellschaft*. Moreover, the programmatic choice to go *zurück zur Wurzel* and the attention to the root controversy represent an original feature of this *Fachtagung*, which cannot but be looked upon favourably by this writer. Therefore, there is no doubt that the volume represents a fundamental acquisition for any library and any researcher interested in PIE studies.

Luca Alfieri  
Dipartimento di Scienze umane  
Università Guglielmo Marconi  
l.alfieri@unimarconi.it

### *Riferimenti bibliografici*

- ACQUAVIVA, P. (2009), *Roots and lexicality in Distributed Morphology*, in GALANI, A. & REDINGER, D. & YEO, N. (eds.), *Fifth York-Essex Morphology Meeting*, York, University of York (“York Papers in Linguistics” series 2, issue 10), pp. 1-21.
- ALEXIADOU, A. & LOHNDAL, T. (2017), *The structural configurations of root categorization*, in BAUKE, L. & BLUMEL, A. (eds.), *Labels and Roots*, Berlin - Boston, de Gruyter, pp. 203-232.

- ALFIERI, L. (2010), *Radici indoeuropee inizianti in \*#V-, l'esistenza di \*a- primaria e l'esito di \*#h<sub>3</sub>e- in anatolico*, in «Historische Sprachforschung» 123, pp. 1-39.
- (2014a), *The arrival of the Indian notion of root into Western linguistics*, in «Rivista degli Studi Orientali» 87.2, pp. 59-84.
- (2014b), *Qualifying modifier encoding and adjectival typology*, in SIMONE, R. & MASINI, F. (eds.), *Word Classes. Nature, Typology and Representations*, Amsterdam - Philadelphia, John Benjamins, pp. 119-139.
- (2016), *The typological definition of the (apparently historical) notion of root*, in «Archivio Glottologico Italiano» 102.1, pp. 129-169.
- (2017), *A proposito di Thomas Lindner, 200 Jahre Indogermanistik (Salzburg-Wien 2016), ovvero la rilevanza della Grammer di Ravid (1648) per la storia della linguistica indoeuropea*, in «Archivio Glottologico Italiano» 102.2, pp. 225-237.
- (2018), *La definizione tipologica della radice e la teoria del segno lessicale*, in ALFIERI, L. & BENVENUTO, M. C. & CIANCAGLINI, C. A. & DE ANGELIS, A. & MILIZIA, P. (a cura di), *Linguistica filologia e storia culturale. In ricordo di Palmira Cipriano*, Roma, Il Calamo, pp. 25-44.
- (2019), *L'aggettivo vedico tra derivazione e lessico*, in «Acme» 72.2, pp. 173-192.
- (2021), *Parts of speech comparative concepts and Indo-European linguistics*, in ALFIERI, L. & ARCODIA, G. F. & RAMAT, P. (eds.), *Linguistic Categories, Language Description and Linguistic Typology*, Amsterdam - Philadelphia, John Benjamins, pp. 313-366.
- ARAD, M. (2005), *Roots and Patterns: Hebrew Morpho-Syntax*, Dordrecht, Springer.
- BELARDI, W. (1985), *Considerazioni sulla ricostruzione dell'indoeuropeo*, in AMBROSINI, R. (a cura di), *Tra linguistica storica e linguistica generale. Scritti in onore di Tristano Bolelli*, Pisa, Giardini, pp. 39-66.
- (1990), *Genealogia, tipologia, ricostruzione, leggi fonetiche*, in BELARDI, W. (ed.), *Linguistica, filologia e critica dell'espressione*, Roma, Il Calamo, pp. 155-218.
- (1993), *Sulla tipologia della struttura formale della parola nelle lingue indoeuropee*, in «Rendiconti dell'Accademia Nazionale dei Lincei. Classe di scienze morali, storiche e filologiche», s. 9, v. 4, f. 4, pp. 525-570.
- (2002), *L'etimologia nella storia della cultura occidentale*, 2 voll., Roma, Il Calamo.
