B. Vodušek

THE REPETITION
OF PHONEMIC CHARACTERISTICS IN RADICAL MORPHEMES IN SETS
OF SYNONYMS FROM INDO-EUROPEAN LANGUAGES*

8.23 SPADE			11 Ir.	laige	lāgh-
1 Grk.	ámē	yām-			P 652,
		P 502			Bois. 561,
2 Grk.	skapheion (?)	(s)kēp-2			WH 1.757 f.
		(s)kāp- etc.	12 ON	reka	(: Frisk 2.92)
		P 930-2			reg'-l
		(Bois. 871 f.)			P 854-6,
3 NG	patóphtuaro	pent-			B (8.24, 8.27),
	(Grk. patéo)	B, P 808-9			John. 717-8,
4		peu-1	13 Dan.	spade	FaT 870
	(Grk. ptuáron,	B (8.24),			sp(h)ē[i]-2
	ptúon)	P 827,			sp(h)ēi-
		Bois. 824			P (982)980,
5 Lat.	pāla	pāg'- pāk'-			FaT 1110,
W.	pal (fr. Lat.)	P 787-8, B,			John. 887,
		WH 2.236			KM 721
		:kwel-	14 OHG	scūvala (?)	skēu-5
		P 545 for W.			P (954)955, B,
6 It.	vanga	wogwh-nis-			KM 639, 646,
	(Late Lat. vanga fr.	wogwh-nes- etc.	15 MHG	grabeschit	FaT 1020 f., 1045
	Gmc., cf. ON vangsni,	REW 9137,			ghrebh-2
	OHG waganso)	WH 2.730,			P 455-6, B,
		P 1179-80			KM 641
7 Fr.	bêche	dwō(u)- dwei-	16		sēk-2
	(VLat. *bissus fr.	FEW 1.381, 382 f.,			P (895)919-21
	Lat. bis)	Gam. 93,	17 Lith.	kasiklis	kes-
		REW 1132,			P 585,
		P 228-30			Fr. 226 f.
8 Sp.	laya	laya	18 ChSl.	rylo	ereu-2
	(Basque: laya)	Cor. 3.57,			P (338)868,
		REW 4957			Vas. 2.555, 558,
9 Rum.	lopata	lēp-			449,
		B, P 679,			Brück. 471, 470,
		Vas. 2.58			Mch. 431, 429
10 Ir.	rāme	erə-1	19 SCr.	ašov	as-
		P 338, B		(Hung. aso, as)	B

* See First Part, *Linguistica* VI, 1964; Second and Third Part, *Linguistica* VII, 1 and 2, 1965; Fourth and Fifth Part, *Linguistica* VIII, 1 and 2, 1966—1968; Sixth Part, *Linguistica* IX, 1, 1969.

20 Russ. zastup	steb(h)- stēb(h)- etc. ste-m-p- P 1011-3, B, Vas. 3.35	2 Grk. skalfs	(s)kel-1 P 923, Bois. 868 f.
21 Skt. khanitra-	cons. k ^x vowel e ^x Mh. 1.301, P 634	3 Grk. sminūe	(s)mēi-2 P 968, Bois. 886
		4 Grk. mākella	cons. k ^x vowel e ^x B, Bois. 602, Frisk 2.163 f.
8.24 SHOVEL		5 Grk. dīkella	dwō(u)- dwei- P 228-9
1 Grk. ptūon	peu-1 P 827, Bois. 824	6	kel-3 P 545 :(s)kel-1 Bois. 189 (Frisk 1.392)
2 Lat. pāla Br. pal (fr. Lat.)	pāg'- pāk'- P 787-8, B (8.23), WH 2.236 :kwel- P 545 for Br.	7 NG tsāpa (It. zappa fr. Illyr. zapp- fr. a calling cry)	zapp- B, REW 9599
3 Rum. lopata	lēp- B, P 679, Vas. 2. 58	8 Lat. ligō	[s]leig- P 961, WH 1.800
4 Ir. slūasat	cons. s vowel ū ^x B	9 Lat. sarculum	ser-5 P 911, WH 2.470 f.
5 W. rhaw	erθ-1 P 338, B (8.23)	10 Lat. bidēns	ed- P 287-9
6 W. siefl (NE shovel)	skēu-5 B, P (954)955	11 Fr. houe (Frank. *hauwa)	kāu- REW 4084, Gam. 519, P 535, KM 293
7 Goth. -skaurō	sēk-2 P (895)954, F 566 f.	12 Sp. azada (VLat. *asciāta, Lat. ascia)	ag-wesi ak-si Cor. 1.345, REW 697, P 9, WH 1.71 f.
8 ON reka	reg'-1 P 854-6, B (8.24, 8.27), Joh. 717-8, FaT 870	13 NIR. grafan (Gmc., cf. ON grafa, OE grafan)	ghrehb-2 (B), P 455-6
9 Skt. khanitra-	cons. k ^x vowel e ^x Mh. 1.301, P 634	14 Br. pigell (Fr. pic)	pikk- B, Gam. 692, REW 6495 (cf. sub 8.26-3 OE pic)
8.25 HOE		15 Dan. hakke (MLG hacke, hacken vb.)	keg- kek- etc. FaT 372, 390, B, P 537-8, KM 279
1 Grk. skapānē	(s)kēp-2 (s)kāp- etc. P 930-2, Bois. 870 f.		
Lith. kaplys	[s]kēp-2 P 930-2, Fr. 217 f.		

The repetition of phonemic characteristics

16 OE	mattuc (VLat. *mattedica, *mattea, Lat. mateola)	mat-2 B, REW 5426, 5425, P 700, WH 2.49	8 Ir.	bongaim	bheg- bhe-n-g- P 114, LP 347, 340
			9 Nir.	spealaim	sons. s, p vowel ex B
	8.26 FORK (s. <i>Linguistica</i> VII, 2, 1965, p. 158)		10 W.	pladuro (Lat. pāla)	pāg'- pāk'- B (8.23), P 787-8, WH 2.236 :kwel- P 545
	8.27 RAKE (s. <i>Linguistica</i> VII, 2, 1965, p. 155)		11 Goth.	sneithan	sneit- P 974, F 440, Joh. 913 f., KM 670 (:FaT 1096 f.)
	8.28 HARROW (s. <i>Linguistica</i> VII, 2, 1965, p. 152)		12 ON	slā	slak- P 959, Joh. 920 ff., F 436, KM 652 FaT 1048 f.
1 Grk.	theridzō	gwher- P 493-4, Bois. 341, Frisk 1.665 f.	13 OE	ripan	rei-1 P 857-8, KM 592, FAT 902, 906
2 Grk.	amáoō	mē-2 m-e-t P 703, Bois. 53, Frisk 1.88	14 Lith.	piauti	pēu- P 827, Fr. 584
3 It.	segare (Lat. secāre)	sēk-2 REW 7764, P 895 :sē[i]k- sōk- sek WH 2.504 f.	15 ChSl.	žeti	gwhen-2 F 491-3, Vas. 1.411,428, Brück. 662 f., Mch. 595
4 It.	falciare (Lat. falx, -cem)	dhelg- REW 3175, BA 2.1586, P 247, (WH 1.449 f.)	16 Skt.	lu-	lcu-2 P 681, B
5 Sp.	guadañar (Goth. *waithō or Frank., Langob. *wai- danjan)	wei-3 Cor. 2.804, REW 9483, P 1123-4, FaT 1361 f., Joh. 111 f., KM 848	17 Skt.	dā-	dā- dāi- dāu- P 175, Mh. 2.31
6 Rum.	secera (VLat. *sicilis, Lat. sicilis)	cons. s vowel i* P 896, REW 7900, WH 2.533, 504			
7 Rum.	cosi (Slav., cf. SCr. kositi, Russ. kosit')	k'es- B, Bern. 1.581, Vas. 1.639 f., P 586	1 Grk.	drépanon	der-4 P 206-11
			2 Grk.	hárpē	ser-5 P 911-2

8.33¹ SICKLE

(s. *Linguistica* VII, 2, 1965, p. 158)

8.33² SCYTHE*

* This set of synonyms was erroneously omitted in the list of sets composing the present concept-group (*Linguistica* IX/1, 1969, p. 37). Consequently, the number of the included sets amounts to 55.

15 ON	telgja	del-3 P 194-6, Joh. 492 f., FaT 1252	4 Ir.	scian	sék-2 P (895)919-20, LP 15
16 ON	ho*ggva	kāu- P 535, Joh. 177, FaT 426	5 ON	knifr	gen- P 370, Joh. 332-4, FaT 550, 548
17 OE	ceorfan	gerebh- P 392	6 OHG	mezzisahs	mad- P 694-5, KM 475, FaT 944
18 ME	cutte	cons. g ^x vowel X FaT 598, Hh. 43, B	7 Lith.	peilis	cons. p vowel i ^x Fr. 563 f., Vas. 2.356, B
19 Lith.	piauti	pēu- P 827, Fr. 584	8 Lett.	nazis (Russ. nož)	neg'h- B, P 760, Vas. 2.225, Brück. 367, 364, Mch. 329, 326 f.
20 Lith.	re*žti	wrēg- P 1181-2, Fr. 725 f., Vas. 2.484, 485, 505, Brück. 476 f., Mch. 434	9 Skt.	kr*ti-	[s]ker-4 P 938-41, Mh. 1.258, 260 257
21 Lett.	griezti	cons. g ^x , r vowel i ^x B, Fr. 169	10 Skt.	śastra-	k'es- P 586
22 Pol.	raǫac	remb- P 864-5, Brück. 455, Vas. 2.541 f.	11 Skt.	churikā	kes- P 585-6, Mh. 1.408 f., 292
23 Skt.	lu-	leu-2 F 681, B	9.24 SCISSORS, SHEARS		
24 Skt.	śas-	k'es- P 586, WH 1.179	1 Grk.	psalís	(s)p[h]el-1 P 985, Bois. 1073, 890
25 Av.	thwarəs-	twerk'- P 1102, Mh. 1.539	2 Lat.	forficēs (pl.)	g'wher- P 493-4, B, WH 1.526 f., 532 f.
26 Av.	brī-	bher-3 P (133)166	3		kap- P 527, WH 1.159 f.
9.23 KNIFE			4 It.	cesoie (VLat. *caesorium, Lat. caedere)	[s]k[h]ai- REW 1475, P 917, WH 1.129
1 Grk.	máchaira	mag'h- P 697, Bois. 616, Frisk 2.186, WH 2.3,4	5 Sp.	tijeras (pl.) (Lat. [forfices] tōn- sōrias, tondēre)	tem-1 Cor. 4.631 f., REW 8784, P 1062-3, WH 2.689 f.
2 Lat.	culter	[s]kel-1 P 923-4, WH 1.304	6 Ir.	demess	dwō(u)- dwei- P 228-9, B, LP 188
3 Rum.	cut*it (VLat. *cōtitus, Lat. cōs, cōtis)	ak'-2 B, P (18)541-2			

7		mē-2 m-e-t- P 703	5		pet-2 P 825-6, WH 2.282 f.
8 W.	gwellailf	wel-4 P 1139	6 Fr.	hache (Frank. *hapja, cf. OHG happa, heppa)	[s]kēp-2 (s)kāp- etc. REW 4035, Gam. 502, P 930-2
9		cons b ^x vowel X B	7 Rum.	topor (Slav., cf. Bulg., Russ. topor)	cons. t vowel ex B, Vas. 3.121 f., 3.95, Lok. 1964
10 ON	skaeri (pl.)	(s)ker-4 P 938-40, Joh. 835-7	8 Ir.	biall	bhei(?) P 117-8, LP 14, 172
	Skt.	kr*pān*i-	9 Ir.	tūag	[s]teu-1 P 1032
11 ON	so*x (pl.)	sēk-2 P 895, Joh. 777-8, FaT 944, KM 575	10 ON	barda	bhar- P (108)110 :bher- Joh. 616 f. (FaT 52, 94, 129)
12 Lith.	žirkle*s	g'her-2 P 441, WH 1.569 f., A. Leskien, Die Bildung d. Nom. 348 (s. Ling. VII, 2, p. 158) :g'hel-2 P 434, B	11 Lith.	kirvis	[s]ker-4 P 938-40, Fr. 259
13 SCr.	nožice (pl.)	neg'h- P 760, Vas. 2.225, Brück. 367, 364, Mch. 329, 326 f. Vuk 437	12 Skt.	kut'hāra-	cons. K vowel X Mh. 1.223 f.
14 SCr.	makaze (Tk. makas fr. Arab.)	makas Bern. 2.9	13 Av.	taša-	tekth- P 1058, Mh. 1.468, 491
9.25 AX			9.27 SPLIT (vb. trans.) (s. Linguistica VII, 2, 1965, p. 143)		
1 Grk.	pélekus (Akkad. pilakku)	pilakku Bois. 761, B	9.45 HEW (s. Linguistica VIII, 1, 1966—1968, p. 31)		
2 Grk.	aksinē	ag-wesī ak-sī P 9, Bois. 65, Frisk 1.115 f., WH 1.71 f., F 54	9.46 BORE (s. Linguistica VII, 2, 1965, p. 154)		
3 NG	tsekoúri (Byz. sikourion, tzikourion fr. Lat. secūris)	sēk-2 B, P 895 sē[i]-k- sēk- sek WH 2.506, 504 f.	9.47 AUGER (s. Linguistica VII, 2, 1965, p. 154)		
4 Lat.	(bipennis)	dwō(u)- dwei- P 228-9	9.48 SAW (sb.)		
1 Grk.	prīōn		1 Grk.	prīōn	prīs- P 846, Bois. 813 f.
2 Lat.	serra		2 Lat.	serra	cons. s vowel ex WH 2.524

The repetition of phonemic characteristics

3 It. sega (Lat. secāre)	sĕk-2 REW 7764, P 895 :sĕ[i]k- sĕk- sek- WH 2.504 f.	3 Fr. tailler (Lat. tāliāre, tālea)	tāl- REW 8542, Gam. 829, P 1055, WH 2.643
4 Rum. fereștrau (Hung. füresz)	fűresz B	4 Ir. snaidim	(s)nadh- P 972-3
5 W. llif (Lat. lima)	lei-3 slei- B, P 662-3, WH 1.801 f.	5 W. cerfio (ME cerve)	gerebh- B (9.22), P 392
6 OE snid	sneit- P 974, F 440, Joh. 913 f., KM 670 (:FaT 1096 f.)	6 Br. kizella (Ofr. cisel fr. VLat. *ciselum, *caesellum, Lat. caedere)	[s]k[h]ai- B, REW 1474, FEW 2.40, Gam. 225, P 917, WH 1.129
7 Lith. piuklas	pĕu- P 827, Fr. 599 f.	7 Br. bena	bhei(ə)- P 117, B (9.45)
8 ChSl. pila (Gmc., cf. OHG fihala, fila)	peig-1 peik'- B, Vas. 2.356, Brück. 414, P 794 f., KM 190, Joh. 535, FaT 216	8 ON skera	(s)ker-4 P 938-9, Joh. 835 ff., FaT 1010 f.
9 SCR. testera (Tk. testere)	testere B	9 ON grafa	ghrebbh-2 P 455-6, Joh. 396 f., FaT 343
10 Skt. krakaca-	ker-1 k'er- sker- P 567-8, B (:Mh. 1.275)	10 Dan. udhugge	kāu- P 535, B, FaT 426, Joh. 177
11 Skt. karapatra-	kwer-1 P 641, B (:Mh. 1.275)	11 NHG ausmeisseln	[s]mēi-2 P (968)697, KM 472, FaT 709
12	pet-2 P 825-6	12 Lith. iškalti	kel-3 F 545-6, Fr. 211
9.50 NAIL TACK (s. <i>Linguistica</i> VII, 2, 1965, p. 155 f.)		13 Lett. tēluot (ORuss. tĕlo)	cons. t vowel X B (9.83), ME 4.171, Vas. 3.91
9.81 CARVE		14 ChSl. vajati	cons. w vowel X Vas. 1.175
1 Grk. glūphō	gleubh- P 401, Bois. 152, Frisk 1.315, WH 1.610 f.	15 Boh. vytesati	tekth- P 1058-9, Mch. 527, Brück. 63, Vas. 3.99
2 Lat. scalpere	(s)kel-1 P 923-6, WH 2.486 f.		

