

Indo-European Migrations: Their Origin from the Point of View of Odontology

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ABSTRACT Undertaken here is a multi-dimensional odontologic analysis of more than 31 ethnic groups of the Mezolithic and Bronze Ages from the territory of Eurasia. On the basis of the received information, cluster analysis was done and has shown the morphologic condensations of ethnoses and vectors of relatives or, conversely, distinctions between them. The anthropological cover of Eurasia, generated during exclusively difficult historical events, is shown. The advancement of the Mediterraneans in the territory of Eurasia was accompanied by not only an interaction of various cultural elements, but also a mixture - a distribution sometimes at considerable distances from their centre of formation. Having addressed such an important theme, namely the odontological features of the ancient population of Eurasia, the author does not apply for its universal characteristic. Reference to this theme was made in some previous works (Khudaverdyan 2002, 2008, 2009), which showed the participation of the indigenous population of the Near East, the Armenian highlands and Caucasus in the formation of the anthropological (including craniological signs) shape of some tribes and their moving over a wide space. The analysis has allowed to reveal the groups having the greatest similarity on a complex odontologic of markers. This similarity assumes an associativity ethnic and reduction processes in groups which they represent. Similar research gives new arguments for an understanding of ethnic processes in Eurasia. As a source of the additional information results of research represent certain interest in connection with discussion about an origin Indo-Europeans and about a place of their ancestral home.

INTRODUCTION

The origin and development of ancient cultures, certainly, is connected with the general laws of social and economic development and an environment. The environment in which the ancient population of the Armenian highlands lived, had a number negative and positive sides. Extreme climatic conditions concern the first. The positive party consists that natural factors promoted active communications between various regions, among these factors it is necessary to specify distribution of natural resources (obsidian, flint, etc.) on wide spaces. Neither natural and artificial barriers, nor huge distances become barriers to adjustment of a close ethno-cultural contact. Extensive open spaces of the Eastern Europe with which occurrence of mobile forms of cattle breeding is connected were rather considerable factors. Non-uniformly developing metallurgy, cattle breeding and agriculture led to strengthening of an exchange and interbreeding communications. The areas surrounding the Black Coast at certain stages of history appeared in a "crater" of interrelations of various cultures. The Circumpontic Metal-lurgical Province was one of the basic centres of cultural interactions and interrelations for the western half of Euro-

asian continent (Chernykh 1988). Overland lines of contacts between Forward Asia through the Armenian highlands up to Caucasus and on the Balkans, and through Caucasus and the Balkans – in North Black Sea coast and in the opposite direction Here lay. In our opinion, it is necessary to speak about an establishment area contacts between groups, it is far not always genetically related, but territorially approaching upto inter-osculation and interference during long time. It led to their integration, to the creation of some large ethnocultural groupings, and interaction between the last - to formation of all circumpon-tic zones, i.e. systems area the contacts which have led to certain integration in interconnected territories and to considerable consequences of economic, cultural, anthropological, general historical character.

Different aspects of the problem of the ancestral home of Indo-Europeans are far from completely resolved and generate lively debate, not converging from the pages of scientific publications. Without attempting a complete analysis of this problem, I will address only several points essential from my point of view. The hypothesis about the West European ancestral home of Indo-European enjoys popularity (Merpert 1974; Klejn 1990; Mallory 1997, 1998).