- (2003-09), *Elementi di armeno aureo*, 3 voll., vol. I: *La scrittura, il sistema fonologico* (2003); vol. II: *Le origini indoeuropee del sistema fonologico armeno aureo* (2006); vol. III: i. *Repertorio delle voci armene di origine indoeuropea*;

- ii. *Formazione lessicale e composizione*; iii. *Elementi di morfologia pronominale* (2009), Roma, Il Calamo.
- (2008), *Le "unità di lingua concrete", la parola e la frase*, in «Incontri Linguistici» 31, pp. 11-39.
- BENEDETTI, M. (2002), *Radici, morfemi nominali e verbali: alla ricerca dell'inacusatività indoeuropea*, in «Archivio Glottologico Italiano» 87.1, pp. 20-45.
- BENVENISTE, É. (1962<sup>3</sup> [1936<sup>1</sup>]), *Origines de la formation des noms en indo-européen*, Paris, Adrien-Maisonneuve.
- BERGEN, B. K. (2004), *The psychological reality of phonaesthemes*, in «Language» 80, pp. 290-311.
- BERMAN, R. & SEROUSSI, B. (2011), *Derived nouns in Modern Hebrew: Structural and psycholinguistic perspective*, in «Rivista di Linguistica» 23.1, pp. 105-125.
- BERTOCCI, D. (2006), *Sulla nozione di radice indoeuropea*, in BORGHI, G. & RONZITTI, R. (a cura di), *Atti del terzo, quarto e quinto incontro genovese di studi vedici e pāṇiniani*, Milano, Qu.A.S.A.R., pp. 35-51.
- BENFEY, TH. (1852), *Handbuch der Sanskritsprache: Vollständige Grammatik der Sanskritsprache zum Gebrauch für Vorlesungen und zum Selbststudium*, vol. I: *Grammatik*, Leipzig, Brockhaus.
- BHAT, SH. D. N. (1994), *Adjectival Categories*, Amsterdam, John Benjamins.
- BLEVINS, J. P. (2003), *Stems and paradigms*, in «Language» 79.4, pp. 737-767.
- (2006), *Word-based morphology*, in «Journal of Linguistics» 42, pp. 531-573.
- BOLOGNA, M. P. (2008), *Dal mistero della 'radice' alla storia della 'parola'*, in «Incontri Linguistici» 31, pp. 91-100.
- & DEDÈ, F. (2022), *Un'analisi contrastiva della Zergliederung di Franz Bopp: la radice tra indoeuropeo e semitico*, in BRUGNATELLI, V. & MAGINI, L. (a cura di), «*Suaditi?*» *Scritti di amici e colleghi in memoria di Francesco Aspesi*, Milano, Centro di Studi Camito-Semitici, pp. 57-66.
- BOPP, F. (1824), *Vergleichende Zergliederung des Sanskrits und der mit ihm verwandten Sprachen*, in «Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin, philosophische-historische Klasse» 1824, pp. 117-148 [repr. (1972), *Kleine Schriften zur vergleichende Sprachwissenschaft*, Leipzig, Zentralantiquariat der deutschen demokratischen Republik, pp. 1-33].
- (1827), *Ausführliches Lehrgebäude der Sanscrita-Sprache*, Berlin, Dümmler.
- (1833-52), *Vergleichende Grammatik des Sanskrit, Zend, Griechischen, Lateinischen, Litthauischen, Gotischen und Deutschen*, 3 voll., Berlin, Druckerei der Königlichen Akademie der Wissenschaften.
- BORER, H. (2014), *The category of roots*, in ALEXIADOU, A. & BORER, H. & SCHÄFER, F. (eds.), *The Syntax of Roots and the Roots of Syntax*, Oxford, Oxford University Press, pp. 112-148.

- BOUDELAA, S. & MARSLÉN-WILSON, W. (2000), *Non-concatenative morphology in language processing: Evidence from Modern Standard Arabic*, in «SWAP-2000», pp. 23-26.
- & ——— (2001), *Morphological Units in the Arabic Mental Lexicon*, in «Cognition» 81, pp. 65-92.
- & ——— (2004a), *Abstract morphemes and lexical representation: The CV skeleton in Arabic*, in «Cognition» 92, pp. 271-203.
- & ——— (2004b), *Allomorphic variation in Arabic: Implications for lexical processing and representations*, in «Brain and the Language» 90, pp. 106-116.