9.84 CHISEL (sb.)			7 Ir.	rind	er-3 P 326-9 per-2 P 808-16, B
1 Grk.	smilē	(s)mēl-2 P 968, Bois. 885 f.	8 Ir.	benn	bend- P 96, LP 38
2 Lat.	scalprum	(s)kel-1 P 923-6, WH 2.486 f.	9 Ir.	corr	[s]ker-4 P 938-44, B
3 It.	cesello (VLat. *caesellum, Lat. caedere)	[s]k[h]ai- REW 1474, BA 2.877, P 917, WH 1.129	10 W.	blaen	mel-1 smel- P 716-9, LP 43
4 Rum.	dalta (Slav., cf. Bulg. dlato, Russ.-ChSl. dlato, Russ. doloto)	delbh- B, P 246, Vas. 1.360, 359	11 Br.	beg (Fr. bec fr. VLat. beccus fr. Gall. *bekkos)	bheg- B, REW 1013, Gam. 93, P 114, WH 1.99
5 W.	cyn (Lat. cuneus)	ak'-2 B, LP 57, P (18)626-7	12 ON	oddr	bak- P 93, B (12.75)
6 W.	gaing	cons. g ^x , n vowel e ^x B			dhē-2 F 235-7, Joh. 166, FaT 787
7 Dan.	bejtēl (MLG. bētel, beitel)	bheid- FaT 69, P 116-7			wes-4 P 1172, FaT 1524
8 OE	graefsex	ghrehb-2 P 455-6, B	13 Dan.	spids (MHG. NHG spitze)	(s)p(h)ēi-1 FaT 118, P 981, KM 728, 726 f., Joh. 887-9
9		sēk-2 P 895			
10 Lith.	kaltas	kel-3 P 545-6, Fr. 211	14 Lith.	galas	gvel-1 P 470-1, Fr. 130
			15 Lith.	smaulusis galas	(s)mēl-2 P 968
12.352 POINT			16 Scr.	šiljak	sē(i)-3 sei- P (891)915-6, B, Vas. 3.398
1 Grk.	akis	ak'-2 P 18-9	17 Boh.	hrot	gher-3 P 440, Mch. 145, Brück. 159, Vas. 1.311
2 NG	mūtē (Grk. mūtis)	mū-1 B (4.23), P 751	18 Pol.	koniec ChSl. konLCb	ken-3 P 563-4, Brück. 252,74, Vas. 1.613 f.
3 Lat.	cuspis	cons. k ^x vowel X B, WH 1.318	19 Skt.	agra-	ag-ro- eg-ro-? P 8, Mh. 1.18
4 Lat.	mucrō	meuk'- P 745, WH 2.117 f.			
5 It.	punta (Lat. punctum, pungere)	peuk'- peug'- BA 4.3149, B, REW 6847, P 828, WH 2.389, 383 f.	12.353 ¹	EDGE (of a knife, sword, etc.)	
6 Rum.	virf (Slav., cf. ChSl. vbrchb, SCR. vrh)	wer-2 B, P 1151-2, Vas. 1.190	1 Grk.	akmē	ak'-2 P 18-19

2 NG	athéras (Grk. athér)	andh- B, P 40-1, Bois. 18 (:Frisk 1.28)	16 MHG	snide	sneit- P 974
3 NG	kópsē (Grk. kóptō)	[s]kēp- (s)kāp- etc. B, P 930-1	17 Skt.	dharā-	dhō- P 272 (Mh. 2.101) :dheu-3 P 261, B
4 Grk.	stóma	stom-en- P 1035, B, Bois. 914 f.	12.353 ² EDGE (of a table, forest, etc.)		
5 It.	filo (Lat. filum)	g ^w heiθ- REW 3306, BA 3.1643, P 489, WH 1.497 f.	1 Grk.	kráspedon	k'er-1 P 574-5, Bois. 509, Frisk. 2.7 f.
6 It.	taglio (Lat. tāliāre, tālea)	tāl- REW 8542, BA 5.3699, P 1055, WH 2.643	2		pēd-2 P 790-1
7 Fr.	tranchant (Lat. truncāre, truncus)	trenk-1 REW 8953, Gam. 857, P 1093, (WH 2.710 f.)	3 Grk.	cheilos	ghelu-[nā] etc. P 436, B (4.25), Bois. 1053, FaT 319
8 Ir.	faebar (Brit., cf. W. gwaew)	g'hais-o- B, P 410, LP 10,18, 28, 67 :g'hei-1 P 424 f., B (20.26)	4 Lat.	ōra	ōus-1 P 784, WH 2.218 f., 224 f.
9 NIr.	bēal	gwet- P 481, B (4.25) :bheg- P 114, WH 1.99	5 Lat.	margō	mereg'- P 738, WH 2.39 f.
10 W.	min	mak- P 698, B, LP 43	6 Fr.	bord (Gmc. *bord, cf. ON bord)	bher-3 REW 1215, FEW 1.436 ff., Gam. 122, P (133)138
11 Br.	dremm	derk'- P 213, B, LP 4	7 Sp.	canto (Lat. cantus fr. Gall. *cantos)	kam-p- kam-tho- Cor. 1.643 f., REW 1616, FEW 2.232, Gam. 205, P (525)526
12 Br.	lemm	lei-3 slei- P 662-3, B (15.78)	8 Ir.	brū	bher- P 170, B
13 Br.	neudenn	(s)nē- (s)nēi- P 973, B (6.38), LP 24	9 Ir.	cimas	kem-1 P 555, B
14 Br.	barvenn (Lat. barba)	bhar- B (4.142), LP 61, P (108)110	10 Ir.	ochar	ak'-2 P 18-21
15 Du.	scherp	(s)ker-4 P 938-43, B (15.78)	11 Ir.	bil	cons. x vowel X B
			12 Br.	ribl (Lat. ripula)	rei-1 B (1.27), P 857-8, WH 2.436

13 Goth. skaut	(s)kēu-5 P (954)955-6, F 431, Joh. 819, FaT 1011 f., 1044 f., KM 677	20.25 ARROW	
14 ON ro*nd	rem- P 8644, Joh. 723 f., FaT 876, KM 580	1 Grk. tókseuma (Iran., cf. NPers. taxš)	tekw- P 1059, Bois. 975, Mh. 1.467 f.
15 OE snaed	sneit- P 974, B	2 Grk. bélos	gwel-2 P 471-2, Bois. 118, Frisk 1.231 f.
16 OHG trādo	der-4 P 206-7, B	3 Grk. ios	eis-1 P 299-301, Bois. 378, Frisk 1.730
17 Lith. kraštas	[s]ker-4 P 938-42, Fr. 289	4 Lat. sagitta (Etruscan?)	cons. s, g ^x vowel e ^x B. WH 2.464
18 Lett. mala	mel-8 P 721-2	5 It. freccia (Fr. flèche fr. Frank. *fleu[k]a, cf. MDu. vlieke, vleke)	pel-1 REW 9424a, Gam. 423, Cor. 2.535 f., BA 3.1712, FaT 238, P (798)835-7
19 ChSl. vьskrilъje	[s]ker-3 P 935-6, Bern. 1.615	6 Br. bir	cons. r vowel X B
20 SCr. ivica	cons. x vowel X Bern. 1.439	7 Goth. arhwazna	arku- P 67, F 56, Joh. 35, WH 1.64
21 Boh. hrana	gher-3 P 440, Mch. 143, Brück. 155, Vas. 1.304	8 ON fleinn OE flān	cons. p, 1 vowel X P 1000, B, Joh. 905, FaT 235
22 Pol. brzeg	bhereg ^h - P 140-1, Brück. 44, Vas. 1.76, Mch. 47, B (1.27)	9 Dan. pil (Lat. pilum)	(peis-1) pis- FaT 825, Joh. 1115, KM 542, P 796, WH 2.304, 302, 307 f.
23 Skt. anta-	ant- P 48, B (12.35)	10 OE strael	ster-4 P 1028, KM 755
24 Av. karana-	cons. k ^x , l ^r vowel e ^x B (12.35)	11 Lith. vilyčia	wei-1 ME 4.639, P 1120 ff., Vas. 1.200
12.75 HOOK (s. Linguistica VII, 2, 1965, p. 156)		12 Lett. bulta (MLG bolte)	bheld- B, P 124
18.51 WRITE (s. Linguistica VII, 2, 1965, p. 154)			

The repetition of phonemic characteristics

13 Lett.	šautra	sk'eu- P 954-5, B, ME 4.10 (Fr. 969)	7 Lat.	hasta	g'hast-o-1 g'hazd-o- P 412, WH 1.636
14 Boh.	šíp	cons. x vowel X Vas. 3.400, Mch. 499, 368	8 Lat.	pīlum	(peis-1) pis- P 796, B, WH 2.304, 302, 307 f.
15 Skt.	śaru-	k'el-3 P 552	9 Fr.	épieu (Frank. *speut, cf. OSax. spiot, OHG spioz)	(s)p(h)end- REW 8163, Gam. 372, P 998-9, KM 726, (FaT 1138)
16 Skt.	bān*a-	cons. x vowel ex Mh. 425, B	10 Rum.	sulit*a (Slav., cf. ChSl., SCr. sulica)	sk'eu- B, P 954-5, Vas. 2.44, Brück. 525, Mch. 484
17 Av.	tig*ri	[s]teig- P 1016, Mh. 1.507, 525 f.	11 Ir.	gae	g'hais-o- P 410, LP 18, 28, 67 :g'hei-1 P 424-5, B, WH 1.575
18 Av.	ašti	cons. x vowel ex B	12 Ir.	sleg	selg* P 900, B
20.26 SPEAR					
1 Grk.	dóru	deru- P 214	13 Ir.	croisech**	cons. kx, r vowel X B
2 Grk.	lógchē	cons. l vowel ex B, Bois. 586, WH 1.757 f., Frisk 2.133 f., P 832	14 Ir.	lāigen	lāgh- P 652, LP 29, Bois. 561, WH 1.757 (:Frisk 2.92)
Lat.	lancea		15 Ir.	mānais**	cons. m vowel a B
3 Grk.	aichmē	āik* P 15, Bois. 31, Frisk 1.48, WH 1.670 f.	16 ON	spjo*r	(s)per-1 P 990, Joh. 893 f., KM 722 :(s)p(h)er-4 P 992, FaT 1140, 1113, 1125
4 Grk.	égchos**	cons. K vowel ex Bois. 214, Frisk 1.440 f., WH 1.608, 2.327	17 Lith.	ietis	ei-1 P 293, B
5 Grk.	ákōn	ak*2 P 18-20, Bois. 40, 32 f., Frisk 1.62	18 Lith.	ragotine*	cons. r, gx vowel ex Fr. 684, 736 f., Vas. 2.526 f.
6 NG	kontári	k'ent-			
	(Late Grk. kontáron, Grk. kontós)	B, P 567, Bois. 491, 434, Frisk 1.913, 820 f.			

g* in Av. tig*ri = the voiced guttural constrictive.

** Not in the list, but mentioned in Buck's discussion.

19 Lett.	šk'eps	(s)kēp-2 (s)kāp- etc. P 930-2, ME 4.33	10 Goth.	mēki	cons. m, K vowel e ^x F 352 f., Joh. 1096, Vas. 2.128, Brück. 331, Mch. 290
ChSl.	копьѣ	[s]kēp-2 P 930-2, Vas. 1.621	11 ON	sverð	swer-4 P 1050, B, KM 693 :wer-1 P 1150, FaT 1214, 1560, Joh. 137 f.
20 Pol.	wlocznia	welk-1 P 1145, Brück. 627	12 ON	brandr	bher-2 P (132)143-5, Joh. 619-20
21 Av.	aršti	eres-1 P 335, Mh. 1.125	13 Lett.	zuobens	g'embh- P 369, ME 4.756
20.27 SWORD			15.45 LOUD		
1 Grk.	ksíphos	cons. k ^x , s vowel X B, Bois. 678 f.	1 Grk.	mégas	meg'[h]- P 708, B
2 Grk.	máchaira	mag'h- P 697, Bois. 616, Frisk 2.186, WH 2.3,4	2 NG	dunatós (Grk. dunatós, dúnamai)	(deu-2) du- P 218 :deu-3 P 219, Frisk 1.423 f., (Bois. 204)
3 Grk.	áor	wer-1 P 1150, B, Bois. 66, 15 f., Frisk 1.117, 23 f.	3 Lat.	clārus	kel-6 P 548-9, WH 1.228
4 NG	spathí (Grk. spathíon, spáthē)	sp(h)ē[i]-2 sp(h)ēi- B, P (982)980, Bois. 888 f., 896	4 It.	forte (Lat. fortis)	bherēg'h- REW 3457, P 140, WH 1.535 ff. :dher-2 P 252 ff., B
5 Lat.	gladius (Celt., cf. W. cleddyf, Br. kleze)	kel-3 WH 1.603 f., P 545-6	5 It.	alto (Lat. altus)	al-2 REW 387, P 26, WH 1.4,31 f.
6 Lat.	ēnsis	n*si-s P 771, WH 1.406	6 Rum.	tare (Lat. talis)	to-1 REW 8543, P 1086-7
7 Rüm.	sabie (Bulg. sab(i)ja, SCR. sablja fr. Hung. szablya, szab)	szab B, KM 617 f.	7 Ir.	ard	er-3 P (326)339
8 Ir.	colg	kel-2 P 545	8 W.	uchel	up-(o)- etc. (e)up-s- P 1106-7, LP 19
9 Goth.	hairus	[s]ker-4 P 938-40, F 235, Joh. 835-7			

IE n*si-s = with syllabic n.