Others connect the ancestral home of these groups with Anatoly, Transcaucasia and Northern Mesopotamia (Gamkrelidze and Ivanov 1981, 1984; Renfrew 1987; Safronov 1989; Gray and Atkinson 2003). According to Diakonoff (1982), the ancestral home of the Indo-Europeans since the Neolithic Period was localized in Europe and was most likely in a zone between the Danube, Rhine and Volga, and from here various tribes settled in territories occupied by them, and one of the first left from an ancestral home to the east of the Indo-Iranian people, who were gradually occupying steppes of Kazakhstan and slowly moved ahead in the south through Central Asia. One group, Protoindians (Indo-Aryans), went to Asia Minor and reached India in the second half of II millennium BC, and Iranians settled in Iran two thousand years before the Common Era. Kuzmina (2008) has this view. According to Gamkrelidze and Ivanov (1981), the way north from the outskirts of the Iranian plateau in Central and Central Asia was well-known by the agriculture and cattle breeding tribes-carriers and speakers of future Hebrew dialects (Kelt-Italian, Illyria, German, Balto-Slavic), and the last, settling across Central Asia in territories to the east of the Caspian Sea (and having also entered into contact with ancestors of the Siberian people), then turned to the west and by the III Millennium BC occupied areas from the Volga steppes to the Northern Black coast; later, already from the middle of the III millennium BC, their advancement further to the west, north, and southwest began. Khlopina's (1970) opinion is the closest to these conclusions about the Iranization of the northern steppes from the south of Central Asia in the late III to the II millennium BC. According to I.N. Khlopin, this process was accompanied by a transition in the specified steppe territories to a more productive economy, the first spreading of skills such as cattle breeding, agriculture, metallurgy, etc., for earlier in the same territories lived only carriers of Neolithic cultures with an appropriating type of an economy. Sarianidi (1998a,b) also is a supporter of the hypothesis of T.V. Gamkrelidze and V.V. Ivanov. He specifies that the migration of the founders of the Bactria and Margiani cultures were from the Near East.

About processes of crossbreeding, occurring in large-scale migrations, it is possible to judge on prominent features of such neutral and stable indicators, as odontologic markers. As a whole,

the morphological structure of tooth crowns is one of the major sources of the historical and biological information as lines of a tooth relief possesses high taxonomical value, for being genetically caused, they do not vary throughout all human life.

MATERIALS

For odontologic analysis it was necessary to select such feature set which, on the one hand, adequately enough would define a direction of intergroup variability in territory of Eurasia, and, on the other hand, would be accessible in publications of some the authors containing a material for the comparative analysis. In total, the analysis included 31 odontological series from the territory of Eurasia (Table 1, Fig. 1). The paper does not allow us to provide a long list of the analyzed groups and references and links to

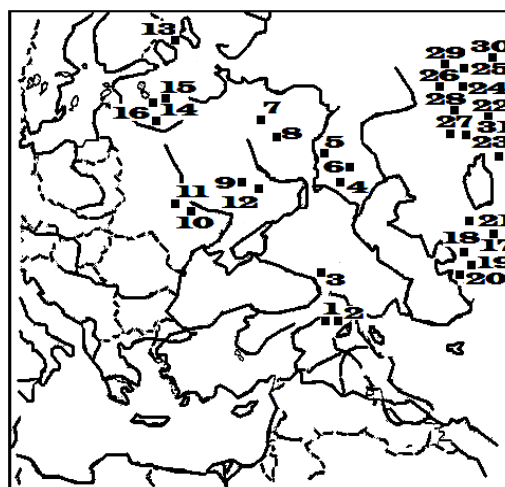


Fig. 1. Localization of groups: 1 – Landjik (AHL), 2 – Black fortress (AHBF), 3. Mckheti – Digosk (GMD), 4. Taktalachyks (VRT), 5 – Volga region (VFC), 6 – Volga region (VBC), 7 – Russian plain (RPL), 8 – Lugovsky (RPLU), 9 – Vasilievka III (DVIII), 10 – Mayak (UM), 11 – Ukraine (UYC), 12 – Dnepr (DDC), 13 – Island Oleny (KIO), 14 – Latvia (L), 15 – Zveinieki (LZ), 16 – Kiwytkalnsk (LAK), 17 – Turkmenistan (TCPC), 18 – Turkmenistan (T), 19 – Altintepe (TA), 20 – Gonur Depe (TGD), 21 – Sapallitepe (CASA), 22 – Tsygankov, Sopka-2 (ACE), 23 – Okunevskya (SOOC), 24 – Southern Siberia (SOKC), 25 – Minusinsk hollow (MHFC), 26 – Tomsk (TOFC), 27 – Area of Ob (OFC), 28 – Kuznetsk hollow (KHFC), 29 – Barabinsk forest-steppe (BFC), 30 – Southern Siberia (SKAC), 31 – Southern Siberia (STAC)

sources on which they have been generated. (For sources of data about the majority of groups, Khudaverdyan 2009). The analysis is carried out by means of following signs: Shov J¹, RHy μ^2 , cara M¹, 6- and 4- forms on μ_1 , 4- form on μ_2 . Data are subjected to the initial analysis. Groups are compared with the help of not weighed pair-group method(year). Kozintseva and Kozintseva's statistical program (Museum of Anthropology and Ethnography of name of the Peter Great, St.-Petersburg) has been used.