- BOZZONE, CH. (2016), *The Origin of the Caland System and the Typology of Adjectives*, in «Indo-European Linguistics» 4, pp. 15-52.
- BRUGMANN, K. & DELBRÜCK, B. (1886-1916), *Grundriss der vergleichenden Grammatik der indogermanischen Sprachen*, 4 voll., vol. I: *Einleitung und Lautlehre* (1886, K. Brugmann); vol. II.1: *Lehre von den Wortformen und ihrem Gebrauch. Allgemeines. Zusammensetzung (Komposita). Nominalstämme* (1906, K. Brugmann), Strassburg, Trübner.
- BYBEE, J. (2007), *Frequency of Usage and the Organization of Language*, Oxford, Oxford University Press.
- & MODER, C. L. (1983), *Morphological classes as natural categories*, in «Language» 59, pp. 251-270.
- & SLOBIN, D. I. (1982), *Rules and schemas in the development and use of the English past tense*, in «Language» 58, pp. 265-289.
- BYRD, A. M. (2015), *The Indo-European Syllable*, Leiden, Brill.
- CANTINEAU, J. (1950a), *Racines et schèmes*, in MARÇAIS, W. (ed.), *Mélanges offerts à William Marçais*, Paris, Maisonneuve, pp. 119-124.
- (1950b), *La notion du schème et son altération dans diverses langues sémitiques*, in «Semitica» 3, pp. 73-83.
- CIPRIANO, P. (1988), *Le implicazioni metodologiche e fattuali della teoria di W. Be-lardi sull'indoeuropeo*, in «Studi e Saggi Linguistici» 28, pp. 101-126.
- (2001), *Il ruolo delle etimologie iraniche nello studio dell'indoeuropeo preistorico*, in BENEDETTI, M. (a cura di), *Fare etimologia. Passato, presente e future nella ricerca etimologica. Atti del convegno tenutosi presso l'Università per Stranieri di Siena, 2-3 ottobre 1998*, Roma, Il Calamo, pp. 107-120.
- (2007), *Evoluzione tipologica e mutamento fonologico nell'area del persiano*, in «Rendiconti dell'Accademia Nazionale dei Lincei. Classe di scienze morali, storiche e filologiche» s. 9, v. 18, f. 1, pp. 21-80.
- COWGILL, W. (1963), *A search for universals in Indo-European diachronic morphology*, in GREENBERG, J. H. (ed.), *Universals of Language*, 2 voll., Cambridge, MIT Press, pp. 114-141.



- CROFT, W. (2001), *Radical Construction Grammar*, Oxford, Oxford University Press.
- (2012), *Verbs: Aspect and Causal Structure*, Oxford, Oxford University Press.
- DANECKI, J. (1985), *Indian Phonetical theory and the Arab grammarians*, in «Rocznik Orientalistyczny» 44, pp. 127-134.
- DAVIS, S. & ZAWAYDEH, B. A. (2001), *Arabic Hypocoristic and the status of consonantal root*, in «Linguistic Inquiry» 32, pp. 512-520.
- DE ANGELIS, A. (2006), *A.ind. dhehí, dehí e la legge di Bartholomae come processo di "terapia linguistica"*, in «Archivio Glottologico Italiano» 91.1, pp. 3-30.
- (2020), *The "phonetic prehistory" of Grassmann's law in Greek*, in «Folia Linguistica Historica» 40.1, pp. 67-87.
- DE BELDER, M. & VAN CRAENENBROECK, J. (2015), *How to merge a root*, in «Linguistic Inquiries» 46.4, pp. 625-65.
- DE DECKER, F. (2015), *What is the Greek counterpart of (Proto-)Indo-Iranian (\*)<sup>h</sup>-?*, in «International Journal of Diachronic Linguistic and Linguistic Reconstruction» 12.2, pp. 89-164.
- DELBRÜCK, B. (1888), *Altindische Syntax*, Halle a. d. Saale, Buchhandlung des Waisenhauses.
- DELL'ORO, F. (2015), *Leggi, sistemi e leghe suffissali "di Caland": storia della questione "Caland" come problema teorico della linguistica indoeuropea*, Innsbrück, Institut für Sprachen und Literaturen der Universität.