The repetition of phonemic characteristics

9 ON	hār	keu-2 P 588-9, Joh. 202 ff., FaT 451 f.	2 NG	tragoudō (Grk. tragō*deō)	ter-3 B, P 1071-3, Bois. 978
10 OE	hlūd	k'leu-1 P 605-6, KM 427, FaT 668	3 Lat.	canere	kan- P 525, WH 1.154 f.
11 Lith.	balsus	bhel-6 P 123-4, Fr. 32	4 Ir.	gaibim	ghabh- P 407-8, B, LP 365
12 Lith.	garsus	gwer(ð)-4 P 478, Fr. 152, 154 :g'ār- P 352, B (15.44)	5 Goth.	siggwan	sengwh- P 906-7, F 419, Joh. 786, KM 709 f. FaT 1227
13 Lith.	didis	dei-1 P 183, Fr. 93	6 ON	gala	ghel- P 428, Joh. 382 ff., KM 230, 244, 499, FaT 269
14 Lett.	skan's	cons. s, k vowel ex B, Fr. 794	7 Lith.	dainuoti	cons. dx vowel ix B, Fr. 80
15 Lett.	skal's	(s)kel- (s)kwel- P 550, Fr. 544	8 Lith.	giedoti	gē(i)- P 355, Fr. 150, Vas. 1.251 :gā(i)- B
16 ChSl.	velijb	wel-3 P 1138, B, Vas. 1.180, 181	9 ChSl.	pēti	cons. p vowel ix Vas. 2.422, Brück. 404, Mch. 305
17 SCr.	glasan	gal-2 P 350, Vas. 1.287, Bern. 1.323, Brück. 144 :ghel- P 428, Mch. 129			
18 Russ.	gromkij	ghrem-2 P 458-9, Vas. 1.311, 310		18.13 SHOUT, CRY OUT (s. <i>Linguistica</i> VII, 2, 1965, p. 149)	
19 Skt.	ucca-	ūd- P 1103-4, Mh. 1.99, 101		18.41 CALL (vb. = SUMMON) (s. <i>Linguistica</i> VII, 1, 1965, p. 42)	
20 Skt.	tāra	ter-4 P (1074)1088-9 Mh. 1.497		18.42 CALL (vb. = NAME; BE CALLED, NAMED)	
		18.12 SING			
1 Grk.	aeidō	au-6 P 76-7, Bois. 15, Frisk 1.22 f.	1 Grk.	kaléō	kel-6 P 548, WH 1.141 f. :kal- Bois. 397 f., Frisk 1.762 f.

ō* in Grk. tragō*deō = ō with iota subscriptum.

2 Grk.	onomádzō	en(o)-mn* etc.	9 Lith.	vadinti	au-6 P 76, Fr. 1177 f., Vas. 1.163 f.
		P 321, B (18.28), Bois. 704, WH 2.173			kāu- kēu- k'au- k'eu- P 535-6, Fr. 968
3 NG	légō (Grk. légō)	leg'- B, P 658, Bois. 563 f., Frisk 2.94 ff., WH 1.780	10 Lett.	saukt	rēk-2 P 863, B (18.22), Vas. 2.525, 508 f., Fr. 716 f. rei-3 rēi- P 859-60 wer-6 P 1162
4 Lat.	vocāre	wekw. P 1135-6, WH 2.823 ff.	11 ChSl.	narešti	g'hau- P 413, Vas. 1.447, Brück. 658, Mch. 589, Vuk 402
5 Fr.	appeler (Lat. appellāre)	pel-2a REW 542, P 801, WH 1.59			dhē-2 P 235, B
6 Ir.	gairim (?)	g'ār- P 352, B, (cf. LP 368, § 555, 6)	12 SCr.	nazvati	
7 W.	galw	gal-2 P 350, B			
8 Goth.	haitan	kēi- kē[i]- P 538, F 236, Joh. 198, KM 300 f., FaT 388	13 Skt.	abhi-dhā-	

* IE en(o)-mn* = with syllabic n.

The chosen 55 synonymic sets are composed of 680 elements. There are 587 established Indo-European roots, 8 imitative radical morphemes belonging to individual Indo-European languages or languages groups, 13 foreign radical morphemes, and 72 unknown roots.

The tables Nos. 38 to 42 give the consonantal distributions of the roots contained in the concept-group. As in establishing the etymologies of the single synonymic sets a somewhat unusual distribution of the root vowels came to light, this vowel distribution is separately listed in the table VI. Each of the vowel classes A and E is divided into two classes: the short A and the long A on the one hand, and the short E and the long E on the other. In all instances where by the traditional methods the original length or brevity of the root vowel cannot be determined with certainty, the vowels A and E are taken as short. Due to the interdependence of the concept groups SHARP and ROUGH the corresponding vowel distribution for the concept group ROUGH is set up in the table VII. The table VIII gives the same vowel distribution of the Representative Sample, and the resulting comparative data are tabulated in the tables Nos. 43 and 44.

LIST OF ESTABLISHED INDO-EUROPEAN ROOTS
OF THE GROUP »SHARP«

I. (Type V). I: ei-1 (= root in Pokorny), 20.26 (= Buck's concept-number); ei-4, 8.21 sb.; roots 2, different roots 2. — U: au-6, 18.12, 18.42; u-1, 18.13; roots 3, different roots 2.

Sum I: 5 4

II a. (Type CV). L: leu-2, 8.32, 8.33¹, 8.33², 9.22, 9.27 lēu-2, 1.44¹; roots 6, different roots 2 = LU 6, 2.

T: dā-, 8.32, 8.33¹, 8.33²; dei-1, 15.45; deu-2, 15.45; dhau-, [s]teu-1, 4.53, 9.25, 9.46; dhē-2, 9.46, 9.47, 12.352, 18.42; dhō-, 12.353¹; to-1, 15.45; roots 15, different roots 8 = TA 3, 1, TI 1, 1, TU 5, 3, TE 6, 3.

K: gē(i)-, 18.12; g'wheið-, 12.353¹; kē(i)-, 18.41, 18.42; [s]k[h]ai-, 9.22, 9.24, 9.81, 9.84; gōu-, 18.41; g'hau-, 18.41, 18.42; kāu-, 8.25, 9.22, 9.45, 9.81; kāu-, k'āu-, 18.13, 18.41, 18.42; kau-1, 4.16; keu-2, 12.75, 15.45; k'eu-1, 8.22, 9.46; roots 23; different roots 11 = KI 8, 4, KU 15, 7.

P: bhā-2, 18.13, 18.41; bhei(ð)-, 9.25, 9.45, 9.81; b(h)eu-2, 6.63, 9.46, 18.13; peu-1, 8.23, 8.24; pēu-, 8.32, 8.33¹, 9.22, 9.48; roots 14, different roots 5 = PA 2, 1, PI 3, 1, PU 9, 3.

S: sē(i)-2, 8.21 sb.; sē(i)-3, 6.35, 6.37, 9.50, 12.352; seu-1, 9.47; roots 6, different roots 3 = SI 5, 2, SU 1, 1.

N: + [s]mēi-2, 9.22, 9.45, 9.81 [s. III b]; meu-1, 4.58; mū-1, 15.78, 12.352; mē-2, 8.32, 9.24; + [s]nē-, 6.35, 6.63 [s. III b]; roots 5+5, different roots 3+2 = NI +3, +1, NU 3, 2, NE 2+2, 1+1.

R: rei-1, 8.32, 12.353², 18.51; rei-3, 18.13; reu-g-, 4.57; roots 5, different roots 3 = RI 4, 2, RU 1, 1.

Sum 88 a: 74 + 5 35 + 2

II b. (Type VC). L: al-2, 15.45, ēl-ā, 6.37; roots 2, different roots 2 = AL 1, 1. EL 1, 1. — T: ūd-, 15.45; ed-, 4.27, 4.58, 8.25; edh-, 6.36; roots 5, different roots 3 = UT 1, 1, ET 4, 2. — K: āik', āig', 6.36, 20.26; ag-ro-, 12.352; ag-wesī-, 8.25, 9.25; ak'-2, 4.57, 15.78, 1.44¹, 1.44², 6.36, 6.63, 8.28, 9.23, 9.47, 9.50, 9.84, 12.352, 12.353¹, 12.353², 20.26; ok'-, 6.37; roots 21 different roots 5 = AK 18, 3, IK 2, 1, EK 1, 1. — P: up-o-, (e)up-s-, 15.45; root 1, different root 1 = UP 1, 1. — S: eis-1, 20.25; ōus-1, 12.353²; roots 2, different roots 2 = IS 1, 1, US 1, 1. — N: en(o)-mn^a-, 18.42; root 1, different root 1 = EN 1, 1. — R: ar(ð)-, 8.21 vb., 8.21 sb.; er-3, 4.66¹, 12.352, 15.45; erð-1, 8.23, 8.24; eres-s-, 4.57; ereu-2, 8.22, 8.23; roots 10, different roots 5 = AR 2, 1, ER 8, 4.

Sum II b: 42 19

II c. (Type VVC). K: aueg-, 6.35; root 1, different root 1 = UEK 1, 1.

Sum II c: 1 1

Sum II: 117 + 5 55 + 2

III a. (Type CVC). LP: [lēb-] lāb-, 8.21 vb.*; lep-3 = 2, 1.44¹; lēp-, 8.23, 8.24; roots 4, different roots 3 = LAP 1, 1, LEP 3, 2. — LK: lūgh-, 8.22, 8.23, 8.24; [s]leig-, 8.25; leg-, 18.42; roots 5, different roots 3 = LAK 3, 1, LIK 1, 1, LEK 1, 1.

Sum L-III a: 9 6

TL: tāl-, 15.78, 9.22, 9.45, 9.81, 12.353¹; del-3, 9.22, 9.27, 9.45; roots 8, different roots 2 = TAL 5, 1, TEL 3, 1. — TR: der-4, 4.66¹, 8.28, 8.33¹, 8.33², 9.27, 12.353²; deru-, 20.26; dher-5, 4.66¹; ter-3, 9.22, 9.45, 9.46, 9.47, 9.50, 18.12; ter-4, 9.47, 15.45; roots 16, different roots 5 = TER 16, 5. — TN: dem-, 9.45; tem-1, 9.22, 9.24; roots 3, different roots 2 = TEN 3, 2. — TK: dhēigw-, 6.63, 8.22; + [s]teig-, 15.78, 20.25 [s. IV]; dek'-2, 8.26, 9.50; tekw-, 20.25; roots 5+2, different roots 3+1 = TIK 2+2, 1+1, TEK 3, 2.

Sum T-III a: 32 + 2 12 + 1

KP: ghabh-, 18.12; ghabh-(o)-lo-, 8.26; kap-, 9.24; + [s]kāp-, [s]kāb-, 12.75 [s. IV]; + [s]kēp-, 15.78, 8.28, 8.33², 9.22, 9.25, 9.45, 12.353¹ 20.26 [s. IV]; roots 3+9, different roots 3+2 = KAP 3+1, 3+1, KEP +8,+1. — KT: g'hed-, 4.66¹; kwēd-, 15.78; roots 2, different roots 2 = KET 2, 2. — KL: gal-2, 15.45, 18.13, 18.41, 18.42; gel-1, 1.44²; gwel-1, 6.36, 12.352; gwel-2, 20.25; ghel-, 18.12; ghelū-[nā], 12.353² g'hel-2, 8.21 sb., 8.33¹; kel-1, 1.44²; kel-2, 20.27; kel-3, 8.22, 8.25, 9.22, 9.27, 9.81, 9.84, 20.27; kel-6, 15.45, 18.13, 18.41, 18.42; k'el-2, 8.28; k'el-3, 20.25; kwel-1, 4.66¹, 8.21 vb.; + [s]kel-1, 9.23 [s. IV]; roots 29+1, different roots 14+1 = KAL 4, 1, KEL 25+1, 13+1. — KR: g'ār-, 18.13, 18.41, 18.42; kar-2, 18.13, 18.41; kar-3, 1.44¹, 1.44²; ger-2, 4.57; ger-3, 8.28, 9.46, 12.75; gwer(ə)-4, 15.45; gweru-, 6.63, 9.46, 9.47; gher-3, 12.352, 12.353²; g'her-2, 8.26, 9.24; g'her-6, 9.22; g'her-s-, g'her-, 1.44¹, 8.28; g'wher-, 8.32, 9.24; ker-1 [sker-, k'er-], 8.27, 9.48, 18.13, 18.41; ker-5, 12.75; k'er-1, 4.39, 4.17, 8.26, 12.353², 12.75; kwel-1, 9.48; [s]ker-3, 6.63, 8.27, 8.28, 8.33¹, 9.50, 12.353², 12.75; + [s]ker-4, 15.78, 6.91, 8.27, 8.28, 8.33¹, 9.22, 9.23, 9.24, 9.25, 12.352, 12.353², 20.27 [s. IV]; roots 42+12, different roots 17+1 = KAR 7, 3, KER 35+12, 14+1. — KN: [kam-p-] kan-th-, 12.353²; kan-, 18.12; gem-, 6.63; gen-, 4.16, 6.63, 6.93, 9.23; g'en-1, 6.35; g'when-2, 8.32; kem-1, 12.353²; kem(ə)-4, 8.21 vb.; ken-2, 4.58; ken-3, 12.352; konə-mo-, 4.16; roots 14, different roots 11 = KAN 2, 2, KEN 12, 9. — KK: kakka-, 4.66¹; k'āk-2, 8.21 sb., 8.26, 9.50; geig'-, 15.78; g'egh-, 8.21 sb.; keg-, 8.25, 12.75; k'ekw-, 4.66¹; koko, kokk-, 4.16; roots 10, different roots 7 = KAK 4, 2, KIK 1, 1, KEK, KOK 5, 4. — KS: kwās-, 4.53; g'hais-o-, 9.47, 12.353¹, 20.26; kes-, 6.63, 6.91, 6.93, 8.22, 8.23, 9.23; k'es-, 8.32, 8.33¹, 9.22, 9.23; roots 14, different roots 4 = KAS 1, 1 KIS 3, 1, KES 10, 2.

Sum K-III a: 114 + 22 58 + 4

PT: bheid-, 4.58, 9.27, 9.84; bhedh-1, 8.22; pēd-2, 12.353²; pet-2, 9.25, 9.48; roots 7, different roots 4 = PIT 3, 1, PET 4, 3. — PL: bhel-3, 4.57, 18.13; bhel-6, 15.45; pel-1, 20.25; pel-2a, 18.41, 18.42; pel-3a, 6.93; pel-(i)-s-, 1.44¹, 1.44²;

* The radical morpheme is lāb- according to WH 1.739 f. Therefore, the form lāb- given sub laborāre 8.11-8, 8.21-5 (Linguistica VI, 24, VII/2, 131, 152, 158), and sub lābi 10.42-3 (Linguistica VII/2, 139, 146), should be corrected into lāb-.

bol-, 8.28; roots 10, different roots 7 = PEL 10, 7. — PR: bhar-, 6.93, 9.25, 9.50, 12.353¹; bher-2, 20.27; bher-3, 6.93, 8.28, 9.22, 9.46, 9.47, 12.353²; bher-, 12.353³; per-2, 6.63; roots 13, different roots 5 = PAR 4, 1, PER 9, 4. — PK: bak-, 12.75; pāk', pāg', 4.39, 8.22, 8.23, 8.24, 8.32, 8.33¹; peig-1, peik', 9.48, 18.51; peuk', peug', 12.352; bhēg-, bhe-ng-, 8.32, 12.352; pek'-2, 6.91; pek^w-, 1.44²; roots 14, different roots 7 = PAK 7, 2, PIK 2, 1, PUK 1, 1, PEK 4, 3. — PS: peis-1, 20.25, 20.26; pēs-1, 8.21¹; roots 3, different roots 2 = PIS 2, 1, PES 1, 1.

Sum P-III a: 47 25

ST: sē[i]dh-, 6.91; root 1, different root 1 = SET 1, 1. — SR: ser-5, 15.78, 8.25, 8.27, 8.33¹, 8.33²; roots 5, different root 1 = SER 5, 1. — SK: seg'h-, 9.50; sēk-2, 4.57, 4.66¹, 1.44¹, 1.44², 6.93, 8.23, 8.24, 8.32, 8.33¹, 8.33², 9.22, 9.23, 9.24, 9.25, 9.27, 9.48, 9.84; roots 18, different roots 2 = SEK 18, 2.

