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Manifestation of Worldviews in Traditional Narratives: Reconstruction of Global Tendencies in the Spread and the Chronology of Emergence of Mythological Motifs

Data on the areal distribution of motifs extracted from ca 25,000 traditional narratives were computed with the purpose of revealing a chronology of the emergence of particular mythological themes. The statistical processing of this material allowed selection of sets of motifs that probably correspond to the routes of major prehistoric migrations known thanks to archaeology and population genetics. Our conclusions are largely based on the comparison of similar sets of motifs in the Old and New Worlds, the time of the peopling of America and its particular episodes being more or less known (initial peopling by Pacific and then by continental Siberian groups). Thanks to the methods applied, the epochal dynamics of the development of mythology were for the first time reconstructed by using systematized data, and not by proceeding from general assumptions. The earliest complex, which is related to the explanation of the mortal nature of man and the loss of the easy life, corresponds to the southern route by which humans of the modern type moved from Africa to the Indo-Pacific borderlands of Asia. These motifs are abundant in sub-Saharan Africa, the southern part of Eurasia, Oceania and America (especially South America), but rare in northern Eurasia and the American Arctic and Subarctic. Motifs relating to the origin of man, human anatomy, and relations between the sexes are most typical of the Circum-Pacific world. This theme probably first developed in Southeast Asia among the people who came from Africa, but before the time when their earliest groups reached America. The geographic distribution of motifs relating to cosmogony and cosmology, and to the etiology of natural phenomena, plants, and animals suggests that many of the corresponding motifs initially appeared in southern Eurasia, were then brought to Siberia, and from there brought to the New World (this movement could be explained by the gradual northward displacement of population after the Late Glacial Maximum). The ideas relating to the interpretation of celestial objects were the last to develop. Corresponding motifs are only abundant in Northern Eurasia, from where many of them were brought to North America but not to South America. Interpretations of celestial objects in European cosmonymy mostly date to the Bronze Age, if not to Iron Age technology, while some are related to the spread of world religions.

Keywords: *Traditional worldviews, mythological motifs, prehistoric migrations, out-of-Africa, America's peopling.*

Analytical catalogue of folklore and mythology of the world: its lay-out and potential for research

Thanks to the progress of archaeology and population genetics, our knowledge of the distant past has become much more detailed than a quarter of a century ago. However, there are some problems that these disciplines cannot solve, the assessment of the time of distribution of particular folkloric themes, narrative plots, and mythological images being among them. The judgments on this topic expressed during the last two centuries, have

depended on researchers' general views regarding the development of mankind, and not on evidence that could be verified. The study of the epochal stratigraphy of ideas about the world, and of the content of traditional tales, was one of the main goals of creating our electronic catalogue of the folklore and mythology of the world.

At the moment, the catalogue contains ca 55,000 abstracts of texts (http://www.ruthenia.ru/folklore/berezkin/, updated at the end of each year). These data are digitally summarized in a correlation table that presently (April 2018) includes information on the distribution of 2450 motifs in 945 traditions. The statistical processing of such a vast amount of material made it possible to reveal tendencies in the folklore and mythology of the world that it would be impossible to observe, not to say analyze, by other methods.

The main analytical unit of our catalogue is the motif. Motifs are divided into two main categories. Category A includes those episodes of narratives that relate to cosmology and etiology, and those images that expose the ideas about the world (for example: a rainbow is a snake, the Big Dipper is seven brothers, a rabbit is seen on the moon, etc.). Motifs of category B are episodes of adventure and trickster tales. Some of these motifs correspond to the ATU system of tale-types (Aarne-Thompson-Uther (Uther, 2004)) or to variants or fragments of them. Others, especially those that have been recorded outside of Europe, do not have analogies in the indexes. In the following, we will only focus on the motifs of category A. Making the picture somewhat simpler than it really is, these motifs may be called mythological *sensu stricto*, while the units of category B can be called "folklore" (i.e. relating to animal tales, fairytales, etc.) motifs.