- DEUTSCH, A. & FROST, R. & FOSTER, K. I. (1998), *Verbs and nouns are organized and accessed differently in the lexicon: evidence from Hebrew*, in «Journal of Experimental Psychology: Learning, Memory and Cognition» 24.5, pp. 1238-1255.
- DI GIOVINE, P. (2001), *Etimologia indoeuropea ed etimologia romanza: due metodi a confronto*, in BENEDETTI, M. (a cura di), *Fare etimologia. Passato, presente e future nella ricerca etimologica. Atti del convegno tenutosi presso l'Università per Stranieri di Siena, 2-3 ottobre 1998*, Roma, Il Calamo, pp. 285-293.
- (2006), *Le laringali indoeuropee: un fantasma della ricostruzione?*, in BOMBI, R. & CIOLETTI, G. & FUSCO, F. & INNOCENTE, L. & ORIOLES, V. (a cura di), *Studi linguistici in onore di Roberto Gusmani*, 2 voll. Alessandria, Ed. dell'Orso, pp. 577-591.
- & FLAMINI, S. & POZZA, M. (2007), *Internal structure of verbal stems in the Germanic languages*, in RAMAT, P. & ROMA, E. (eds.), *Europe and the Mediterranean as a Linguistic Area. Convergencies from a historical and typological perspective*, Amsterdam, John Benjamins, pp. 49-62.
- DIXON, R. M. W. (1977), *Where have all adjectives gone?*, in «Studies in Languages» 1, pp. 19-77 [repr. (1982), Berlin, Mouton de Gruyter].

- (2004), *Adjective classes in typological perspective*, in DIXON, R. M. W. & AIKHENVALD, A. Y. (eds.), *Adjective Classes: A Cross-linguistic Typology*, Oxford, Oxford University Press, pp. 1-50.
- EMBICK, D. (2021), *The Motivation for Roots in Distributed Morphology*, in «Annual Review of Linguistics» 7, pp. 69-88.
- FLEISCH, H. (1961-1979), *Traité de philologie arabe*, Beyrouth, Imprimerie Catholique.
- FROST, R. & FOSTER, K. I. & DEUTSCH, A. (1997), *What we can learn from the morphology of Hebrew? A masked-priming investigation of morphological representation*, in «Journal of Experimental Psychology: Learning, Memory and Cognition» 23.4, pp. 829-856.
- GIURA, F. (2016), Auris, audio e ausculto. *Revisione etimologica e histoire des mots*, in «Archivio Glottologico Italiano» 101.1, pp. 66-87.
- GRESTENBERGER, L. (2013), *The Indo-Iranian cākri-type*, in «Journal of the American Oriental Society» 133.2, pp. 269-293.
- (2022), *To v or not to v? Theme vowels, verbalizers and the structure of the Ancient Greek Verb*, in «Glossa: a journal of general linguistics» 7.1, pp. 1-42.
- HARLEY, H. (2014), *On the identity of roots*, in «Theoretical Linguistics» 40.3/4, pp. 225-276.
- HAY, J. B. & BAAYEN, H. R. (2005), *Shifting paradigms: Gradient structure in morphology*, in «Trends in Cognitive Science» 9.7, pp. 342-348.
- HENGVELD, K. (1992), *Non-verbal Predication: Theory, Typology, Diachrony*, Berlin, Mouton de Gruyter.
- HIRT, H. A. (1927-1937), *Indogermanische Grammatik*, 5 voll., Heidelberg, Winter.
- HUMBOLDT, W. VON. (1836), *Über die Verschiedenheit des menschlichen Sprachbaues und ihren Einfluß auf die geistige Entwicklung des Menschengeschlechts*, Berlin, Druckerei der Königl. Akademie der Wissenschaften [it. transl. by Di Cesare, D. (2005), *La diversità delle lingue*, Roma - Bari, Laterza].
- IDRISSI, A. & PRUNET, J.-F. & BÉLAND, R. (2007), *On the mental representation of Arabic roots*, in «Linguistic Inquiry» 39.2, pp. 221-161.