Sum S-III a: 24 4

NT: mad-, 6.93, 9.23; mat-2, 8.25, 8.28; roots 4, different roots 2 = NAT 4, 2. — NL: mel-1, 12.352; mel-6, 18.51; mel-8, 12.353²; roots 3, different roots 3 = NEL 3, 3. — NR: mer-5, 4.58; root 1, different root 1 = NER 1, 1. — NK: mag'h-, 9.23, 20.27; mak-, 12.353¹; meuk', 12.352; meg'h-, 1.44¹, 15.45; neg'h- 6.93, 9.23, 9.24; roots 9, different roots 5 = NAK 3, 2, NUK 1, 1, NEK 5, 2.

Sum N-III a: 17 11

RT: rēd-2, 6.93, 8.27; roots 2, different root 1 = RET 2, 1. — RN: rem-, 12.353²; root 1, different root 1 = REN 1, 1. — RK: reg'-1, 6.93, 8.23, 8.24, 8.27; rēk-2, 18.42; roots 5, different roots 2 = REK 5, 2.

Sum R-III a: 8 4

Sum III a: 251 + 24 120 + 5

III b. (Type CCV). KL: klēu-, klāu-, 9.50; k'leu-1, 15.45; roots 2, different roots 2 = KLU 2, 2. — KS: ksēu- [skēu-3], 4.54; root 1, different root 1 = KSU 1, 1. — PN: pneu-, 4.54; root 1, different root 1 = PNU 1, 1. — SP: (s)p(h)ēi-1, 6.63, 9.27, 9.50, 12.352; (s)p(h)yēu-, 4.57; (s)p(h)ē[i]-2, 8.23, 9.27, 20.27; roots 8, different roots 3 = SPI 5, 2, SPE 3, 1. — ST: stā-, 1.44²; stāi-, 1.44¹, 1.44²; roots 3, different roots 2 = STA 1, 1, STI 2, 1. — SL: [lei-3] slei-, 15.78, 9.48, 12.353¹; roots 3, different root 1 = SLI 3, 1. — SN: (s)mēi-2, 8.25, 9.84, 12.352; (s)nē-, 6.36, 12.353¹ [s. II a]; roots 5, different roots 2 = SNI 3, 1, SNE 2, 1. — SK: (s)kēu-5, 8.23, 8.24, 12.353; sk'eu-, 20.25, 20.26; roots 5, different roots 2 = SKU 5, 2.

Sum III b: 28 14

III c. (Type VCC, VCVC). ST: ost(h)-, 4.16, 9.27; roots 2, different root 1 = EST 2, 1. — NP: enebh-1, 9.47; root 1, different root 1 = ENP 1, 1. — NT: andh-, 12.353¹; ant-, 12.353²; roots 2, different roots 2 = ANT 2, 2. — NK: ank-2, 12.75; onogh-, 4.39, 9.50; roots 3, different roots 2 = ANK 1, 1, ENK 2, 1. — NS: n'st-, 20.27; root 1, different root 1 = NS 1, 1. — RP: ereb-, 9.46; root 1, different root 1 = ERP 1, 1. — RK: arku-, 20.25; er(e)k-2,

8.22, 18.51; roots 3, different roots 2 = ARK 1, 1, ERK 2, 1. — RS: eres-1, 20.26; root 1, different root 1 = ERS 1, 1.

Sum III c: 14 11
Sum III: 293 + 24 145 + 5

IV. (Type CVCC, CVCVC, CCVC, CCCV). TL-: dhelg-, 6.63, 8.32, 8.33¹, 8.33²; dhelbh-, 8.22, 9.84; roots 6, different roots 2 = TEL- 6, 2. — TR-: derk-, 12.353¹; trëb-, 8.21 vb.; roots 2, different roots 2 = TER-, TRE- 2, 2. — TN-: denk-, 4.58; root 1, different root 1 = TEN- 1, 1. — TK-: tekth-, 9.25, 9.45, 9.81; roots 3, different root 1 = TEK- 3, 1.

Sum T-IV: 12 6

KL-: gleubh-, 9.27, 9.81; roots 2, different root 1 = KLU- 2, 1. — KR-: ghreib-, 8.26; + [gerebh-] gribh-, 8.28 [s. below]; g^wrëug'h-, 4.58; grebh-1, 8.27; ghrehb-2, 6.91, 8.22, 8.23, 8.25, 9.50, 9.81, 9.84; gerebh-, 9.22, 9.81, 18.51 [s. above]; ghrem-2, 15.45; k'ers-2, 8.21 sb.; roots 15+1, different roots 7+1 = KRI- 1+1, 1+1, KRU- 1, 1, KER-, KRE- 13, 5. — KN-: g'embh-, 4.27, 6.91, 20.26; k'ent-, 20.26; roots 4, different roots 2 = KEN- 4, 2. — KS-: g'hast-o-, 4.17, 20.26; kost-, 4.16; roots 3, different roots 2 = KAS- 2, 1, KES- 1, 1.

Sum K-IV: 24 + 1 12 + 1

PL-: bheld-, 20.25; pelk', pelg', 8.28; roots 2, different roots 2 = PEL- 2, 2. — PR-: pris-, 9.48; bhreg'-1, 4.57, 8.28; bhreg'h-, 12.353², 15.45; roots 5, different roots 3 = PRI- 1, 1, PER-, PRE- 4, 2. — PN-: hend-, 4.17, 6.63, 12.352; pent-, 8.23; roots 4, different roots 2 = PEN- 4, 2.

Sum P-IV: 11 7

SP-: (s)p(h)eud-, 20.26; (s)p(h)el-1, 6.63, 9.24, 9.27; (s)per-1, 20.26; (s)pen-(d)-, 6.63; roots 6, different roots 4 = SPU- 1, 1, SPE- 5, 3. — ST-: (s)teig-, 6.63 [s. III a]; (s)trei-g-3, 18.13; steb(h)-, 8.23; ster-4, 20.25; stom-en-, 12.353¹; roots 5, different roots 5 = ST-I- 2, 2, STE- 3, 3. — SL-: slak-, 8.32; (s)leug-, (s)leuk-, 4.57; selg', 20.26; selk-, 8.21 vb., 8.21 sb.; roots 5, different roots 4 = SLA- 1, 1, SLU- 1, 1, SEL- 3, 2. — SN-: (s)nadh-, 9.22, 9.45, 9.81; sneit-, 8.32, 9.22, 9.48, 12.353¹, 12.353²; seng^wh-, 18.12; roots 9, different roots 3 = SNA- 3, 1, SNI- 5, 1, SEN- 1, 1. — SK-: (s)kăp-, 8.22, 8.23, 8.25 [s. III a and the next]; + (s)këp-, 9.27 [s. III a and the former]; (s)keuðd-, 18.13; (s)kel-1, 1.44², 8.25, 9.27, 9.81, 9.84 [s. III a]; (s)kel-, (s)kwel-, 15.45; (s)ker-4, 6.93, 9.81, 12.353¹, 18.51 [s. III a]; roots 14+1, different roots 5+1 = SKA- 3, 1, SKU- 1, 1, SKE- 10+1, 3+1.

Sum S-IV: 39 + 1 21 + 1

NR-: mereg', 12.353²; root 1, different root 1 = NER- 1, 1.

Sum N-IV: 1 1

RN-: remb-, 9.22; root 1, different root 1 = REN- 1, 1.

Sum R-IV: 1 1
Sum IV: 88 + 2 48 + 2

V. (Type CCVCC, CCCVC). TR: trenk-1, 15.78, 9.22, 12.353¹; roots 3, different root 1 = TRE- 3, 1. — PS: pster-, 4.54; root 1, different root 1 = PS-E- 1, 1. — SK: s'kerd-, 4.57, 4.66¹; roots 2, different root 1 = SKE- 2, 1.

Sum V: 6 3
Sum I-IV: 509 + 31 255 + 9

VI. Y: yeu-2, 8.21 vb.; yē-, 4.57, 6.63; roots 3, different roots 2 = YU 1, 1, YE 2, 1.

YN: yām-, 8.23; root 1, different root 1 = YAN 1, 1.

Sum Y: 4 3

W: wei-1, 8.26, 20.25; wei-3, 8.32, 8.33²; wī-1, 9.46, 9.47; roots 6, different roots 3 = WI 6, 3.

WL: wel-3, 15.45; wel-4, 9.24; wel-7, 1.44², 9.50; roots 4, different roots 3 = WEL 4, 3. — WK: wek^w, 18.41, 18.42; wog^{wh}-nes-, 8.22, 8.23; roots 4, different roots 2 = WEK 4, 2. — WP: wāb-, 18.13; wap-2, 18.13; roots 2, different roots 2 = WAP 2, 2. — WN: wem-, 4.57; root 1, different root 1 = WEN 1, 1. — WR: wer-1, 20.27; wer-2, 12.352; wer-3, 4.57, 6.35, 6.36, 9.46, 9.47; wer-7, 18.51; roots 8, different roots 4 = WER 8, 4.

WL: welk-1, 8.28, 20.26; roots 2, different roots 1 = WEL- 2, 1. — WR: werḡ-2, 8.21 vb.; wrēḡ-, 9.22; roots 2, different roots 2 = WER-, WRE- 2, 2.

-W: [dwō(u)-] dwei-, 8.23, 8.25, 8.26, 9.24, 9.25; twerk-, 9.22; roots 6, different roots 2 = TWI 5, 1, TWE 1, 1. — koi-, kwī-, 18.13, gwe-, 9.50; gwet-, 12.353¹; k'wek-, 6.91; roots 4, different roots 4 = KWI- 1, 1, KWE- 3, 3. — swer-4, 20.27; swerbh-, swer-, 9.46, 9.47; roots 3, different roots 2 = SWE 3, 2. — skwerb(h)-, 9.46; root 1, different root 1 = SKWE- 1, 1.

Sum W: 43 26
Sum I-VI: 556 + 31 284 + 9

TABLE VI

SHARP	Short A		Long A		I		U		Short E		Long E		TOTAL		
I	—	—	—	—	2	2	3	2	—	—	—	—	5	4	
II a	L	—	—	—	—	—	6	2	—	—	—	—	6	2	
	T	—	—	3	1	1	1	5	3	1	1	5	2	15	8
	K	—	—	—	—	8	4	15	7	—	—	—	—	23	11
	P	—	—	2	1	3	1	9	3	—	—	—	—	14	5
	S	—	—	—	—	5	2	1	1	—	—	—	—	6	3
	N	—	—	—	—	3	1	3	2	—	—	4	2	10	5
	R	—	—	—	—	4	2	1	1	—	—	—	—	5	3
II bc		—	—	5	2	24	11	40	19	1	1	9	4	79	37
	L	1	1	—	—	—	—	—	—	—	—	1	1	2	2
	T	—	—	—	—	—	—	1	1	4	2	—	—	5	3
	K	18	3	—	—	2	1	1	1	1	1	—	—	22	6
	P	—	—	—	—	—	—	1	1	—	—	—	—	1	1
	S	—	—	—	—	1	1	1	1	—	—	—	—	2	2
	N	—	—	—	—	—	—	—	—	1	1	—	—	1	1
R	2	1	—	—	—	—	—	—	8	4	—	—	10	5	
III a		21	5	—	—	3	2	4	4	14	8	1	1	43	20
	L	4	2	—	—	1	1	—	—	2	2	2	1	9	6
	T	—	—	5	1	4	2	—	—	25	10	—	—	34	13
	K	21	12	1	1	4	2	—	—	110	47	—	—	136	62
	P	11	3	—	—	7	3	1	1	28	18	—	—	47	25
	S	—	—	—	—	—	—	—	—	23	3	1	1	24	4
	N	7	4	—	—	—	—	4	1	9	6	—	—	17	11
R	—	—	—	—	—	—	—	—	6	3	2	1	8	4	
III bc		43	21	6	2	16	8	2	2	203	89	5	3	275	125
	L	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	T	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	K	—	—	—	—	—	—	3	3	—	—	—	—	3	3
	P	—	—	—	—	—	—	1	1	—	—	—	—	1	1
	S	—	—	1	1	13	5	5	2	2	1	5	2	26	11
	N	3	3	—	—	—	—	—	—	3	2	—	—	6	5
R	1	1	—	—	—	—	—	—	4	3	—	—	5	4	
IV—V		4	4	1	1	13	5	9	6	9	6	5	2	41	24
	L	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	T	—	—	—	—	—	—	—	—	15	7	—	—	15	7
	K	2	1	—	—	2	2	3	2	18	8	—	—	25	13
	P	—	—	—	—	1	1	—	—	11	7	—	—	12	8
	S	7	3	—	—	7	3	3	3	25	14	—	—	42	23
	N	—	—	—	—	—	—	—	—	1	1	—	—	1	1
R	—	—	—	—	—	—	—	—	1	1	—	—	1	1	
	9	4	—	—	10	6	6	5	71	38	—	—	96	53	
I—V	77	34	12	5	68	34	64	38	298	142	20	10	539	263	

V. (Type CCVCC, CCCVC). TR: trenk-1, 15.78, 9.22, 12.353¹; roots 3, different root 1 = TRE- 3, 1. — PS: pster-, 4.54; root 1, different root 1 = PS-E- 1, 1. — SK: s'kerd-, 4.57, 4.66¹; roots 2, different root 1 = SKE- 2, 1.

Sum V: 6 3
Sum I-IV: 509 + 31 255 + 9

VI. Y: yen-2, 8.21 vb.; yē-, 4.57, 6.63; roots 3, different roots 2 = YU 1, 1, YE 2, 1.

YN: yām-, 8.23; root 1, different root 1 = YAN 1, 1.

Sum Y: 4 3

W: wei-1, 8.26, 20.25; wei-3, 8.32, 8.33²; wi-1, 9.46, 9.47; roots 6, different roots 3 = WI 6, 3.

WL: wel-3, 15.45; wel-4, 9.24; wel-7, 1.44², 9.50; roots 4, different roots 3 = WEL 4, 3. — WK: wek^w, 18.41, 18.42; wog^{wh}-nes-, 8.22, 8.23; roots 4, different roots 2 = WEK 4, 2. — WP: wāb-, 18.13; wap-2, 18.13; roots 2, different roots 2 = WAP 2, 2. — WN: wem-, 4.57; root 1, different root 1 = WEN 1, 1. — WR: wer-1, 20.27; wer-2, 12.352; wer-3, 4.57, 6.35, 6.36, 9.46, 9.47; wer-7, 18.51; roots 8, different roots 4 = WER 8, 4.

WL: welk-1, 8.28, 20.26; roots 2, different roots 1 = WEL- 2, 1. — WR: werg²-2, 8.21 vb.; wrēg²-, 9.22; roots 2, different roots 2 = WER-, WRE- 2, 2.

-W: [dwō(u)-] dwei-, 8.23, 8.25, 8.26, 9.24, 9.25; twerk²-, 9.22; roots 6, different roots 2 = TWI 5, 1, TWE 1, 1. — koi-, kwī-, 18.13, gwes-, 9.50; gwet-, 12.353¹; k'wek-, 6.91; roots 4, different roots 4 = KWI- 1, 1, KWE- 3, 3. — swer-4, 20.27; swerbh-, swer-, 9.46, 9.47; roots 3, different roots 2 = SWE 3, 2. — skwerb(h)-, 9.46; root 1, different root 1 = SKWE- 1, 1.