CANONICAL METHODS AND RESULT

The first step in analyzing samples was to determine frequencies of occurrence for all 31 traits. We shall consider mutual relation of attributes in 1 integrated characteristics (reflects 34.1% common dispersions) system of 6 attributes (Table 2).

Taking into account character of connection of attributes in this component, it is possible to tell that the large values till 1 coordinate axes correspond to morphological groups with 4- form

on μ_2 (0.834), 6- form on μ_1 (0.780), 4- form on μ_1 (0.562) and RHy μ^2 (0.490). In 2 vector (reflects 24.9%) large values have Shov J¹ (0.838), cara M¹ (0.661) and RHy μ^2 (-0.467). In 3 vector (reflects 18.4%) large values have 4- form on μ_1 (0.582), RHy M² (0.507), cara M¹ (0.496) and 6- form on μ_1 (-0.403). Thus, on the basis of the given characteristic of morphological complexes it is possible to mention, that groups are differentiated under the form to a signs reducing character.

The final step in analysis was to generate intersample affinities using only the above six traits to affirm their influence. Groups are in pairs and compared with the help of the not weighed paired-group method (Table 3).

Wide comparison odontologic data from territory of Eurasia allows to reveal presence morphological close groups in geographical frameworks of all this extensive territory. This similarity assumes an associativity of cultural and ethnic processes in groups which they represent. During a bronze epoch southern grace odontologic the complex has been extended to big enough territory covering Caucasus, Central Asia

Table 1: Eurasian craniological sample

<i>Sample name</i>	<i>Site (s)</i>	<i>Date</i>
Landjik (Kuzo-Arask culture)	Armenian highland(AHL)	c. 4000-3000 BC
Black fortress	Armenian highland(AHBF)	c. 3000-2000 BC
Mckheti – Digosk	Georgia (GMD)	c. 4000-2000 BC
Taktalachyks	Volga region (VRT)	c. 3000-2000 BC
Total group (Fatianovo culture)	Volga region (VFC)	c. 2000-1500 BC
Total group (Balanovo culture)	Volga region (VBC)	c. 3500-2500 BC
Total group (neolith)	Russian plain (RPL)	c. 5000-4000BC
Lugovsky	Russian plain (RPLU)	c. 3000-2000 BC
Vasilievka III (mezolith)	Dnieper region (DVIII)	c. 8000-6000 BC
Mayak (Cucuteni-Tripolya culture)	Ukraine (UM)	c. 4000-3000 BC
Total group (Yamnaya culture),	Ukraine (UYC)	c. 4000-3000 BC
Total group (Dnepro-Donetsk culture)	Dnieper region (DDC)	c. 4000-3000 BC
Island Oleny	Kareliya (KIO)	c. 6000-5000 BC
Total group	Latvia (L)	c. 5000-3000 BC
Zveinieki	Latvia (LZ)	c. 6000-2000 BC
Kiwytkalnsk (culture shtrixovaya ceramics)	Latvia (LAK)	c. 2000-1500BC
Total group (Aulture painted ceramics)	Turkmenistan (TCPC)	c. 2000-1000 BC
Total group	Turkmenistan (T)	c. 3000-1000BC
Altintepe	Turkmenistan (TA)	c. 4000-3000 BC
Gonur Depe	Turkmenistan (TGD)	c. 3000-2000BC
Sapallitepe	Central Asia (CASA)	c. 2000-1000 BC
Tsygankov, Sopka-2 (culture Eluninskaya)	Altai (ACE)	c. 2000–1600 BC
Okunevskaya (Okynevskaya culture)	Siberia (SOOC)	c. 2000BC
Total group (Okynevskaya culture)	Siberia (SOKC)	c. 2000BC
Total group (Andronovo culture)	Minusinsk hollow (MHFC)	c. 1700-1200BC
Total group (Andronovo culture)	Tomsk (TOFC)	c. 1700-1200BC
Total group (Andronovo culture)	Area of Ob (OFC)	c. 1700-1200BC
Total group (Andronovo culture)	Kuznetsk hollow (KHFC)	c. 1700-1200BC
Total group (Andronovo culture)	Forest-steppe Barabinskaya (BFC)	c. 1700-1200BC
Total group (Karasukskaya culture)	Siberia (SKAC)	c. XVIII–XVI BC
Total group (Tagarskaya culture)	Siberia (STAC)	c. X – VIII BC

Table 2: Elements of three initial vectors for 31 groups.