A separate statistical processing of the motifs that belong to categories A and B and that are widespread in the Old World demonstrated their different areal distribution*. The motifs of category B mainly reflect relatively recent (during the last millennia) inter-ethnic contacts in societies with a high demographic density, complex social organization, and developed means of communication [Berezkin, 2015a, 2015c]. The motifs of category A can also be borrowed and cross ethno-linguistic boundaries, but this happens much more slowly. The penetration of these motifs into new territories was realized not so much via the transfer of information between people, but as a result of the migrations of people themselves. For the New World, Oceania, and Australia, with their lower demographic density and less complex socio-economic organization, the differences in the distribution of the motifs of the two categories are not so significant.

The global distribution of mythological motifs by themes

The accumulation of material made it possible to proceed to a new stage of this study: a separate processing of particular thematic groups of motifs included in category A. From this set, four groups were singled out, which together characterize the main core of world mythology. These are the motifs explaining and describing 1) the mortal nature of man, and the loss of an easy life and original abundance; 2) the origin of man and society, features of anatomy and social organization, relations between the sexes; 3) the origin of the world as a whole, of elements and natural phenomena, and of plants and animals; 4) celestial objects, i.e. the sun and the moon, the shadows on the moon, stars, and constellations. The fourth group is really a part of the third one, but since its constituent motifs are numerous and easily distinguished among others, we have processed them separately.

The differences in the areal distribution of the motifs of these categories proved to be significant. The discovered regularities allow us not only to reveal regional

*This treatment is as follows. In digital form, our database is a binary table (consisting of zeros and ones), in which the rows correspond to ethnic/linguistic groups (traditions), and the columns to the motifs. Thus, traditions are characterized by sets of zeros and ones, by which the degree of similarity of various traditions can be determined in various ways. One considers this space to be spanned by underlying (hidden) factors. The set of factors forms a simpler (lower dimensional) space, and the factors themselves are not correlated with each other. To decide which factors to use, one determines the weights that extract the directions in the vector space, which correspond to the maximum amounts of variance in the data. The first direction is called the *first principal component* (PC); it accounts for the largest amount of variability in the data and thus contains the largest amount of information about the differences between traditions. The next PC has the next highest variance (and information about differences) but is uncorrelated with the first PC, etc. Following this method, each tradition is expressed in terms of a small number of factors, namely the principal components. Usually only two, three or four PC's are required, and these only account for a small proportion of the variances—less (sometimes much less) than 20 % of the total. However, this turns out to be sufficient to deliver a convincing differentiation of the traditions. The other 80 % of the variances are related to many local tendencies relevant to a small number of traditions. Every PC has two poles that correspond to the sets of traditions most different from each other. But if there is only one powerful tendency in the material, the 1st PC practically selects only one pole with traditions that have mathematical indexes with high absolute values. The absolute values of the indexes of the opposite pole are low. Sometimes (though not necessarily), the corresponding traditions are only united by the absence of motifs that are typical of the first pole.

differences between mythologies, but also to outline the epochal sequence of the appearance of mythopoeic ideas.

Let us begin with the origin of death. This is a narrow topic, therefore, the total number of motifs of this group included in the catalogue is small: 33. Accordingly, there are many lacunae on maps reflecting the results of statistical analysis. Traditions for which only one or two motifs of the corresponding category have been recorded yield principal component values that are close to zero, and are not shown on the maps. The percentage of variability for even the main trends in the distribution of motifs is also small. Nevertheless, the picture obtained is not chaotic because it indicates the concentration of the corresponding motifs in some territories and their rarity in others (Fig. 1, 2). It deserves special attention that "mortal" motifs are widespread in tropical Africa, where other A-motifs are extremely rare. Another significant feature of the distribution is that individual sets of "mortal" motifs are characteristic of the Americas, Melanesia, sub-Saharan Africa, Central Asia, but not of Western Europe, northern Siberia, and the North American North. In these areas, the theme of the origin of death and difficult life is less pronounced than in other territories*.

Central Asian parallels to "mortal" motifs in West Africa also deserve attention (Fig. 2). This is a case of the recent penetration of Mediterranean folklore into the region, probably with the Arabs as mediators, see (Berezkin, 2013: 57–71; Berezkin, Duvakin, 2016).