Sum W: 43 26
Sum I-VI: 556 + 31 284 + 9

TABLE VI

SHARP	Short A		Long A		I		U		Short E		Long E		TOTAL		
I	—	—	—	—	2	2	3	2	—	—	—	—	5	4	
II a	L	—	—	—	—	—	6	2	—	—	—	—	6	2	
	T	—	—	3	1	1	1	5	3	1	1	5	2	15	8
	K	—	—	—	—	8	4	15	7	—	—	—	—	23	11
	P	—	—	2	1	3	1	9	3	—	—	—	—	14	5
	S	—	—	—	—	5	2	1	1	—	—	—	—	6	3
	N	—	—	—	—	3	1	3	2	—	—	4	2	10	5
	R	—	—	—	—	4	2	1	1	—	—	—	—	5	3
II bc		—	—	5	2	24	11	40	19	1	1	9	4	79	37
	L	1	1	—	—	—	—	—	—	—	—	1	1	2	2
	T	—	—	—	—	—	—	1	1	4	2	—	—	5	3
	K	18	3	—	—	2	1	1	1	1	1	—	—	22	6
	P	—	—	—	—	—	—	1	1	—	—	—	—	1	1
	S	—	—	—	—	1	1	1	1	—	—	—	—	2	2
	N	—	—	—	—	—	—	—	—	1	1	—	—	1	1
R	2	1	—	—	—	—	—	—	8	4	—	—	10	5	
III a		21	5	—	—	3	2	4	4	14	8	1	1	43	20
	L	4	2	—	—	1	1	—	—	2	2	2	1	9	6
	T	—	—	5	1	4	2	—	—	25	10	—	—	34	13
	K	21	12	1	1	4	2	—	—	110	47	—	—	136	62
	P	11	3	—	—	7	3	1	1	28	18	—	—	47	25
	S	—	—	—	—	—	—	—	—	23	3	1	1	24	4
	N	7	4	—	—	—	—	4	1	9	6	—	—	17	11
R	—	—	—	—	—	—	—	—	6	3	2	1	8	4	
III bc		43	21	6	2	16	8	2	2	203	89	5	3	275	125
	L	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	T	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	K	—	—	—	—	—	—	3	3	—	—	—	—	3	3
	P	—	—	—	—	—	—	1	1	—	—	—	—	1	1
	S	—	—	1	1	13	5	5	2	2	1	5	2	26	11
	N	3	3	—	—	—	—	—	—	3	2	—	—	6	5
R	1	1	—	—	—	—	—	—	4	3	—	—	5	4	
IV—V		4	4	1	1	13	5	9	6	9	6	5	2	41	24
	L	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	T	—	—	—	—	—	—	—	—	15	7	—	—	15	7
	K	2	1	—	—	2	2	3	2	18	8	—	—	25	13
	P	—	—	—	—	1	1	—	—	11	7	—	—	12	8
	S	7	3	—	—	7	3	3	3	25	14	—	—	42	23
	N	—	—	—	—	—	—	—	—	1	1	—	—	1	1
R	—	—	—	—	—	—	—	—	1	1	—	—	1	1	
	9	4	—	—	10	6	6	5	71	38	—	—	96	53	
I—V	77	34	12	5	68	34	64	38	298	142	20	10	539	263	

TABLE VII

ROUGH		Short A		Long A		I		U		Short E		Long E		TOTAL	
I		—	—	—	—	1	1	3	3	—	—	—	—	4	4
II a	L	—	—	—	—	—	—	1	1	—	—	—	—	1	1
	T	—	—	2	1	—	—	2	2	—	—	2	1	6	4
	K	—	—	—	—	—	—	4	4	—	—	—	—	4	4
	P	—	—	1	1	—	—	3	2	—	—	—	—	4	3
	S	—	—	—	—	4	2	1	1	—	—	—	—	5	3
	N	—	—	—	—	1	1	1	1	—	—	—	—	2	2
	R	—	—	—	—	3	2	1	1	—	—	1	1	5	4
		—	—	3	3	8	5	13	12	—	—	3	2	27	21
II b	L	—	—	—	—	—	—	—	—	2	1	—	—	2	1
	T	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	K	6	1	—	—	—	—	—	—	1	1	—	—	7	2
	P	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	N	—	—	—	—	—	—	—	—	1	1	—	—	1	1
	R	3	2	—	—	—	—	—	—	6	3	—	—	9	5
		9	3	—	—	—	—	—	—	10	6	—	—	19	9
III a	L	3	3	—	—	2	1	1	1	3	3	—	—	9	8
	T	—	—	—	—	1	1	—	—	19	6	1	1	21	8
	K	13	9	—	—	1	1	—	—	63	30	—	—	77	40
	P	8	3	1	1	1	1	—	—	19	12	—	—	29	17
	S	—	—	1	1	—	—	—	—	14	6	—	—	15	7
	N	2	2	—	—	—	—	—	—	3	3	—	—	5	5
	R	—	—	—	—	—	—	—	—	2	1	3	1	5	2
		26	17	2	2	5	4	1	1	123	61	4	2	161	87
III bc	L	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	T	—	—	—	—	—	—	2	1	—	—	—	—	2	1
	K	—	—	—	—	—	—	1	1	—	—	—	—	1	1
	P	—	—	1	1	—	—	1	1	—	—	1	1	3	3
	S	—	—	1	1	4	4	—	—	—	—	2	1	7	6
	N	3	1	—	—	—	—	—	—	3	2	—	—	6	3
	R	—	—	—	—	—	—	—	—	2	2	—	—	2	2
		3	1	2	2	4	4	4	3	5	4	3	2	21	6
IV—V	L	—	—	—	—	—	—	—	—	1	1	—	—	1	1
	T	1	1	—	—	—	—	—	—	3	3	—	—	4	4
	K	3	3	—	—	3	2	1	1	10	8	—	—	17	4
	P	—	—	—	—	—	—	—	—	7	4	—	—	7	4
	S	—	—	—	—	1	1	3	3	15	8	—	—	19	12
	N	—	—	—	—	—	—	—	—	1	1	—	—	1	1
	R	—	—	—	—	—	—	—	—	2	2	—	—	2	2
		4	4	—	—	4	3	4	4	39	27	—	—	51	38
I—V		42	25	7	6	22	17	25	23	177	98	10	6	283	175

TABLE VIII

REPRES. SAMPLE		Short A		Long A		I		U		Short E		Long E		TOTAL	
I		—	—	—	—	13	5	18	6	5	2	—	—	36	16
II a	L	—	—	1	1	5	2	12	2	—	—	1	1	19	7
	T	—	—	6	2	9	3	27	8	—	—	25	4	67	17
	K	—	—	11	2	31	14	33	16	6	2	4	2	85	36
	P	—	—	15	4	10	6	24	9	—	—	—	—	49	19
	S	—	—	—	—	6	1	12	6	1	1	—	—	19	8
	N	—	—	6	3	12	7	10	5	—	—	14	4	42	19
	R	—	—	—	—	2	1	4	3	—	—	—	—	6	4
	—	—	39	12	75	34	122	50	7	3	44	11	287	110	
II bc	L	10	5	—	—	—	—	—	—	6	6	—	—	16	11
	T	1	1	1	1	—	—	—	—	5	2	1	1	8	5
	K	10	3	—	—	4	3	8	4	14	5	—	—	36	15
	P	—	—	—	—	—	—	—	—	3	2	—	—	3	2
	S	3	1	—	—	1	1	3	3	6	3	—	—	13	8
	N	10	4	2	1	—	—	—	—	7	3	—	—	19	8
	R	15	2	—	—	—	—	—	—	18	8	—	—	33	10
	49	16	3	2	5	4	11	7	59	29	1	1	128	59	
III a	L	6	5	1	1	10	4	19	7	15	5	3	3	54	25
	T	2	1	—	—	11	3	4	2	86	32	2	1	105	39
	K	33	18	3	3	4	3	8	4	181	65	1	1	230	95
	P	19	8	1	1	8	5	8	5	110	38	1	1	147	58
	S	1	1	7	1	2	2	—	—	41	15	1	1	52	20
	N	9	5	—	—	1	1	4	2	53	23	5	2	72	33
	R	2	2	—	—	2	1	2	2	17	7	—	—	23	12
	72	40	12	6	38	20	45	22	503	185	13	9	683	282	
III bc	L	2	2	—	—	—	—	—	—	1	1	—	—	3	3
	T	—	—	—	—	2	1	—	—	—	—	—	—	2	1
	K	—	—	—	—	4	4	4	3	—	—	3	2	11	9
	P	—	—	—	—	3	3	1	1	—	—	—	—	4	4
	S	—	—	26	2	13	10	15	7	2	1	2	1	58	21
	N	6	5	—	—	—	—	—	—	5	3	—	—	11	8
	R	1	1	—	—	—	—	—	—	3	2	—	—	4	3
	9	8	26	2	22	18	20	11	11	7	5	3	93	49	
IV—V	L	—	—	—	—	—	—	—	—	5	3	—	—	5	3
	T	1	1	—	—	1	1	—	—	19	14	—	—	21	16
	K	5	3	—	—	3	3	1	1	40	24	—	—	49	31
	P	5	4	—	—	—	—	3	2	15	7	—	—	23	13
	S	4	4	—	—	9	5	8	5	59	28	—	—	80	42
	N	2	2	—	—	—	—	—	—	8	6	1	1	11	9
	R	—	—	—	—	—	—	—	—	1	1	—	—	1	9
	17	14	—	—	13	9	12	8	147	83	1	1	190	115	
I—V	147	78	80	22	166	90	228	107	732	309	64	25	1417	631	

The repetition of phonemic characteristics

TABLE 1
REPRESENTATIVE
SAMPLE,
ROOTS CVC etc.,
GROUP III—V

	P	T	L	R	N	K	K	S	
L	9	6	—	1	4	19	19	4	62
T	6	—	14	51	20	19	19	1	130
K	9	14	34	56	24	2	1	5	145
K	10	14	34	56	23	1	2	5	145
P	2	23	43	58	16	13	12	7	174
S	23	63	15	7	28	27	27	—	190
N	1	12	13	12	29	13	12	2	94
R	5	9	—	—	2	5	6	1	28
	65	141	153	241	146	99	98	25	968

TABLE 38
SHARP, POINTED,
LOUD,
ROOTS CVC etc.,
GROUP III—V
Normalized

	P	T	L	R	N	K	K	S	
L	9	—	—	—	—	5	7	—	21
T	—	—	33	49	9	12	12	—	115
K	14	3	39	82	21	7	5	21	192
K	14	2	40	82	21	7	5	21	192
P	—	16	28	42	12	16	17	9	140
S	33	26	19	12	33	47	46	—	216
N	3	14	7	5	—	14	14	2	59
R	2	5	—	—	5	9	9	3	33
	75	66	166	272	101	117	115	56	968

TABLE 39
SHARP, POINTED,
LOUD,
ROOTS CVC etc.,
GROUP III—V
Actual

	P	T	L	R	N	K	K	S	
L	4	—	—	—	—	2	3	—	9
T	—	—	14	21	4	5	5	—	49
K	6	1	17	35	9	3	2	9	82
K	6	1	17	35	9	3	2	9	82
P	—	7	12	18	5	7	7	4	60
S	14	11	8	5	14	20	20	—	92
N	1	6	3	2	—	6	6	1	25
R	1	2	—	—	2	4	4	1	14
	32	28	71	116	43	50	49	24	413

TABLE 4
REPRESENTATIVE
SAMPLE,
DIFFERENT ROOTS
CVC etc., GROUP
III—V

	P	T	L	R	N	K	K	S	
L	7	5	—	1	2	7	7	2	31
T	3	—	8	24	6	7	8	1	57
K	4	8	13	26	10	2	1	3	67
K	5	8	13	26	10	1	1	4	68
P	1	13	19	18	7	6	6	5	75
S	12	18	11	6	14	11	11	—	83
N	1	7	8	6	10	8	8	2	50
R	3	5	—	—	2	2	3	1	16
	36	64	72	107	61	44	45	18	447

TABLE 40
SHARP, POINTED,
LOUD,
DIFFERENT ROOTS
CVC etc., GROUP
III—V
Normalized

	P	T	L	R	N	K	K	S	
L	7	—	—	—	—	2	5	—	14
T	—	—	9	17	7	4	7	—	44
K	7	2	19	29	14	5	4	6	86
K	4	2	20	29	15	5	2	9	86
S	15	20	11	2	11	13	11	—	83
N	2	9	7	4	—	6	9	2	39
R	2	2	—	—	4	5	4	3	20
	37	44	86	99	58	49	48	26	447

TABLE 41
SHARP, POINTED,
LOUD,
DIFFERENT ROOTS
CVC etc., GROUP
III—V
Actual

	P	T	L	R	N	K	K	S	
L	3	—	—	—	—	1	2	—	6
T	—	—	4	8	3	2	3	—	20
K	3	1	9	13	6	2	2	3	39
K	2	1	9	13	7	2	1	4	39
P	—	4	9	8	3	4	3	3	34
S	7	9	5	1	5	6	5	—	38
N	1	4	3	2	—	3	4	1	18
R	1	1	—	—	2	2	2	1	9
	17	20	39	45	26	22	22	12	203

The repetition of phonemic characteristics

TABLE 42
ROOTS CV, VC,
GROUP II

	RS Roots	SHARP		RS Diff. roots	SHARP	
		Norm.	Act.		Norm.	Act.
L	35	27	8	18	12	4
T	75	68	20	22	33	11
K	60	76	22	25	25	8
K	61	77	23	26	26	9
P	52	51	15	21	17	6
S	32	27	8	16	15	5
N	61	38	11	27	17	6
R	39	51	15	14	24	8
	415	415	122	169	169	57

TABLE 43
ROOTS,
GROUP I—V
VOWELS

	RS Roots	SHARP Norm.	ROUGH Norm.	SHARP Act.	ROUGH Act.
Short A	147	202	210	77	42
Long A	80	31	35	12	7
I	166	179	110	68	22
U	228	168	125	64	25
Short E	732	784	887	298	177
Long E	64	53	50	20	10
	1417	1417	1417	539	283

TABLE 44
DIFFERENT
ROOTS,
GROUP I—V
VOWELS

	RS Diff. roots	SHARP Norm.	ROUGH Norm.	SHARP Act.	ROUGH Act.
Short A	78	82	90	34	25
Long A	22	12	22	5	6
I	90	82	61	34	17
U	107	91	83	38	23
Short E	309	340	353	142	98
Long E	25	24	22	10	6
	631	631	631	263	175

CONCLUSION

I

1. In our examination of C. D. Buck's dictionary of synonyms we started from the fact that individual synonymic sets show frequent repetitions of identical or similar phonemes in independent radical morphemes. In the work of the Indo-European scholars this fact which clearly goes beyond the frame of generally recognized onomatopoeic terms has either been overlooked or — because of the theoretical suppositions to the contrary — has received no particular attention, even when observed. Despite the tiresome labour required by such an undertaking, it seemed worth while to proceed to a systematic investigation which might establish whether all this can be due to a broader regularity in the parallel naming of the same reality. By means of a comparative analysis of synonyms and by the application of the statistical method we approached, on a limited corpus of material, the old and yet again and again tackled problem of the intrinsic connection between sound and meaning.