	<i>I</i>	<i>II</i>	<i>III</i>
Shov J ¹	0.159	0.838	-0.308
RHy μ^2	0.490	-0.467	0.507
cara M ¹	-0.395	0.661	0.496
6- form on μ_1	0.780	0.011	-0.403
4- form on μ_1	0.562	0.302	0.582
4- form on μ_2	0.834	0.213	-0.021
Values	34.048	24.889	18.326

and the Eastern Europe. The antiquity of this layer goes back to earlier time from areas of the Near East (Dahlberd 1960). The graphic version of the result of clustering is evident in the form of the interposition of groups on the degree of similarity of their odontologic complexes (Fig. 2).

When considering the dendrogram, note the

significant similarity of the ancient groups of the Armenian highlands, Georgia, Turkmenistan (II-I millennium BC and painted ceramics), Baltics, the Volga region, Ukraine and Siberia. Possibly, it can be extrapolated on the big anthropological generality in which processes of difficult ethno-cultural interactions proceeded. So, tribes Kura-Araks the Armenian highlands (Landjik) show communications relations with carriers Andronovo cultures. It is necessary to consider here affinity of tribes Cucuteni-Tripolya cultures as to carriers of cultures Kura-Araks and Andronovo. Necessary note, that results craniological the analysis on a wide geographical and cultural background have revealed relations of representatives Kuro-Araksa of the Armenian highlands with tribes Cucuteni-Tripolya cultures from

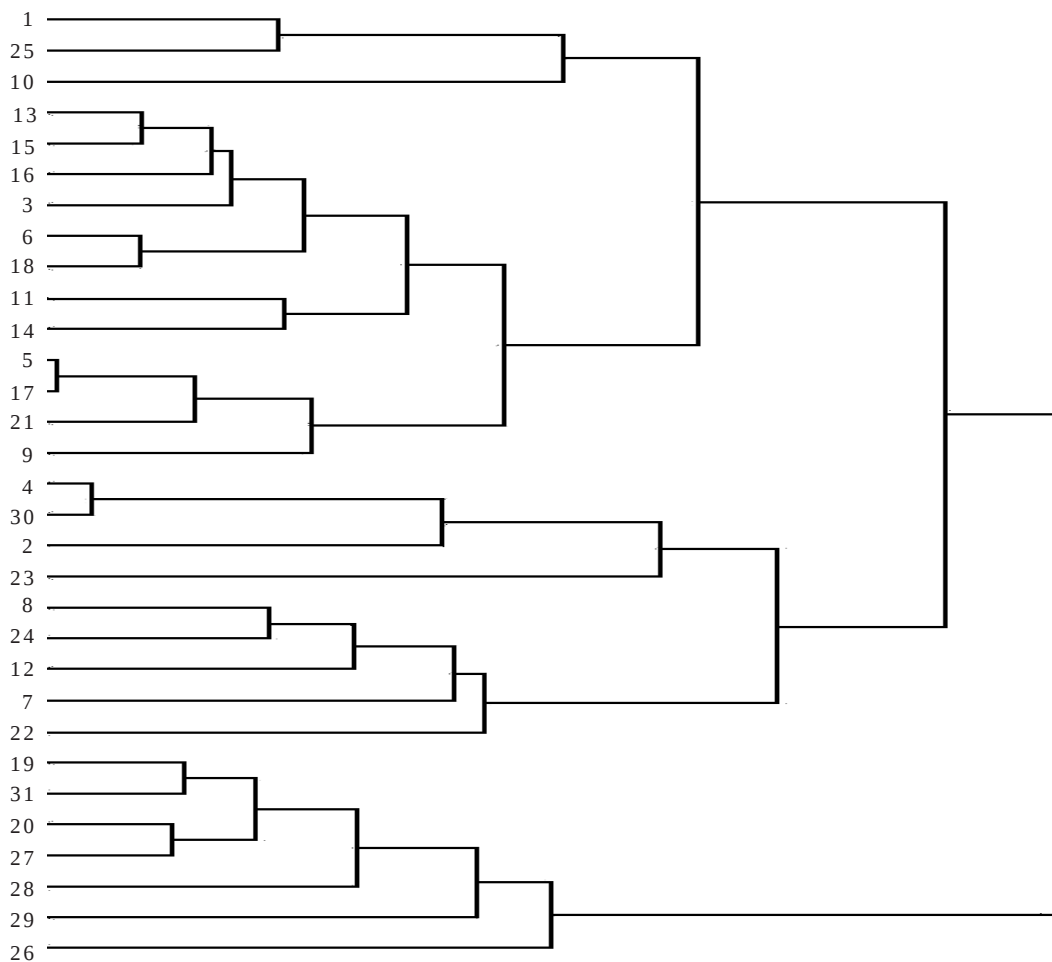
**Fig. 2. Total comparison of 31 groups of epoch of a neolith and early bronze**