The theme of human origin, relations between the sexes, etc. in world mythology is represented by a much larger number of motifs—207. Nevertheless, in Central and South Africa, such motifs are much less numerous than those that explain the origin of death. The motifs of this thematic group are most typical of the Indo-Pacific margin of Asia (non-Aryan India, Taiwan, Philippines, northeastern Siberia) and especially for Melanesia and America (Fig. 3). Many Melanesian and American tales that treat this subject are very similar (Berezkin, 2002; Vasiliev et al., 2015: 355, 362–369). As for North Africa and the southwestern half of Eurasia, motifs of this category do exist here, but they are fewer in number than in America or Melanesia, and their assortment is less diverse. Some of the "sexual" motifs in Africa and Eurasia are found not in the mythological prose, but in fairy tales. Such motifs could have spread recently, together with particular ATU tale-types.

The third pattern of the global distribution is represented by mythological images and narrative episodes relating to the origin of the world and its elements. In our sample, there are 478 such motifs (Fig. 4). Africa is again poorly represented: in particular, there are almost no motifs here explaining the origin of plant species. Territories where the motifs of the third group are most diverse are continental Eurasia and, to a lesser extent, America. Although the North American part of Fig. 4 is almost empty, it does not mean that North American Indians had few myths about the origin of the earth, animals, or plants. The reason is that in North America, motifs that are characteristic of continental Eurasia and those that are characteristic of South America and Melanesia are both well represented. These two poles balance each other, and consequently, the mathematical indices for particular traditions (the 1st PC) are near to zero. The data of the 2nd PC, which distinguish Siberia and America, on the one hand, and the western and southwestern regions of Eurasia and Africa, on the other hand, are more revealing (Fig. 5).

Distribution of the motifs of the fourth category (their total number is 200), which is connected to the interpretation of celestial bodies, resembles the distribution of the motifs from the second group; but the role of Europe is more significant here, and the role of South America is much weaker (Fig. 6, 7). In the traditions of the equatorial belt and the Southern Hemisphere, this group of motifs is poorly represented.

Interpretation of data

World trends in the distribution of the motifs from the four categories described above are so clear that the random nature of such a spread is excluded. To explain the resulting picture, two approaches are possible—functional and historical. If choosing the first, the special interest in one section of mythology and the lack of such an interest in others should be explained by the dependence of ideas on some external factors. However, judging by the maps, the preference of some sections of mythology to others does not correlate with natural, economic, or socio-political circumstances. If so, the historical approach remains the only one that has a good potential for interpretation of the results.

Motifs that explain the mortal nature of man are the only ones in category A that are well represented in sub-Saharan Africa. The hypothesis that has been advanced, the alternative for which is not yet visible, is that it was the myths about the origin of death that arose the very first, even before the people of the modern type spread

*Notably, this is a question of the variety of motifs, and not of the significance of myths based on them in specific cultures. For example, the number of records of myths about the origin of death among the Khoisan peoples of South Africa is quite comparable to that among the Bantu of East Africa. However, among the Khoisan this is practically the only "mortal" story ("the falsified message" with the Moon and the hare as protagonists), whereas the Bantu-speaking peoples have many different myths about the origin of death. What has been said about South Africa relates in part to Australia. Besides, the data on Australian mythology are relatively scarce, so on our maps this continent is poorly represented.