- IEW = POKORNY, J. (1959), *Indogermanisches etymologisches Wörterbuch*, Bern - Stuttgart, Francke Verlag.
- IVERSON, G. K. & SALMONS, J. C. (1992), *The phonology of the Proto-Indo-European root structure constraints*, in «Lingua» 87, pp. 293-320.
- JOSEPH, B. (2013), *Aspirates, fricatives and laryngeals in Avestan and Indo-Iranian*, in CHEN, Sh.-F. & SLADE, B. (eds.), *Grammatica et verba, Glamour and verve. Studies in South-Asian, historical, Indo-European linguistics in honor of Hans Heinrich Hock on the occasion of his seventy-fifth birthday*, Ann Arbor - New York, Beech Stave Press, pp. 122-128.

- JUCQUOIS, G. (1976), *La reconstruction linguistique. Application à l'indo-européen*, Louvain, Peeters.
- KIPARSKY, P. (2009), *On the architecture of Pāṇini's grammar*, in HUET, G. & KULKARNI, A. & SCHARFE, P. (eds.), *Sanskrit Computational Linguistics*, Berlin - Heidelberg, Springer ("Lecture Notes on Computer Science" 5402), pp. 33-94.
- KEYDANA, G. (2004), *Silbenstruktur und Phonotaktik im Indogermanisch*, in KOZIANKA, M. & LÜHR, R. & ZEILFELDER, S. (eds.), *Indogermanistik – Germanistik – Linguistik. Aktern der Arbeitstagung der Indogermanischen Gesellschaft, Jena 18.-20.09.2002*, Hamburg, Kovač, pp. 163-192.
- KHAN, G. (2001), *The early eastern tradition of Hebrew grammar*, in DE LANGE, N. (ed.), *Hebrew Scholarship and the Medieval World*, Cambridge, Cambridge University Press, pp. 77-91.
- KLOEKHORST, A. (2006), *Initial laryngeals in Anatolian*, in «Historische Sprachforschung» 119, pp. 77-108.
- KULIKOV, L. (2014), *The decline of labile syntax in Old Indo-Aryan: A diachronic typological perspective*, in «Linguistics» 52.4, pp. 1139-1165.
- KURYŁOWICZ, J. (1935), *Études indo-européennes*, Kraków, Gebethner and Wolff.
- (1977), *Problèmes de linguistique indo-européen*, Wrocław, Polska Akademia Nauk.
- LARCHER, P. (1995), *Où il est montré qu'en arabe classique la racine n'a pas de sens et qu'il n'y a pas de sens à dériver d'elle*, in «Arabica» 42.3, pp. 291-314.
- LAW, V. (1990), *Indian influence on Arab phonetics – or coincidence?*, in VERSTEEGH, K. & CARTER, M. G. (eds.), *Studies in the History of Arabic Grammar II*, Amsterdam - Philadelphia, John Benjamins, pp. 215-227.
- LAZZERONI, R. (1990), *La diatesi come categoria linguistica: studio sul medio indo-europeo*, in «Studi e Saggi Linguistici» 30, pp. 53-72.
- (2002), *Transitivi, causativi e incoativi nel sistema verbale vedico*, in «Incontri Linguistici» 25, pp. 105-122.
- (2004), *Inaccusatività indoeuropea e alternanza causativa vedica*, in «Archivio Glottologico Italiano» 89.2, pp. 139-165.
- (2012), *Fra semantica e morfologia: i deverbali vedici raddoppiati del tipo cákri*, in «Studi e Saggi Linguistici» 50.1, pp. 7-23.
- (2014), *L'attuazione di un mutamento: perfetto e medio in alcune lingue indoeuropee*, in «Archivio Glottologico Italiano» 99.2, pp. 129-154.
- (2017), *I presenti in -ya del Rgveda: alla ricerca dell'intransitività scissa*, in «Archivio Glottologico Italiano» 102.1, pp. 1-20.
- LIPP = DUNKEL, G. E. (2014), *Lexikon der indogermanischen Partikeln und Pronominal-stämme*, 2 voll., Heidelberg, Winter.