The thesis which had to be tested on our statistical material was the assertion put as an anti-motto at the outset of our study [1], 21. There is little need to point out that in emphasizing only the difference of the sound-form of synonymic morphemes this assertion coincides with the well known principle of the arbitrariness of the linguistic sign [2], 67. Interpreted in statistical terms it amounts to saying that the phonemic distribution of language at all levels and in all component parts of the linguistic forms is in principle independent of the conceptual content. Hence — if the arbitrariness of the linguistic sign were generally valid — in our case the phonemic distribution of radical morphemes in the synonymic sets selected by specific conceptual criteria should not significantly differ from the normal distribution of radical morphemes appearing in synonymic sets taken at random in the dictionary.

But it turned out that the seven broad concept groups of synonymic sets chosen and analyzed show great deviations from the normal phonemic distribution.

2. In the course of our investigation we have limited ourselves to a detailed presentation of the data acquired through the analysis and to their illustration in the tables, leaving the facts to speak for themselves. For a definitive, statistically valid conclusion on the overall result of the inquiries as well as on the strength of the individual data this, however, is not sufficient. This is the reason why, in accordance with the requirements of the statistical theory, we have concluded our investigation with four probability calculations, namely:

a) the calculation of Chi-square for the tested seven concept groups, in every field — i. e. in the field of discrete consonants, of consonant pairs, and of vowels — in order to find out whether the phonemic distributions of these concept groups, taken as a whole, significantly differ from the respective normal phonemic distribution.

b) the calculation of Chi-square for thirty groups of synonymic sets set up at random from our population, in all the fields, for the purpose of establishing whether the normal phonemic distribution, taken as a whole, is stable.

c) the calculation of the standard deviations for the individual frequencies of the same at random set up groups of synonymic sets, in order to determine to what degree the individual frequencies in these conceptually unrelated groups are stable.

d) the probability calculation using the standard deviations obtained under c), to establish to what degree the individual frequencies of the tested seven concept groups significantly differ from the corresponding frequencies of the respective normal distribution.*

3. The probability inferences are as follows:

ad a) The differences between the consonant distributions of the seven concept groups and the normal consonant distribution are in all instances statistically significant. The same is true also of the distribution of consonant pairs, with the only exception of the concept group TOUCH. The differences between the vowel distributions of the concept groups and the normal vowel distribution are statistically significant with the concept groups BLOW, SMELL, SHARP and ROUGH. The probability that these differences might be differences of pure chance nowhere exceeds $P = 0.001$, this being a appropriately fixed limit for the evaluation of the essential differences of the total distributions [3], 2, 47.

ad b) The differences between the phonemic distributions of the thirty at random selected groups and the normal phonemic distribution are in no instance, in no field, statistically significant. The probability of chance is in every case far beyond the fixed limit of 0.001.

ad c) The deviations of the frequencies for the individual phonemic elements of the thirty at random formed groups from the frequencies to be expected from the normal distribution all the time move — with a single relevant exception for the consonant pair KR, and four negligible exceptions for LT, PP, NP, RS — within the interval of three standard deviations. The probability of chance is — besides the one case with KR — everywhere far greater than $P = 0.0027$ which corresponds with phonemic elements with greater relative frequency in the population to three standard deviations, and which is for the evaluation of the individual deviations an appropriately fixed limit [4], 95, 314.

ad d) The deviations of the frequencies for the individual phonemic elements of the seven concept groups from the frequencies to be expected from the normal distribution exceed three standard deviations in a number of instances. When taking into account also the relative frequency for the individual phonemic elements in the population, we find with the same

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phonemic elements as under c) 19 instances of doubtlessly significant deviations in the positive direction and to these correspond 18 instances of doubtlessly significant deviations in the negative direction.

Above all in the field of consonants we find positive significant deviations with all the seven consonant classes of high relative frequency: K, R, N, S, L, T, and P. Further ten positive significant deviations are found with the consonant pairs, each of which represents more than 3 per cent of the population [5], 292, specifically with KR, KN, SN (twice), PL (twice), PR, SK, TR, and ST. In the field of vowels we find with the same phonemic elements as under c) two occurrences of positive significant deviations, both times with the class U.

The eighteen negative significant deviations are distributed as follows: in the field of consonants they occur with K (three times), R, N (twice), and T (twice) — altogether eight times; in the field of consonant pairs they occur with NN, LK (twice), SK (twice), ST, and TR — altogether seven times; in the field of vowels they occur with I, U, and long A altogether three times.

Here it should be added that owing to a later combining or splitting up of the individual phonemic elements another 12 significances have been established; six in the field of consonant pairs with the joined pairs SL + NL + TL (twice), TP + PT, PS + SP, KT + TK, and TR + PR, and six in the field of vowels and consonant-vowel combinations, with short A + short E (twice), with long A + long E (negative significance), with K - short A (twice), and with P-U.

The probability that all these might be deviations of pure chance nowhere exceeds the fixed limit of 0.0027.*

4. On the basis of the obtained results it is possible to maintain that the tested thesis about the expression of the same concepts with consistently various phonemes does not apply to the statistical material of our seven concept groups. Obviously there exists a connection between the significant deviations from the normal phonemic distribution, taken as a whole, and in particulars, and the fact that the synonymic sets of our concept groups have been selected according to specific conceptual criteria.

5. The existence of this connection is clearly demonstrated by our additional tests, in so far the normal phonemic distribution in the thirty

* The great difference concerning the distributions under c) and under d) is evident also from the following data: In the 30 groups set up at random we have with the phonemic characteristics representing 3 per cent and more of the population altogether 24 instances of deviations which exceed two standard deviations; once with K, R, L, P, and twice with S and T; once with KN, PL, TR, and twice with KL, SK, ST, LK, TK; once with short A, U, and E. In the seven concept groups, in spite of the four times smaller number of instances, 31 similar deviations are found; R, S, short A, and -U in the concept group SHARP; -L, PR, TR, -ST, -long A, -I, and E in the concept group ROUGH; -KL, NN, and -long A in the concept group NARROW; N, -SK, -long A, and -I in the concept group SMELL; -KR, -KN, -NN, -TK, -long A, and E in the concept group SMOOTH; -N, -L, -KL, -NN, and -U in the concept group TOUCH; -KL, -NN in the concept group BLOW.

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at random formed groups of synonymic sets nowhere essentially varies taken as a whole and shows almost no essential deviations in particulars. The statistical experiments under b) and c) confirm that our population of independent roots from Buck's synonymic sets behaves in this respect in the same way as the population of an alphabetically arranged dictionary. In fact, if we take sufficiently large parts from any alphabetically arranged dictionary, chosen at random, we shall see that the phonemic distribution will not essentially vary from one part to another or from the average phonemic distribution of the dictionary [4], 67. On the other hand, essential differences will immediately come up, when we compare the phonemic distributions of consecutively running word groups, chosen exclusively from one initial letter, with those chosen exclusively from another letter: the frequencies of the initial phonemes are in such a case throughout preferred.

In our case we are dealing not with an alphabetical but with an onomatological dictionary. Admittedly the dictionary is limited to the etymological projections of the root part of the various terms and is also reduced by the exclusion of the recurrent etymologically identical roots with each individual concept, but nevertheless it preserves the typical statistical characteristics of a dictionary with its stable phonemic distribution. A distribution, essentially different from the normal, were to be expected only on condition that the parts taken from the dictionary are chosen at one time exclusively under one concept group and at another time exclusively under another, and further, that there are specific phonemic characteristics preferred in different concept groups. The results of our investigation prove that such preferences in fact exist. Instances of preference may be seen already in the fact that in small synonymic sets certain phonemic characteristics prevail to the exclusion of others. Frequent instances of preference are found in the recurrence of certain phonemic characteristics where with regard to the normal phonemic distribution these recurrences should not turn up. And finally we get preference through excessive recurrences of certain phonemic characteristics with big synonymic sets, where with regard to the normal phonemic distribution only a smaller number of such recurrences would be justified. The sum of the preferences, of which each for itself is too small for reliable evaluation, gives significant differences, on the whole and with individual phonemic elements, in our seven concept groups. Conversely, in groups of synonymic sets formed at random the single preferences are mutually eliminating, and the phonemic distributions remain essentially identical with the normal phonemic distribution.

6. The fact that it was possible to detect so numerous phonemic characteristics preferred in definite concept groups, i. e. that it was possible to establish systematic morpho-semantic correlations, is based of course on the application of some fundamental methods.

First of all the Indo-European phonemic system had to be simplified. The simplification, as it was explained at an earlier stage, was necessitated by larger phonemic classes so that the statistical material should not get too

scattered. Here we must emphasize that the linguistic phenomenon subjected to our inquiry consists not only of the recurrences of the same phonemes and phonemic combinations under definite circumstances but to an even larger degree of the recurrences of similar phonemes and phonemic combinations. If the problem was to be approached in total, a classification into types was indispensable. The inductive classification of phonemes as resulting directly from our statistical material happens in respect of the principal consonantal characteristics to be in an almost consistent agreement with the traditional classification of consonants, i. e. the classification into plosives, fricatives, liquids and nasals according to the manner of articulation, and into labials, dentals, and gutturals according to the zone of articulation. The only difference from the traditional classification is in the separation of the two liquids considered as being two independent phonemic characteristics. This procedure, at variance with the hypothesis that the Indo-European parent tongue had originally only one liquid [6], was fully required by our statistical material. Not only that it was not possible to establish any broader concept group in which both liquids would appear in a joint morpho-semantic correlation but the initial perusal of Buck's dictionary already disclosed that each of the two phonemes was in an independent correlation with a highly different concept group. The statistical tests carried out confirmed our inductive conclusions and even revealed an unusual coherence of the simplified consonant system.

From the analysis of the recurrent R in the concept group ROUGH, for instance, we can see that the significance of R is primarily related to the occurrences of the radical morphemes in which R appears with any of the guttural plosives; and from the analysis of the recurrent L in the concept group SMOOTH we can see that the significance of L is at least in part dependent on the supernumerary occurrences of the radical morphemes with an additional labial plosive. If we take the guttural and labial plosives as phonemic types, we get in fact another two significant phonemic characteristics: KR, and PL. Similarly, the recurrent significant S in the concept group SMELL is related to the supernumerary occurrences of radical morphemes containing either an additional M or an additional N, and the two nasals treated as one single phonemic type give a further significant phonemic characteristic: SN. Three of the four consonant types: K, P, T, and N, which appear as independent phonemic characteristics in the concept groups SHARP, BLOW, TOUCH, and NARROW, appear thus in significant combinations with individual consonants in the first mentioned concept groups ROUGH, SMOOTH, and SMELL. The whole of the statistical results permits the conclusion that the morpho-semantic correlations of the consonant types are to be attributed to the generic, and hence the more important, auditory-articulatory features of these consonantal categories. Where, on the other hand, the morpho-semantic correlations are related to individual consonants, the individual auditory-articulatory features of these consonants are to be considered equally important as the generic features of the consonant types.

7. The establishment of types in the Indo-European vowel system was as well done inductively, but within the frame of the concept groups for which consonantal morpho-semantic correlation had been found. From the overall impression of the recurrences of similar vowel elements in these concept groups it seemed that the most appropriate thing to do was to make a statistical verification of the heuristic value of the traditionally assumed five-member vowel system *a-e-i-o-u*, modified, by joining *e* and *o*, into a four-member system. This modification was suggested by the absence of any sign that would point towards a morphosemantic correlation in connection with *o*, an absence that was probably correctly explained by the fact that owing to the qualitative vowel alternation or some other reason [7], 38, 106, 392, at least the large majority of roots with *o* sounds, either short or long ones, contained originally an *e* sound. In the simplified system of the four basic, qualitatively different vowel elements no distinction was made between short and long elements, regarding shortness or length as genetically secondary distinctive features.

8. A special procedure was used in the determination of the vowel classes *U* and *I*. These classes came to include not only the independent unreduced *u* and *i* root sounds [8] but also the falling *u* and *i* diphthongs in radical morphemes, irrespective of the quality of the various initial vowels. Already from the methodological point of view such a joining could hardly be avoided: the root diphthongs had to be taken as a uniform phonemic characteristic because of the statistical comparison with simple root vowels which are counted only once. Also it was not possible to count and discuss separately the *u* and *i* vowel sounds on the one hand and the *u* and *i* semi-vowel sounds on the other, since in both cases we are concerned with phonologically the same phoneme [7], 393. The decisive factor in the establishment of types was again our statistical material. After a statistical verification in two concept groups, *BLOW* and *SMELL*, the vowel class *U*, established in this way, turned out to be doubtlessly significant. The parallel class *I* gave indeed in our statistical material no positive significant result, but the negative significance of that class in the concept group *BLOW* indirectly proved its real existence. It follows that with the falling diphthongs the initial vowel subject to quantitative vowel alternation is — at least in the mentioned concept groups — semantically subordinated to the vowel element *u* and *i*. The decisive semantic significance of the second vowel elements in these diphthongs agrees with the fact that these elements are not affected by reduction, or rather are even strengthened by it. In their stability they are like the consonantal phonemic characteristics that represent the chief semantic value of the Indo-European radical morphemes [9], 152, [7], 392. Accordingly, we may, irrespective of the hypothesis about the monophthongal origin of the falling diphthongs in imitative words [10], 288, attribute the statistical significance of the *U* and *I* classes to the prominent auditory-articulatory features of the *u* and *i* sounds which prevail over the respective features of the accompanying initial vowels.*

9. Important as are the obtained results concerning the vowel classes U and I, within the frame of the four-vowel system they remained solitary. Only the vowel distribution of the concept group ROUGH seemed to indicate, if taken as a whole, another essential deviation from the normal vowel distribution — but this owing to the extremely low frequency of the class U and to a slightly less low frequency of the class I and not to any positive significance. One of the reasons for the small number of the established morpho-semantic correlations of vowels was obviously the fact that these correlations were being established in addition to those of the consonants — but the small number could have been caused also by inadequate establishing of the vowel types. To get this clear at the end of our investigation we split up the vowel class A into the class of short A sounds and the class of long A sounds. This was done with particular respect to the vowel distribution of the concept group SHARP in which short A sounds were markedly recurrent. Besides, we limited ourselves in distinguishing between short and long vowels to the class A, because particularly here it might be possible to find an original difference in the quality between the two categories [7.187]. With such a classification of vowels into five basic elements there appeared an essentially different vowel distribution, in contrast to the normal, not only with the concept group ROUGH but also in the concept group SHARP. Nevertheless neither of A classes reached the limit of significance. Only in distinguishing between short and long vowels also with the class E, a close parallelism showed up between the split up classes of A and E. Taking long A sounds and long E sounds together on the one hand, and short A sounds and short E sounds on the other, there came to light a clear significance of the joined short vowels in both concept groups SHARP and ROUGH. Conversely, with an opposite methodical approach, separating the various consonantal combinations with a short A sound, we succeeded in discovering the significance of the consonant-vowel combination K — short A.