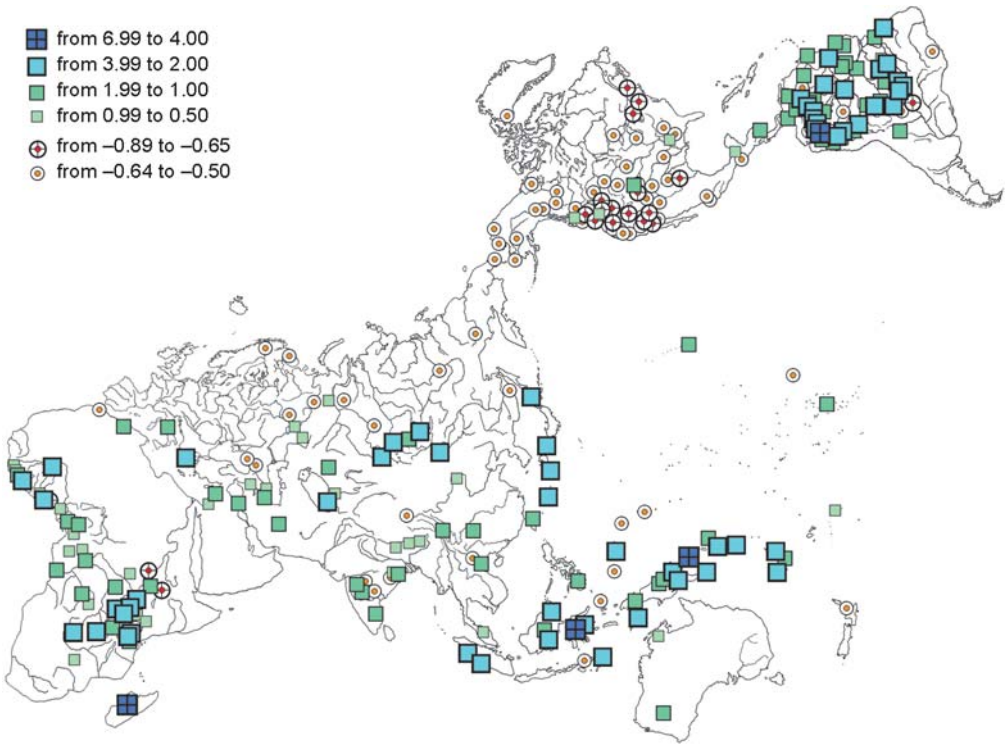

Fig. 1. Statistical data on the distribution of 33 motifs relating to the explanation of the mortal nature of man, in 517 traditions. 1st PC. Dispersion 2.57 %. Traditions with low absolute values of mathematical indexes (from 0.49 to –0.49) are not on the scheme.

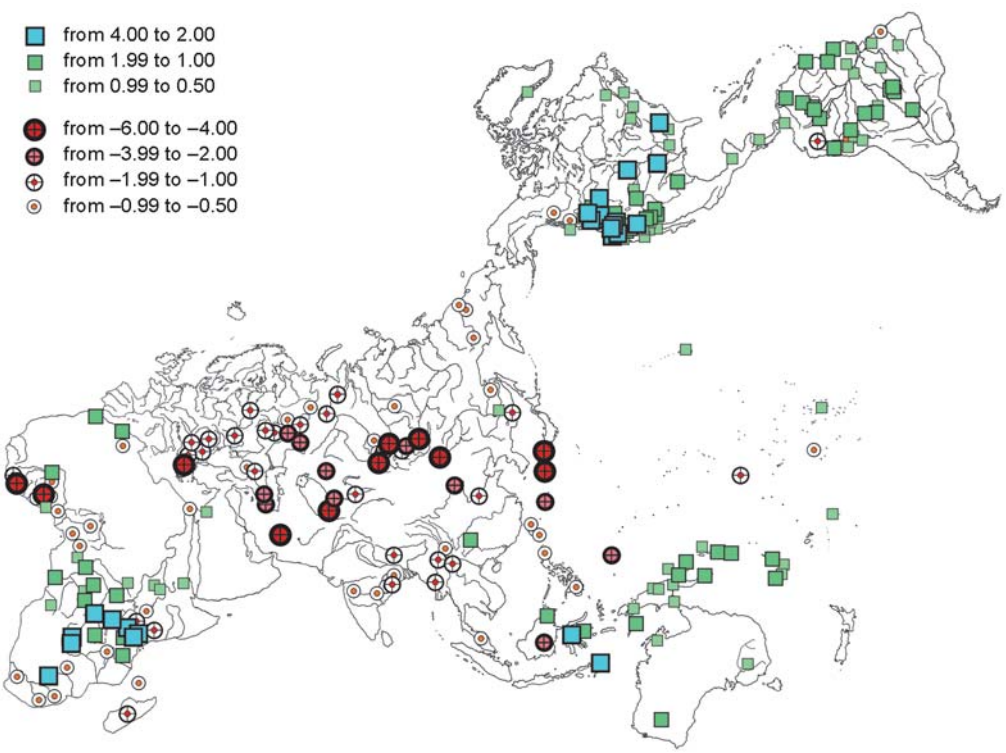

Fig. 2. Statistical data on the distribution of 33 motifs relating to the explanation of the mortal nature of man, in 517 traditions. 2nd PC. Dispersion 2.21 %. Traditions with low absolute values of mathematical indexes (from 0.49 to –0.49) are not on the scheme.

