ON THE BIOLOGICAL DISTINCTNESS OF THE PIT-GRAVE (YAMNAYA) PEOPLE IN THE NORTHWESTERN CASPIAN: CRANIAL EVIDENCE

The cranial series from the Pit-Grave (Yamnaya) burials of the northwestern Caspian is very different from other series associated with this culture. The population history of Eastern Europe in the Neolithic and Early Bronze Age is reconstructed based on the multivariate analysis of Mesolithic, Chalcolithic, and Bronze Age groups. Most local Pit-Grave populations and those of the Khvalynsk and Sredni Stog cultures are shown to have descended from the Mesolithic groups of Eastern Europe. The Pit-Grave people of the northwestern Caspian evidently descended from a different population that appeared in Eastern Europe in the Neolithic.

Keywords: Physical anthropology, craniology, craniometry, Pit-Grave culture, Bronze Age, Chalcolithic, Neolithic, Mesolithic, Eastern Europe.

Biological studies of the Pit-Grave (Yamnaya) population of northwestern Caspian began in the late 1960s and early 1970s, when large cranial samples appeared (Shevchenko, 1973, 1974a, b; 1980), although single crania had been described earlier (Debetz, 1936, 1948; Ginzburg, 1959; Glazkova, Chetetov, 1960; Firstein, 1967). In the late 1980s, A.V. Shevchenko’s first major study on the craniology of the southern Russian Bronze Age steppe populations was published (Shevchenko, 1986). One of the main issues discussed by Shevchenko was the origin of the Pit-Grave people of Kalmykia and the Astrakhan Province. Somewhat later, G.P. Romanova (1991) measured Early Bronze Age crania from the Stavropol Province. In the first decade of the 21st century, M.M. Gerasimova (2002, 2011) reported that new crania from Bronze Age burial mounds in the same province had been measured and prepared for publication, whereas A.A. Khokhlov (2006) published measurements of Pit-Grave skulls from Kalmykia. The total sample size, therefore, has become large enough to revisit the issue of the origins of northwestern Caspian representatives of that culture.

In the early studies, written under the typological paradigm, the Pit-Grave people were usually said to belong to the Proto-European type that was common among prehistoric Eastern Europeans. Its distinctive characteristics, according to the typological approach, were cranial robustness and broad face with a rather sharp horizontal profile, features inherited from the first anatomically modern population of Europe, the Cromagnons (Debetz, 1936, 1948). Later it was questioned whether broad typological terms such as “Proto-European type” were warranted (Vuich, 1958; Gokhman, 1966). Eventually it became clear that the Pit-Grave people could not be described as representatives of a single type, and considerable geographic variation within this human group was demonstrated (Zinevich, 1967; Firstein, 1967; Kruts, 1972; Konduktorova, 1973; Shevchenko, 1974a, b).
The affinities of the Pit-Grave people who inhabited the northwestern Caspian were subject to debate. The most controversial view was expressed by A.V. Shevchenko, who tried to demonstrate multiple affinities. Drawing mostly on cranial samples from Kalmykia, Shevchenko spoke of three components: firstly, the Neolithic people of the Lower Dnepr steppes; secondly, the eastern Pit-Grave populations; thirdly, the population group associated with the Sredny Stog tradition (Shevchanko, 1980, 1986). Shevchenko’s idea concerning the multiple origins of the Pit-Grave people of Kalmykia was subject to debate. The most convincing evidence against this idea was provided by A.A. Khokhlov (2006), who argued that other contemporaneous Pit-Grave populations were dolicho- and mesocranic, and that it was not clear why brachycephalization had not affected them. Khokhlov suggested that the distinctness of the Pit-Grave people of Kalmykia was due to some idiosyncratic microevolutionary process, possibly under admixture with Chalcolithic groups such as Khlopok Bugor, the Saratov Province, and with certain unknown populations of the Azov and Caspian steppes (Ibid.).

My own search for the ancestors of the Early Bronze Age northwestern Caspian groups is based on the multivariate statistical analysis (stepwise canonical variate analysis and Mahalanobis distances). The analysis was especially adapted for craniometric studies by including a standardized within-group correlation matrix (the software package was written by B.A. Kozintsev). Both published and unpublished measurements were used*. The database included more than 1300 male crania representing 68 series from Eastern Europe, southern Caucasus, eastern Ural, and southern Siberia spanning the period from the Neolithic to the Late Bronze Age.

At the first stage of the canonical variate analysis, a subsample of 47 series, totaling about 900 crania, was used to assess the distinctness of the northwestern Caspian Pit-Grave people from all known Bronze Age populations of Eastern Europe (Fig. 1).

The first canonical variate (CV I) accounts for 41% of the total variation in this analysis. Traits with the highest loadings on CV I are cranial length and breadth, bizygomatic breadth, and naso-malar angle. Traits which mostly define the variation along the second CV (CV II) are nasal protrusion angle and cranial length (Table 1, stage 1). As the scatter diagram (Fig. 2) demonstrates, not a single Eastern European Bronze Age group is close to the Pit-Grave people of the northwestern Caspian. On the most informative vector – CV I – groups associated with the Pit-Grave culture of Kalmykia, Astrakhan Province, and Stavropol Province are separated from other Eastern European Bronze Age populations owing to maximal cranial and facial breadth combined with a somewhat less sharp upper horizontal profile of the face.

At the second stage, we included samples which had been previously shown to reveal affinities with the Pit-Grave series from northwestern Caspian (Shevchenko, 1980, 1986; Alekseyev, 1983; Alekseyeva, Kruts, 1999): the Neolithic groups of the Lower Dnepr – Volnoye (Surnina, 1961), Vovnigi, Vasilyevka II (Gokhman, 1966), Dereivka, Nikolskoye (Zinevich, 1967), and later (Middle and Late Bronze Age) series from southern Siberia – Andronovo (Fedorovka) (Dremov, 1997), Karasuk (Rykushina, 2007), Irmen (Dremov, 1997; Molodin, Chikisheva, 1988; Bobrov, Chikisheva, Mikhailov, 1993). The number of male series used in this comparative analysis is 56, and the total number of crania exceeds 1100 (Fig. 1). In this case too, CV I mostly correlates with cranial length and breadth, facial breadth, and both horizontal facial profile angles, whereas CV II is mainly defined by orbital height, and cranial, frontal, and facial breadths (Table 1, stage 2). Extreme positions on CV I are taken by southern Siberian groups, which are similar to the Pit-Grave group in terms of transverse cranial and facial dimensions, but display facial and nasal flattening and have somewhat lower orbits. In comparison, the Early Bronze Age groups of the northwestern Caspian are more similar to other Eastern Europeans, especially to the Neolithic population of the Lower Dnepr (Fig. 3). Findings of the second stage of our analysis, then, support Shevchenko’s

*The trait battery included 14 traits: cranial length, breadth, and height, facial breadth, minimal frontal breadth, upper facial height, nasal breadth and height, orbital breadth and height, naso-malar and zygo-maxillary angles, simotic index, and nasal protrusion angle.