10. In this way the finally established classification of the Indo-European vowel system consisting of six basic elements, short A — long A — I — U — short E — long E, capable of being joined together or further divided, now according to one of their features now according to another, came to be the most appropriate one for the determining of vowel morpho-semantic correlations in our statistical material. In the case of the significance of the joined short vowels we are concerned apparently with a morpho-semantically relevant opposition to long vowels, which in the concept group SHARP happen even to be negatively significant: this is to say that we are concerned with the positive significance of the closed syllable in opposition to the negative significance or rather non-significance of the open syllable, the shortness or

* Since in the rising root diphthongs with the initial semi-vowels u and i there is no reduction in favour of these initial vowel elements, the rising diphthongs were not included into the classes U and I, and the question of their classification remained open. In view of the comparatively small number of such instances this could be done without affecting the validity of the statistical results.

length of vowels in the Indo-European monosyllabic roots relying in principle on the central, or rather the final, place in the syllable [11]. The auditory-articulatory features which are the sole decisive factor for the morpho-semantic correlations are in this case related only to the syntagmatic structure, i. e. the closedness and openness, of the radical morphemes.*

The significance in our statistical material of the consonant-vowel combination K — short A with regard to the specific quality of the short A sound is another somewhat surprising finding since the existence of an original Indo-European A is also for the short A still controversial. But even if in the statistical calculation we include only the roots containing in Pokorny's dictionary a consistently marked short A, and exclude all cases where A might possibly be long, the significance of the K — short A combination with the concept group SHARP is beyond doubt. At this point it must be added that in the normal phonemic distribution almost half of the doubtlessly short A sounds appear in combination with K, while in the same distribution only a quarter of long A sounds appears in such a combination. Finally, in the combination K — short A the guttural is nowhere labialized, this occurs only in the combination K — long A. The sole exception to the rule is found in the radical morpheme (s)lāg^w-. All this points to the articulatory uniformity of the non-labialized K — short A, similar to the articulatory uniformity of P-U in the concept group BLOW, and to the real existence of the short A sound in the Indo-European mother tongue. The significance of the combination K — short A is in all probability to be attributed to the common guttural auditory-articulatory features of K and short A. But our results give no explanation to the problem whether the class of long A in fact represents an independent vowel quality that would be distinct not only from the vowel quality of short A but also from that of E. It is only the establishment of a particular morpho-semantic correlation appearing in some positive significance of the class of long A that could conduce to the elucidation of this question; until such a correlation has been established, a distinct treatment of the class of long A is methodologically required.

11. Along with the establishing of the phonemic types as common denominators in the recurrences of similar phonemic characteristics in the synonymic sets we proceeded with the conceptual categorization of these sets. The categorization was called for by the statistical method, but in order to carry it out successfully suitable theoretical criteria were required. The working hypothesis, which included these criteria, was in the course of this study already briefly explained; but since it represents the main methodological approach in our investigation, we shall try now to explain it in some detail and show how its empirical and theoretical foundations agree.

* If the classes U and I are divided into occurrences in closed and in open syllables, and the occurrences in closed syllables are added to short A and E, and occurrences in open syllables to long A and E, we get both with ROUGH and with SHARP positive significances in the first case and negative significances in the second.

The fundamental assumption in the working hypothesis was that the recurrences of phonemic characteristics under consideration have their origin in the imitative representation of reality. One indeed cannot imagine any other acceptable reason for these systematic recurrences. Theoretically speaking, only two modes of representation of the reality are possible: the imitative and the symbolic [4], 168, or rather, since the second term is not strictly unambiguous, the imitative and the non-imitative, or the iconical and the non-iconical [12]. The thesis about the arbitrary nature of the linguistic sign resides in the proclamation of the absolute validity of the second mode in language; the concretely established not-accidental recurrences of phonemic characteristics in our synonymic sets point, on the contrary, to the first alternative.

12. But what in fact is imitated in the radical morphemes, and what is the mechanism of imitation like? From our statistical material it seems to be evident that the established significances cannot be accounted for by onomatopoeias in the traditional sense of the word, i. e. by reproductions of acoustical phenomena. Unusual recurrences of phonemic characteristics occur frequently with synonymic sets where the denominated phenomena are not acoustically manifesting themselves or their acoustical manifestation is clearly subordinated, e. g. it is only facultative, less intense or less important with regard to other forms of manifestation. This applies to the majority of the synonymic sets in the concept groups SMOOTH, ROUGH, NARROW, TOUCH, and SHARP, as well as for numerous sets in the groups BLOW and SMELL. It is therefore a necessary conclusion that the significance in all these cases is caused by a specific imitation of non-acoustic phenomena. The idea that such imitations in fact exist, is — as has been seen from Plato's quotation — a very old one; it has been alive through the entire history of the European culture and was again emphasized by the romantic school of the 18th and 19th centuries. At the beginning of this century it was the well known psychologist Wundt [13], 323, who tried to formulate it in scientific terms. But the repeated studies of imitation in language to be seen in the copious bibliography [10], [12] have not led to a uniform view of scholars and to a clear demarcation between the not acoustically conditioned imitation and the onomatopoeia as it is traditionally understood. The uniform and overlapping use of terms like sound gestures, kinetic onomatopoeia, sound pictures, sound-symbolic expressions, expressive words, clearly reflects this state. And although the recent experimental and statistical studies on artificial and natural linguistic material [14], prior to the present investigation, more than once succeeded in proving the objective existence of systematic non-acoustic correspondence between sound and meaning, the basic physiological and psychological mechanism, the development, and the historical origin of this correspondence have remained unclear.

13. The first reason for this is to be sought in the insufficient knowledge about the physiological and psychological conditions of man's speech in

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13. The first reason for this is to be sought in the insufficient knowledge about the physiological and psychological conditions of man's speech in

general; the beginnings of a universally conceived examination of these conditions come only from the second half of this century [15], [16]. In the elucidation of the problem outlined one must needs start from the physiological and psychological data concerning man's speech; until these have been adequately clarified, no definite explanation of any linguistic imitation can be expected. It should be pointed out that the question of the so-called acoustic imitation can no more be regarded as settled; this is demonstrated by the widely known fact that the imitations of this kind vary from one language to another — a fact which the protagonists of the consistently arbitrary nature of the linguistic sign have frequently used to negate any systematic imitation in speech [17].

14. As now it is certainly true that the examination of the relation between the linguistic sign and the phenomenon to which the sign refers is normally not the linguist's concern [12], this assertion does not apply to the real or presumable imitative terms. A consistent scientific study of the imitative terms would in addition to a necessary analysis inside the particular linguistic system require a special inter-disciplinary method for the comparison of these terms and the corresponding phenomena, the acoustical-auditory comparison on the auditory level and the physically-physiological one on the other sensory levels which are involved in the motor-sensory mechanism of man's speech. In this way only — with positive and negative findings — it would be possible to establish definitively the structure of the respective concepts with all the elements of sensory perceptions contained in them and to determine the intermediate link between the phenomena and the corresponding imitative terms. The fact that such investigations — with the exception of some experiments carried out by H. Wissemann [18] concerning the onomatopoeias — have not yet been undertaken is the second and the main reason for the ignorance of the physiological and psychological mechanism of the linguistic imitations. A direct consequence of the lack of such knowledge is the disagreement in view of the role of the imitative terms in the origin of language. If e. g. a renowned linguist regards the problem of the origin of language as insoluble and for that reason as something outside the scope of the linguistic science, his view is conditioned by a somewhat hasty judgment that the subjective work of a single, be it acute, observer in comparing imitative terms and the acoustic and other elements of the imitated phenomena [19] already suffices for a definitive explanation of the imitative mode in language [20], 19, 270.

15. In these circumstances a working hypothesis was necessary to explain the concept groups suggested by the unusual repetitions of phonemic characteristics in definite synonymic sets.

The basis of this hypothesis are two obvious facts: 1) The linguistic imitation consists in the reproduction of extra-linguistic perceptions by means of the organs of speech on the part of the speaker. 2) Speaking is performed through a motor process in the organs of speech, controlled on

the one hand by an auditory feedback from the ear, and on the other by a tactile and proprioceptive feedback from the organs of speech themselves.

It follows that trying to reproduce the extra-linguistic perception the speaker controls this reproduction by the multi-sensory feedback, necessarily accompanying every speech activity. And there exists the possibility that in the process of reproduction and feedback the speaker reproduces and controls anyone of the extra-linguistic perceptions which are of the same nature as those generally taking part in speaking, i. e. not only auditory but also tactile and proprioceptive perceptions.

In agreement with this possibility we assume that linguistic imitations of tactile and proprioceptive perceptions occurring wherever in the body really exist. We assume further that the understanding and the acceptance of these imitations on the part of the listener takes place after an active repeating of the particular imitation on his part and experiencing the same process of reproduction and control as experienced by the speaker. Finally, we assume that the identification of tactile and proprioceptive perceptions coming from any part of the body and those arising through speaking in the speech organs in many cases is facilitated by synergism and by sensations involving the entire human organism, taking place in various physiological processes and voluntary motor activities.

These identifications are not conceived as conscious: in man's consciousness the phenomenon producing the extra-linguistic perceptions is identified with the sound carrying their linguistic reproductions.

16. Taking into account that the reproduced extra-linguistic sensory perceptions may occur either separately or in combination, we obtain seven possible types of imitated phenomena listed in the table below. Disregarding the difference between the tactile and proprioceptive perceptions and taking them together as non-auditory perceptions, the number of the possible types is reduced to three. In the table, AUD stands for auditory perceptions, NON-AUD for non-auditory perceptions, TACT for tactile perceptions, and PROP for proprioceptive perceptions.

TABLE IX: The basic possible types of imitated phenomena producing:

AUD TACT PROP	AUD TACT	AUD PROP	TACT PROP	TACT	PROP	AUD
1	2	3	4	5	6	7
AUD — NON-AUD I				NON-AUD II		AUD III

The table shows what type of imitation may explain the unclear significances of the phonemic characteristics in our concept groups. Where the synonymic sets refer to real phenomena that are not acoustically manifesting themselves, it seems plausible to explain the unusual repetition of the phone-

mic characteristics as an imitation of sensory perceptions listed in the table under II 4, 5, or 6. Wherever the real phenomena expressed in the synonymic sets get at least in part acoustically manifested, the unusual repetition of the phonemic characteristics may be accounted for by the imitations under I 1, 2, or 3 in our table. In the forming of the synonymic sets, however, the imitative type 7 or rather III has been excluded for methodological reasons. Our guiding criterion in the forming of the concept groups was to collect in the concept groups only those synonymic sets which express phenonema producing normally tactile or proprioceptive perceptions or both, and to exclude the synonymic sets which refer to other phenomena. In other words: we have limited ourselves to the linguistic expression of that part of reality only which man directly experiences either through his body or on it.

17. Such a decision seemed inductively appropriate from the point of view of our statistical material; otherwise we just would not have known how to form both sufficiently large and sufficiently homogeneous concept groups covering sets with unusual repetitions of phonemic characteristics; and theoretically we relied here on the great significance of the simultaneous experience of one's own body and of the external reality [21], [22]. In this connection it might not be superfluous to note that even the study of modern poetic synaesthetic metaphors reveals that the most frequent source of these metaphors is to be found in tactile sensory perceptions, irrespective of the single authors [23], 282. And the decisive role of the sense of touch and of the proprioceptive sense in the human organism, which two senses condition all of man's physical operations, has been recently emphasized by the cybernetic science [24].

Just as we excluded from our concept groups all the sets with terms for phenomena which are accessible to man only by the auditive way we excluded also the sets with terms for phenomena accessible to man only optically. Since the visual perceptions in the auto-perception of the speech under normal conditions do not occur, there is a lack of parallelism. This lack does not permit the identification of extra-linguistic and linguistic sensory perceptions, and this applies also to all other sensory perceptions which are not considered in our model. All these perceptions may have an indirect share in the linguistic imitation, to the extent to which they are in a local, synergetic or synaesthetic connection with auditory, tactile, or proprioceptive perceptions.

18. Before trying to explain the individual established morpho-semantic correlations, we must tackle the question with what sound material the linguistic imitations under consideration have been performed: with linguistic sounds as they are known or reconstructed, or with pre-linguistic sound elements which were only at a later stage changed into linguistic sounds? Are these imitations primary or secondary, and to what period of the language do they belong?

Once more it was pointed out under 5. that the statistical population from which our results are derived represents an onomatological dictionary,

reduced to genealogically independent Indo-European radical morphemes in each synonymic set. This is of course not a dictionary referring to some pre-Indo-European state where the language morphemes would appear in their pure radical shape. This is a specially worked out onomatological dictionary of the main Indo-European languages; their independent linguistic systems are here taken in consideration with regard to the main periods of their development. Only because all these linguistic systems go back to the same original mother tongue it was possible to reduce the semantically decisive parts of the synonyms, i. e. the roots, to their supposed shape in the mother tongue, and in this way we obtained the statistical population of the radical morphemes expressed in the same phonemic system and amenable to a statistical investigation. But although the roots of the synonyms go back to the period of the Indo-European community, the synonyms themselves belong to different historical periods. And although the root, abstracted from a particular synonym had most times in the Indo-European period the same semantic content, this is not the rule; often the semantic content of the Indo-European root is new in the synonym. From the fact that nevertheless we have found with the individual concept groups numerous morpho-semantic correlations, two conclusions can be made. First, that behind the established correlations there are certain identical, permanent imitative tendencies that have been working in the historical development with unchanged or not too changed phonemes; second, that among the radical morphemes in the concept groups there must be a considerable amount of old imitative linguistic material, which preserved in the later stages of the Indo-European languages its semantic concept, if not its sound form.

19. On a detailed inspection of the analyzed synonymic sets permanent imitative tendencies are confirmed. This is seen first in the cases of unusual change of meaning where terms whose roots have an outer significant phonemic characteristic acquire in spite of their originally different meaning the meaning corresponding to the particular significant phonemic characteristic. Another confirmation is seen in the cases where terms with the same phonemic characteristic are substituted, both containing the same or a similar root. Imitative tendencies appear also in a third phenomenon where terms possessing no significant phonemic characteristic are substituted by terms marked by a such. All these phenomena can be most clearly observed in cases of well recorded historical succession of terms, e. g. in Romance languages if compared with Latin. Finally we know cases of borrowings from foreign languages when terms with preferred root forms for a given concept are borrowed in agreement with synonyms possessing the same preferred phonemic characteristic.

In our statistical material borrowings from cognate Indo-European languages only come into consideration for the calculation of significance; analyzing entire synonymic sets, we can observe, moreover, analogous cases of borrowings from non-cognate languages. Outside the calculation of the significance remain also the so-called »Urschöpfungen« (original creations)

[25] in the domain of the individual Indo-European languages which contain the very phonemic characteristics found in our statistical material to be significant. Because of the strict restriction of our inquiry to the original radical part of the synonyms root forms significantly changed through mutual contamination or irregular sound transformation, the so-called »Typusaufpropfungen (the graftings of type) are likewise excluded. Further instances of such a reconstructed agreement between sound and meaning appear in the combination of unsuitable radical parts with suitable affixes or by other morphological means, e. g. by reduplication [26], [19], 402. In our synonymic sets certain cases of secondary — not calculated — significance of root extensions belong there. Beyond doubt we have here to do with surprising parallel phenomena of imitative tendencies evident already from the comparatively narrow framework of our statistical material, limited to the common forms of the Indo-European radical morphemes.