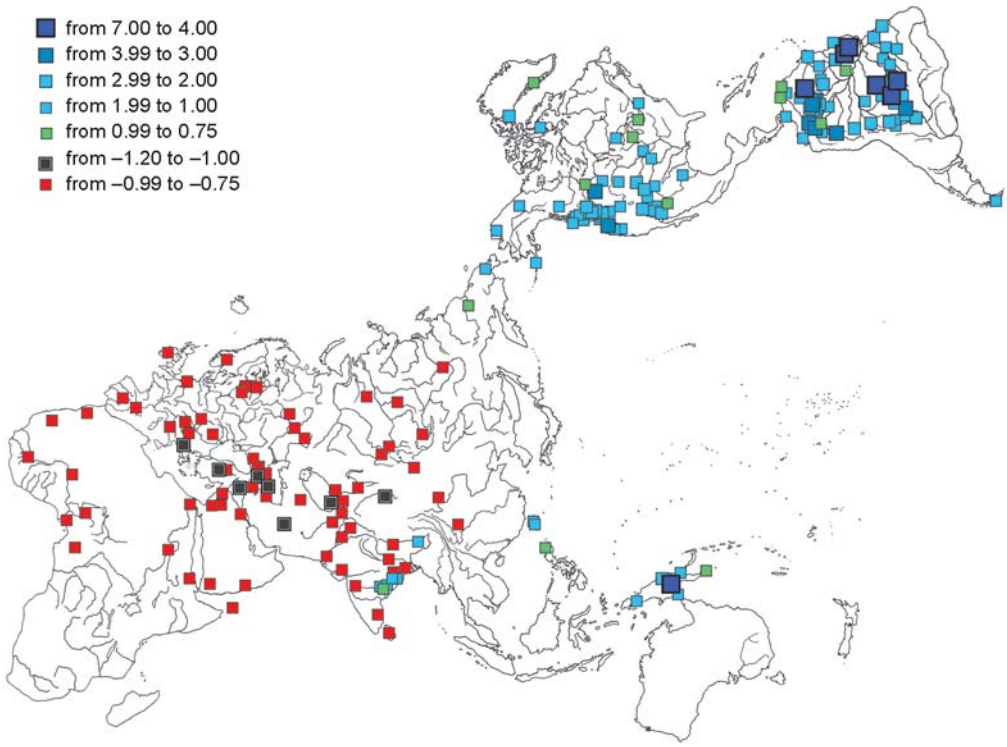

Fig. 3. Statistical data on the distribution of 207 motifs relating to the origin of man, human anatomy, and gender relations, in 815 traditions. 1st PC. Dispersion 9.16 %. Traditions with low absolute values of mathematical indexes (from 0.99 to –0.74) are not on the scheme.