- LIV<sup>2</sup> = RIX, H. & KÜMMEL, M. & ZEHNDER, TH. & LIPP, R. & SCHIRMER, B. (2001<sup>2</sup>, eds.), *Lexikon der indogermanischen Verben. Die Wurzeln und ihren Primärstammbildungen*, Wiesbaden, Reichert.
- LUBOTSKY, A. (1989), *Against a Proto-Indo-European phoneme \*a*, in VENNEMANN TH. (ed.), *The New Sound of Proto-Indo-European. Essays in Phonological Reconstruction*, Berlin - New York, de Gruyter, pp. 53-66.
- MEILLET, A. (1934<sup>7</sup> [1903<sup>1</sup>]), *Introduction à l'étude comparative des langues indo-européennes*, Paris, Hachette.
- (1921), *Linguistique historique et générale*, 2 voll., Paris, Hachette.
- MCCARTHY, J. (1979), *Formal Problems in Semitic Phonology and Morphology*, PhD Diss., MIT.
- (1981), *A Prosodic Theory of Nonconcatenative Morphology*, in «Linguistic Inquiry» 12.3, pp. 373-418.
- MOLINA-MUÑOZ, A. (2013), *Sanskrit compounds and the architecture of grammar*, in CHEN, SH.-F. & SLADE, B. (eds.), *Grammatica et verba. Glamour and verve. Studies in South-Asian, historical, Indo-European linguistics in honor of Hans Heinrich Hock on the occasion of his seventy-fifth birthday*, Ann Arbor - New York, Beech Stave Press, pp. 181-201.
- MORPURGO DAVIES, A. (1996), *La linguistica dell'Ottocento*, Bologna, il Mulino.
- NIL = WODTKO, D. S. & IRSLINGER, B. & SCHNEIDER, C. (2008, eds.), *Nomina im Indogermanischen Lexikon*, Heidelberg, Winter.
- NUSSBAUM, A. (1976), *Caland's "Law" and the Caland System*, Ph.D. diss., Harvard University, Harvard.
- OETTINGER, N. (2017a), *Das suffix \*-uó- im Indogermanischen und Anatolischen*, in «Indogermanische Forschungen» 122, pp. 253-263.
- (2017b), *Der Ursprung des indogermanischen Caland-System und die \*-nt-Stämme*, in LE FEUVRE, C. & PETIT, D. & PINAULT, G. J. (eds.), *Verbal Adjectives and Participles in Indo-European Languages. Proceedings of the conference of the Society for Indo-European Studies (Indogermanische Gesellschaft)*, Paris, 24th to 26th September 2014, Bremen, Hampen, pp. 267-275.
- PAGLIARO, A. (1962), *Il conoscere linguistico*, in «Ricerche Linguistiche» 5, pp. 17-48.
- POOTH, R. A. (2004), *Ablaut und autosegmentale Morphologie: Theorie der urindogermanischen Wurzelflexion*, in KOZIANKA, M. & LÜHR, R. & ZEILFELDER, S. (eds.), *Indogermanistik – Germanistik – Linguistik. Akten der Arbeitstagung der indogermanischen Gesellschaft, Jena 18-20.09.2002*, Hamburg, Dr. Kovač, pp. 401-471.
- (2015), *Gr. ἐπ-, ved. ²ṛ- und arí-, die uridg. Wurzel \*h<sub>1</sub>er- ~ \*h<sub>1</sub>ar- und uridg. \*h<sub>1</sub>ér- ~ \*h<sub>1</sub>ár-, Widder, Schafbock'*, in «Historische Sprachforschung» 128, pp. 94-122.

- POTT, A. F. (1833-36), *Etymologische Forschungen auf der Gebiete der Indo-Germanischen Sprachen mit besonderen Bezug auf die Lautumwandlung im Sanskrit, Griechischen, Lateinischen, Litthauischen und Gothischen*, 2 vols., Lemgo, Meyer.
- PRUNET, J.-F. & BÉLAND, R. & IDRISSE, A. (2000), *The mental representation of Semitic word*, in «Linguistic Inquiry» 31, pp. 609-648.
- RAVIUS CH. (1650 [1648<sup>1</sup>]), *A Generall Grammer for the ready attaining of the Ebrew, Samaritan, Calde, Syriac, Arabic and the Ethiopic Languages*, London, W. Wilson.