Table 3: Distance matrix for 6 signs among 31 groups

Samples	AHL	AHBF	GMD	VRT	VBC	VFC	TCPC	CASA	TA	T	TGD	RPLU
AHBF	3.37	0.0										
GMD	2.36	3.10	0.0									
VRT	2.60	1.84	2.52	0.0								
VBC	1.85	2.42	1.04	2.24	0.0							
VFC	2.87	4.52	1.70	4.11	2.15	0.0						
TCPC	2.88	4.48	1.69	4.10	2.11	0.10	0.0					
CASA	3.32	4.69	2.14	4.54	2.42	0.74	0.66	0.0				
TA	2.83	2.61	0.78	2.36	1.16	2.29	2.26	2.56	0.0			
T	2.21	2.57	0.67	2.33	0.47	1.99	1.95	2.27	0.72	0.0		
TGD	3.22	2.79	1.30	3.01	1.40	2.23	2.18	2.26	0.82	1.04	0.0	
RPL	2.65	5.17	3.04	3.64	3.46	3.32	3.40	4.04	3.70	3.47	4.34	0.0
DDC	1.45	3.83	2.12	2.44	2.25	2.86	2.90	3.51	2.70	2.36	3.35	1.40
RPLU	2.41	2.77	2.07	1.08	2.19	3.58	3.60	4.14	2.16	2.18	2.95	2.69
DVIII	3.15	5.37	2.51	4.77	2.95	0.99	1.06	1.39	3.19	2.86	3.22	3.14
UM	2.81	2.82	2.63	3.59	1.79	2.91	2.82	2.72	2.56	2.04	2.15	5.00
UYC	3.25	3.94	1.04	3.29	2.06	1.70	1.72	2.15	1.36	1.64	1.71	3.19
L	3.04	4.61	1.52	3.86	2.36	1.03	1.11	1.69	2.16	2.09	2.41	2.73
KIO	2.27	3.86	1.05	2.81	1.82	1.76	1.81	2.44	1.75	1.63	2.33	2.06
LZ	2.39	3.53	0.63	2.63	1.54	1.75	1.78	2.35	1.29	1.26	1.89	2.50
LAK	2.25	3.83	0.86	3.14	1.51	1.05	1.09	1.69	1.62	1.33	1.93	2.62
MHFC	1.06	2.89	1.84	2.63	1.05	2.35	2.32	2.62	2.19	1.48	2.36	3.31
ACE	3.44	4.53	3.20	2.75	3.67	4.29	4.35	4.99	3.50	3.58	4.31	2.05
OFC	3.81	3.12	1.74	3.41	2.00	2.53	2.48	2.49	1.21	1.61	0.60	4.75
KHFC	4.46	4.07	2.16	4.10	2.78	2.61	2.57	2.57	1.83	2.33	1.51	4.87
SOKC	2.30	3.60	1.81	2.07	2.27	2.98	3.03	3.64	2.23	2.19	3.00	1.80
STAC	3.39	3.13	1.09	2.90	1.74	2.27	2.25	2.49	0.65	1.27	0.88	3.94
TOFC	5.79	5.35	3.46	5.00	4.32	3.97	3.98	4.12	3.22	3.84	3.27	5.38
BFC	5.60	4.30	3.37	4.67	3.81	4.06	4.02	3.96	2.80	3.39	2.46	6.12
SKAC	2.45	1.72	2.53	0.25	2.14	4.07	4.06	4.49	2.37	2.28	2.99	3.69
SOOC	4.18	3.36	3.50	1.95	3.73	5.11	5.13	5.63	3.30	3.62	4.05	4.03
Samples	DDC	RPLU	DVIII	UM	UYC	L	KIO	LZ	LAK	MHFC	ACE	AOFC
RPLU	1.68	0.0										
DVIII	3.04	4.12	0.0									
UM	3.79	3.87	3.67	0.0								
UYC	2.69	2.65	2.41	3.46	0.0							
L	2.51	3.12	1.40	3.61	1.08	0.0						
KIO	1.50	2.00	2.19	3.45	1.23	1.15	0.0					
LZ	1.79	1.93	2.37	3.20	0.93	1.23	0.47	0.0				
LAK	1.96	2.53	1.70	2.89	1.18	0.89	0.78	0.76	0.0			
MHFC	2.08	2.60	2.89	1.79	2.81	2.74	2.20	2.13	1.88	0.0		
ACE	2.10	1.78	4.52	5.43	3.31	3.52	2.55	2.72	3.31	3.94	0.0	
OFC	3.84	3.34	3.52	2.60	1.84	2.64	2.70	2.25	2.34	2.97	4.61	0.0
KHFC	4.22	3.81	3.48	3.52	1.69	2.49	2.86	2.46	2.56	3.71	4.75	1.04
SOKC	1.10	1.03	3.35	4.03	2.16	2.36	1.25	1.39	1.95	2.58	1.44	3.39
STAC	3.12	2.61	3.18	2.96	1.08	2.05	1.92	1.46	1.77	2.74	3.72	0.93
TOFC	5.11	4.51	4.60	5.39	2.62	3.40	3.74	3.45	3.78	5.26	4.86	2.84
BFC	5.40	4.60	4.95	4.32	3.02	3.94	4.15	3.71	3.94	4.81	5.62	1.87
SKAC	2.43	1.22	4.73	3.42	3.35	3.88	2.85	2.67	3.13	2.47	2.91	3.42
SOOC	3.38	1.81	5.70	5.30	3.77	4.49	3.51	3.37	4.09	4.32	2.22	4.24
Samples	KHFC	SOKC	STAC	TOFC	BFC	SKAC	SOOC					
SOKC	3.65	0.0										
STAC	1.23	2.54	0.0									
TOFC	1.94	4.26	2.60	0.0								
BFC	1.48	4.69	2.29	2.03	0.0							
SKAC	4.14	2.16	2.95	5.13	4.74	0.0						
SOOC	4.55	2.51	3.55	4.65	4.87	2.19	0.0					