20. Considering only the root material taken into account in the statistical calculations of significance, the later imitations, however, provoked by the continued imitative tendencies, represent an obvious minority in comparisons with the old imitations. Since we have no knowledge of the historical origin of the old imitations we cannot a priori distinguish the possible secondary transformations from a previous non-imitative linguistic material on the one hand, and the Indo-European »Urschöpfungen« or the inherited »Urschöpfungen« from the pre-Indo-European period on the other hand. But as the old imitations come up in great, semantically closely connected groups, and this in the earliest, still accesible stage of Indo-European languages, their primary origin is, on the whole, much more probable. In favour of this speaks also the circumstance that in single concept groups the positive and negative significant phonemic characteristics are clearly opposed with regard to opposed articulatory areas in the organs of speech, and that a similar opposition is found between the particular concept groups (table XII). And the most decisive in this respect is the fact that it is just the simplification of the Indo-European phonemes into the non-differentiated phonemic classes in connection with the auditory-tactile-proprioceptive categorization which permitted the discovery of numerous and systematic morpho-semantic correlations. If the non-differentiation of phonemic classes and the multi-sensory imitation, as they indeed seem to be, are the two characteristic features of an archaic linguistic stage, then our statistical investigation has brought us to the frontiers of that period when the forming of the original imitative morphemes was accompanied by the forming of linguistic phonemes. Be it as it may, one thing is clear: the imitative tendencies which reach till into our days represent at a time of increasing arbitrariness of the linguistic sign a regression taking place mostly in the peripheric areas of the linguistic and conceptual world. But the old imitations bear — irrespective of the uncertainties of detail — testimony to a quite different, opposite state where central elements of human language and thought are in a well recognizable way build up by the imitative representation of reality.

The five tables in the appendix contain:

Table X — a symmetric arrangement of the general and combined consonant characteristics according to their principal articulatory areas in the organs of speech;

Table XI — the total calculation of Chi-square, in all the fields, for the seven concept groups from SHARP to BLOW;

Table XII — the significant deviations concerning the individual phonemic characteristics, in all the fields, for the seven concept groups from SHARP to BLOW;

Table XIII — the supplementary data about the six-member vowel distribution set subsequently up, and the respective data about the consonant-vowel combinations K — short A, and P-U.

Table XIV — the Chi-square results, in all the fields, for the thirty at random set up groups of synonymic sets, and the greatest deviations concerning the individual phonemic characteristics in these groups;

Explanation:

In the tables the positive significant characteristics are printed with capital letters and the figures for all the significant results are in heavy print.

The statistical data for vowels, consonant pairs, consonants, and consonant-vowel combinations refer everywhere to the morphemic groups I to V. The number of vowels is in principle identical with the number of roots; one root with SHARP, three roots with SMELL, two roots with SMOOTH, and one root with TOUCH, contain, however, no vowel. The number of consonants is reduced by subtracting the repetitions of the same consonant class in the two-consonant roots. The fundamental figures for the REPRESENTATIVE SAMPLE are: vowels 1417, consonant pairs 968, consonants 1936 (morphemic groups III to V) and 415 (morphemic group II), 37 repetitions having been subtracted — altogether 2314.

The initial figures 533.67 for consonants, 225.63 for consonant pairs, and 325.93 for vowels in the table XIV represent the arithmetic means of the respective numbers occurring in 30 groups of synonymic series set up at random. Each single group was formed by adding at random synonymic series from the REPRESENTATIVE SAMPLE till the limit of 220 consonant pairs was attained, the number of consonants and vowels being thus mechanically determined. If a synonymic series had to appear more than two times in a group, this second repetition was not taken into account.

A great deal of the ordered consonant pairs having a small relative frequency, the sums of each two pairs were taken for the Chi-square calculations given in the tables XI and XIV. For the same reason in some cases even the sums of more consonant pairs had to be joined: kk etc. denotes kk, rr, ss, ll, tt, pp, nr, rn, sr, rs, lr, rl; sl etc. denotes sl, ls, nl, ln, tl, lt; tn etc. denotes tn, nt, pn, np.

At the probability level $P = 0.001$ the non-significant Chi-square for the distributions of consonants — taking six degrees of freedom — is 22.457. At

the same level the non-significant Chi-square for the distributions of consonant pairs — taking fortythree degrees of freedom — is 77.419. The corresponding non-significant Chi-square for the five-vowel distributions with four degrees of freedom is 18.467, and for the six-vowel distribution with five degrees of freedom it amounts to 20.515.

In the tables XII, XIII, XIV, in each case, the right lower figure is the determined standard deviation, and the left upper figure is the number of standard deviations. For the groups SHARP and TOUCH the figures are adequately reduced.

TABLE X

MOUTH	SHARP	ROUGH	NARROW	SMELL	SMOOTH	TOUCH	BLOW	LIPS
BLOW	pk	PR	pn	ps	PL	pt	P	BLOW
TOUCH	tk	TR	tn	ts	tl	T	tp	TOUCH
SMOOTH	lk	lr	ln	ls	L	lt	lp	SMOOTH
SMELL	SK	sr	SN	S	sl	ST	sp	SMELL
NARROW	nk	nr	N(n)	ns	nl	nt	np	NARROW
ROUGH	rk	R	rn	rs	rl	rt	rp	ROUGH
SHARP	K	KR	KN	ks	kl	kt	kp	SHARP
THROAT	SHARP	ROUGH	NARROW	SMELL	SMOOTH	TOUCH	BLOW	MOUTH

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SMOOTH	lk	lr	ln	ls	L	lt	lp	SMOOTH
SMELL	SK	sr	SN	S	sl	ST	sp	SMELL
NARROW	nk	nr	N(n)	ns	nl	nt	np	NARROW
ROUGH	rk	R	rn	rs	rl	rt	rp	ROUGH
SHARP	K	KR	KN	ks	kl	kt	kp	SHARP
THROAT	SHARP	ROUGH	NARROW	SMELL	SMOOTH	TOUCH	BLOW	MOUTH

TABLE XI

Chi-square

	SHARP	ROUGH	NARROW	SMELL	SMOOTH	TOUCH	BLOW
CONSONANTS							
K	+11.93	+ 2.93	- 1.33	-15.15	-11.61	- 3.31	-16.99
R	+ 3.25	+49.67	- 1.38	- 1.50	- 5.66	- 0.05	0.00
N	- 8.86	-14.52	+45.97	+ 6.46	- 0.36	- 6.01	- 0.08
S	+ 5.69	- 0.06	- 0.22	+12.64	+ 0.13	+ 1.05	- 0.08
L	- 1.75	- 3.36	- 0.67	+ 0.01	+68.14	- 3.98	- 0.26
T	-13.33	-11.53	- 1.23	+ 0.13	- 1.43	+26.88	- 1.56
P	- 0.87	- 0.14	- 1.62	+ 0.39	- 1.57	+ 0.23	+70.30
	45.71	82.84	52.46	36.31	88.93	41.55	89.31
CONSONANT PAIRS							
kk etc.	+ 3.46	+ 5.72	- 1.72	+ 0.82	+ 0.18	- 1.13	0.00
KR + rk	+12.41	+29.18	- 0.05	- 4.11	- 9.74	- 1.33	- 0.01
KN + nk	- 0.01	- 0.31	+42.09	- 4.63	- 3.05	- 1.60	- 2.75
nn	-12.37	- 6.98	+ 4.83	- 1.67	- 4.59	- 6.17	- 6.77
SN + ns	+ 0.37	- 5.35	+ 7.88	+59.31	+ 0.81	- 0.12	+17.26
sl etc.	+ 0.05	- 0.45	+ 0.36	+ 8.25	+48.50	- 1.82	- 6.29
kl + lk	+ 0.85	- 1.66	- 6.54	- 4.19	+ 4.64	- 2.63	- 5.57
PL + lp	- 1.72	- 1.62	0.00	+ 0.06	+23.43	- 0.70	+23.41
pt + tp	- 2.33	- 5.12	- 5.27	+ 5.34	+ 1.01	+ 3.97	+ 7.71
sp + ps	+ 2.11	+ 1.06	+ 0.35	+ 0.32	- 0.41	- 0.12	+14.26
pk + kp	+ 2.78	+ 0.18	0.00	- 0.22	- 3.40	+ 1.18	+ 5.81
PR + rp	- 2.30	+ 4.04	- 3.62	+ 0.01	- 2.56	- 0.83	+12.01
SK + ks	+34.50	+ 2.03	- 7.32	- 0.55	- 1.24	- 0.96	-11.20
ST + ts	- 9.73	- 5.74	- 1.42	- 1.02	- 0.72	+15.78	- 1.63
tk + kt	- 9.27	- 4.97	- 1.68	+ 1.02	- 5.11	+ 9.81	- 1.89
TR + rt	- 0.26	+ 3.95	+ 0.10	- 1.85	+ 0.03	+ 5.76	- 5.79
tn etc.	- 1.15	- 5.15	+ 2.94	+ 1.14	0.00	+ 0.01	+ 0.21
	95.74	83.59	86.22	94.58	109.51	53.99	122.66
VOWELS							
Short A	+ 7.95	+ 5.44	+ 0.49	- 0.04	- 1.26	+ 1.50	- 0.58
Long A	-11.16	- 5.04	- 3.02	- 4.51	- 4.91	0.00	- 2.41
I	+ 0.54	- 3.75	+ 0.57	- 6.32	0.00	- 0.25	-10.02
U	- 5.96	- 9.26	- 1.76	+32.23	- 0.81	- 5.34	+31.36
E	+ 0.67	+ 4.94	+ 0.37	- 1.28	+ 2.73	+ 0.87	- 0.53
	26.28	28.44	6.21	44.38	9.71	7.97	44.90

TABLE XII
Significant deviations for the particular phonemic characteristics

	SHARP	ROUGH	NARROW	SMELL	SMOOTH	TOUCH	BLOW
Cons.	938	505	549	520	490	739	565
C. Pairs	413	233	238	208	215	326	226
Vowels	539	283	327	319	280	423	353
KR		4.65					
		6.25					
K	3.44			-3.83	-3.25		-4.22
	15.69			11.83	11.83		11.83
R		9.24			-3.07		
		6.25			6.25		
K — Short A	6.08	3.88					
	5.13	3.72					
Short (A + E)	3.61	5.32					
	11.27	8.16					
long (a + e)	-3.25						
	7.02						
long a	-3.91						
	4.71						
KN			4.04				
			3.08				
N	-3.22	-4.01	7.44				
	9.70	7.32	7.32				
nn	-3.55						
	3.48						
SN				5.98			3.81
				3.01			3.01
SL + NL + TL				3.66	6.88		
				3.00	3.00		
S				3.65			
				7.25			

[illegible]

TABLE XIII

	RS	Chi-square	
		ROUGH	SHARP
Vowels	1417	539	283
Short A		+ 7.95	+ 6.08
Long A		- 11.16	- 5.05
I		+ 0.37	- 3.75
U		- 5.96	- 9.26
Short E		+ 1.37	+ 6.49
Long E		- 0.78	- 0.60
		27.59	31.23

	Significant deviations	
	SHARP	ROUGH
	539	283
Short (A + E)	375	Short (A + E) 219
Expected	334.35	Expected 175.56
	40.65	43.44
Calculated stand. dev.	11.27	Calculated stand. dev. 8.16
	40.65 = 3.61	43.44 = 5.32
	11.27	8.16
Long (A + E)	32	
Expected	54.78	
	22.78	
Calculated stand. dev.	7.02	
	-22.78 = -3.25	
	7.02	

Statistical data for K — short A

	RS	SHARP	ROUGH
IIbc	10	18	6
IIIa	51	34	17
IIIbc	5	2	3
IV—V	7	5	3
	73	59	29

Statistical data
for P-U

	RS	BLOW
Vowels	1417	353
IIa	24	18
IIbc	—	1
IIIa	15	10
IIIbc	1	3
IV—V	5	2
	45	34

SHARP

K — short A	59	K — short A	29
Expected	27.77	Expected	14.58
	31.23		14.42
Calculated stand. dev.	5.13	Calculated stand. dev.	3.72
	31.23 = 6.08		14.42 = 3.88
	5.13		3.72

BLOW

P-U	34
Expected	11.21
	22.79
Calculated stand. dev.	3.29
	22.79 = 6.92
	3.29

TABLE XIV

The Chi-square results for 30 groups

Cons.	533.67	1. 3.51	2. 5.17	3. 5.96	4. 5.86	5. 3.73
C. Pairs	225.63	19.59	9.84	15.01	22.81	7.91
Vowels	325.93	3.82	9.63	4.79	3.11	0.59
6. 6.92	7. 7.00	8. 3.52	9. 5.05	10. 3.31	11. 3.58	12. 4.98
19.13	18.94	15.05	25.82	9.21	13.19	31.07
5.13	1.40	10.84	2.86	7.48	1.71	0.37
13. 8.48	14. 3.95	15. 7.32	16. 5.92	17. 5.37	18. 8.16	19. 3.52
17.87	12.89	19.41	13.84	21.97	19.13	11.34
4.66	11.15	7.01	1.91	4.48	10.56	1.39
20. 8.70	21. 4.17	22. 9.48	23. 8.09	24. 3.99	25. 3.57	26. 3.11
14.23	22.18	13.75	17.66	7.06	8.12	9.91
9.22	1.17	1.00	10.26	0.87	0.42	10.96
	27. 14.96	28. 4.17	29. 5.48	30. 15.58		
	26.66	16.74	20.92	31.12		
	5.20	2.72	3.29	1.90		

The greatest deviations for the particular phonemic characteristics in 30 groups

CONSONANTS

K	R	N	S	L	T	P
2.49	2.06	1.98	2.46	2.41	2.88	2.17
11.83	6.25	7.32	7.25	6.01	9.63	8.16

CONSONANT PAIRS

kk	KR	KN	ks	kl	kt	kp
2.48	3.40	2.14	2.70	2.08	2.17	1.95
1.52	6.25	3.08	1.37	3.62	2.44	1.88
rk	rr	rn	rs	rl	rt	rp
2.35	0.00	1.74	3.00	0.00	2.36	2.48
1.67	0.00	0.73	0.30	0.00	1.54	1.17
nk	nr	nn	ns	nl	nt	np
2.19	1.74	1.96	2.62	2.25	2.62	4.38
2.28	1.58	2.58	0.61	1.46	1.22	0.43
SK	sr	SN	ss	sl	ST	sp
2.18	1.44	1.86	0.00	2.31	2.34	2.49
3.29	1.08	3.01	0.00	1.50	3.24	2.92
lk	lr	ln	ls	ll	lt	lp
2.13	2.27	1.77	1.88	0.00	3.30	2.28
2.63	0.37	1.06	1.05	0.00	1.21	1.32
tk	tr	tn	ts	tl	tt	tp
2.04	2.39	2.05	2.56	2.21	0.00	1.81
3.26	2.35	2.03	0.34	2.14	0.00	0.96
pk	PR	pn	ps	PL	pt	pp
2.30	1.96	1.96	2.48	2.06	2.08	3.12
2.63	3.38	1.58	0.94	3.17	2.00	0.74

VOWELS

Short A	Long A	I	U	E
2.76	1.80	1.98	2.20	2.01
7.14	3.67	5.94	6.45	9.75

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(To be continued.)

POVZETEK

Preiskava Buckovega onomaziološkega besednjaka glede notranje zveze med glasom in pomenom se sklepa s pojmovno skupino »oster, špičast, glasen«, obstoječo iz 55 sinonimičnih serij, in vsebuječo nadštevilo fonemsko karakteristiko K.

Na podlagi končnega statističnega preračuna celotnih rezultatov sledi prvi del razlage, v katerem je obravnavana nenaključnost teh rezultatov in je teoretično utemeljen uporabljeni metodološki postopek.