- RAU, J. (2009), *Indo-European Nominal Morphology: The Decads and the Caland System*, Innsbruck, Institut für Sprachen und Literaturen der Universität.
- (2013), *Notes on stative verbal roots, the Caland System, and primary verbal morphology in Indo-Iranian and Indo-European*, in COOPER, A. I. & RAU, J. & WEISS, M. (eds.), *Multi Nominis Grammaticus: Studies in Classical and Indo-European Linguistics in Honor of Alan J. Nussbaum on the Occasion of his Sixty-Fifth Birthday*, Ann Arbor, Beech Stave, pp. 255-273.
- (2017), *The derivational history of the perfect participle active*, in LE FEUVRE, C., PETIT, D. & PINAULT, G. J. (eds.), *Verbal Adjectives and Participles in Indo-European Languages. Proceedings of the Conference of the Society for Indo-European Studies (Indogermanische Gesellschaft), Paris, 24th to 26th September 2014*, Bremen, Hampen, pp. 377-389.
- RIX, H. (1999), *Schwach charakterisierte lateinische Präsensstämme zu Set-Wurzeln mit Vollstufe I*, in EICHNER, H. & LUSCHÜTZKY, CH. (eds.), *Compositiones indogermicae in memoriam Joachem Schindler*, Praha, Enigma, pp. 511-535.
- ROUSSEAU, J. (1984), *La racine arabe et son traitement par les grammairiens européens (1505-1810)*, in «Bulletin de la Société de Linguistique de Paris» 79.1, pp. 285-321.
- RUBIO, G. (2005), *Chasing the Semitic root: The skeleton in the closet*, in «Aula orientalis» 30, pp. 45-63.
- SAUSSURE, F. DE (1878), *Mémoire sur le système primitif des voyelles dans les langues indo-européennes*, Leipzig, Teubner.
- (1922 [1916<sup>1</sup>]), *Cours de linguistique générale*, Paris, Payot [it. transl. by De Mauro, T. (1999), *Corso di linguistica generale*, Roma - Bari, Laterza].
- SCHARFE, H. (1977), *Grammatical Literature*, in GONDA, J. (ed.), *A History of Indian Literature*, vol. V.2, Wiesbaden, Harrassowitz.
- SCHULTZE-BERNDT, E. (2008), *What do “do” verbs do? The semantic diversity of generalized action verbs*, in VERHOEVEN, E. et al. (eds.), *Studies on Grammaticalization*, Berlin, de Gruyter, pp. 185-207.
- SHIMRON, J. (2002), *Semitic languages: are they really root-based?*, in SHIMRON, J. (ed.), *Language Processing and Acquisition in Languages of Semitic, Root Based Morphology*, Amsterdam, Benjamins, pp. 1-28.

- VELAN, H. & FROST, R. & DEUTSCH, A. & PLAUT, D. C. (2005), *The processing of root morphemes in Hebrew: Contrasted processed and distributed account*, in «Language and Cognitive Processes» 20, pp. 169-206.
- WACHTER, R. (1998), *Wortschatzrekonstruktion auf der Basis von Ersatzbildungen*, in MEID, W. (ed.), *Sprache und Kultur der Indogermanen. Akten der X. Fachtagung der Indogermanischen Gesellschaft*, Innsbruck, Institut für Sprachwissenschaft, pp. 199-207.
- WHITNEY, W. D. (2000 [1924<sup>5</sup>, 1889<sup>1</sup>]), *Sanskrit Grammar*, Delhi, Motilal Banarsidass.
- WRIGHT, W. (1979 [1896<sup>1</sup>]), *A Grammar of the Arabic Language, translated from the German of Caspari and edited with numerous additions and corrections by W. Wright, LL.D.*, 3rd ed. revised by W. Robertson Smith and M. J. de Goeje, Cambridge, Cambridge University Press.
- WzRV = GRASSMANN, H. (1996<sup>6</sup> [1873<sup>1</sup>]), *Wörterbuch zum Rig-Veda*, ed. by M. Kozińska, 6th ed., Wiesbaden, Harrassowitz.