Ukraine and Transdnistria. Analogies to the Tripol are revealed with representatives of the Iran highlands (Tepe-Gissar II, Caratash) and Egypt (Badari, Naga et-Der, Acmand, Nagada)

(Khudaverdyan 2010). It is possible to state confidently that since the Neolithic Period a considerable part of Europe has been occupied from the Near East. Hence, it is possible to outline

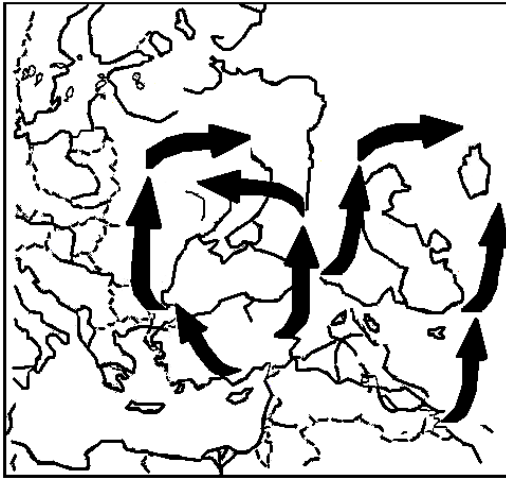


Fig. 3. Major diffusion routes the Mediterranean groups

the cultural and ethnic communications in antiquity and the known role of the Armenian highlands as the intermediary between ancient area of distribution Cucuteni-Tripolya cultures and the East countries (Passek 1949; Martiroyan and Mnacakanyan 1973; Lang 2005).

It is necessary to notice that by data cranio-logy it has been fixed communications Andronovo cultures with groups from Armenian highlands. The nearest parallels of carriers of Andronovo cultures are found from Mountain and forest-steppe Altai, Barnaulnearob (Firsov IV), with ethnic groups of the Armenian highlands (Kuro-Araks, Artik), Georgia (total group Middle Bronze). The Kuznetsk Basin (Andronovo cultures) very close to the groups from the North Caucasus (Khudaverdyan 2010).

For group of Georgia (Mckheti – Digosk) analogies to representatives of Baltic (Zveinieki, Kivytalnsk) are most distinct. Tribes Balanovo cultures show affinity with group of Turkmenistan (II - I millennium BC). Hence, level of a reduction of tooth system unites tribes of cultures end II to the first half of the I millennium BC from Turkmenistan and Georgia with groups of Baltic and the Volga region (Balanovo culture). Thereupon it is necessary to recollect, that all mentioned groups unites presence at them (in whole or in the form of a component) the Mediterranean anthropological type (Akimova 1963; Denisova 1975; Velikanova 1975; Graydonis et al. 1985). Culture tribes painted ceramics from Turkmenistan are very close to groups Fatianovo from the

Volga region. Parallels with groups of Uzbekistan (Sapallitepe) and Dnepr (Vasilievka III) are noted also. Tribes Andronovo cultures are close to representatives Turkmenistan (Gonur Depe). So, tribes Andronovo enter in Mediterranean cluster, - that serves as the certificate of that, as during an epoch of bronze the gradient of the Mediterranean a complex is notable in Northern Eurasia. Groups of the Volga region (Taktalchyks) and Southern Siberia (Karasukskaya culture) were allocated in separate cluster and show similarity to representatives of the Armenian highlands (Black fortress). Data testify to it cranioscopic markers (on methodology Berry and Berry 1967) and results of integration of data on both systems of signs (Khudaverdyan 2009). This cluster represents very chaotic picture (groups of Russian plain / neolith, Lugovsky/, Ukraine /Dnepro-Donetsk culture/, Siberia /Okunevskaya culture, Tsygankov-Sopka-2/) which it is possible to explain intensive ethnic and cultural interactions. Tribes Tagazskaya cultures are close with chronologically earlier population Turkmenistan (Altintepe).

Thus, a broad comparison of the Mediterranean groups to territory of the Armenian highlands, Caucasus and Central Asia, reveals the presence of morphologically similar groups in the geographical scope of all this vast territory (Fig. 3). Representatives of Siberia enter into the Mediterranean cluster, evidenced by the fact that in the Bronze Age Mediterranean gradient features are notable in Northern Eurasia. Cluster analysis has revealed odontological series having analogies (on a complex of craniometric signs) with representatives of the South-Caucasian population of the Armenian highlands, Caucasus, the Near East and Central Asia. The South-Caucasian morphological component revealed as a part of the population of separate archaeological cultures of the Bronze Age of Europe and Siberia occurs from one source. Paleoanthropological data correspond, on the whole, to Bobrova's (1994) concepts about a "block" of the related Siberian cultures formed on a different substratum to a basis under the influence of the general cultural component of a southern origin, appearing as a result of population shift.

Thus, movement of the Mediterraneans was accompanied not only by the interaction of various cultural elements, but also mixture, distribution sometimes on considerable distances from their

centre of formation. The “in itself” concept of migratory waves from the Near East holds a strong enough place in a historical science. It is possible to state the same reasons and concerning mutual relations of the population of the Armenian highlands (and Caucasus as a whole) and the considered regions. The anthropological fact opened by us also has a historical basis, as the distribution of morphological signs is connected with resettlement, and the mixture of tribes is accompanied by concrete historical and cultural phenomena. The occurrence of these South-Caucasian morphological variants requires the connection of more than one single migratory stream. It is easy to explain the wide area of movement by the Mediterraneans in antiquity by the demographic pressure, starting with the emergence of Asia Minor as a center and the development of a production-oriented economy.

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