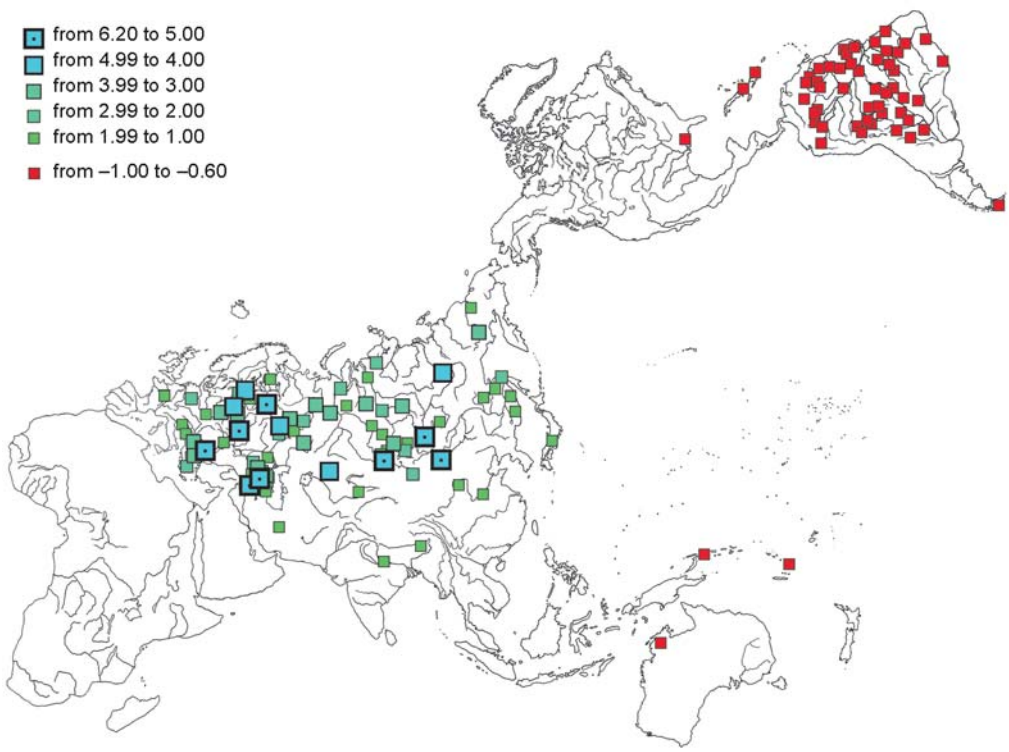

Fig. 4. Statistical data on the distribution of 478 motifs relating to the interpretation of the origin of the world and its elements, in 881 traditions. 1st PC. Dispersion 5.28 %. Traditions with low absolute values of mathematical indexes (from 0.99 to –0.59) are not on the scheme.

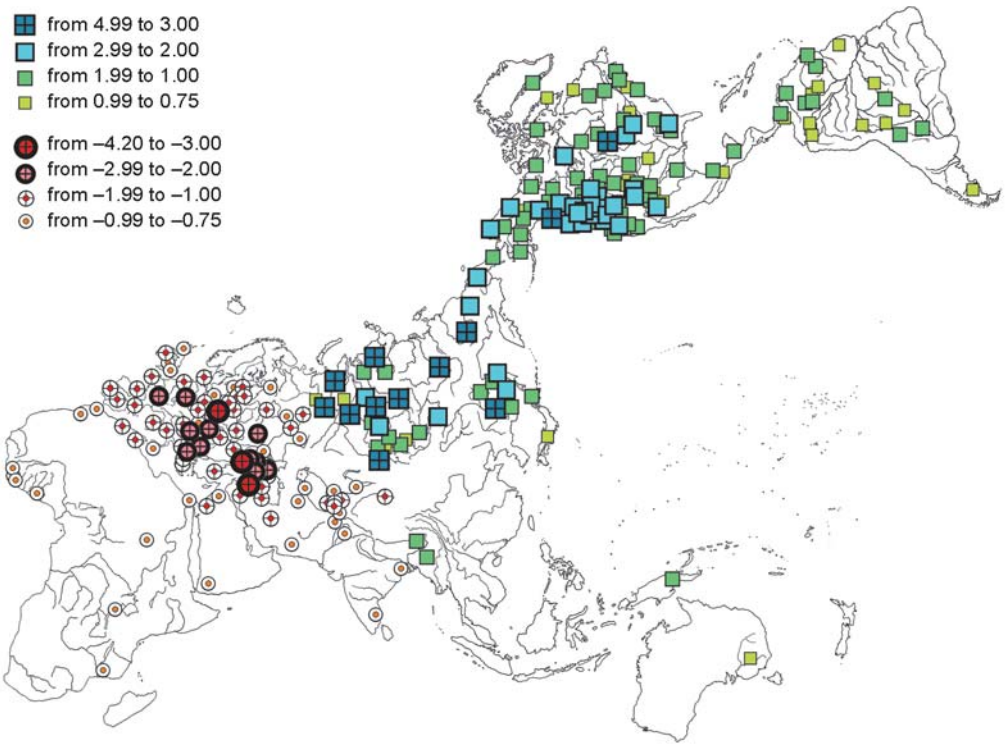

Fig. 5. Statistical data on the distribution of 478 motifs relating to the interpretation of the origin of the world and its elements, in 881 traditions. 2nd PC. Dispersion 3.93 %. Traditions with low absolute values of mathematical indexes (from 0.74 to –0.74) are not on the scheme.

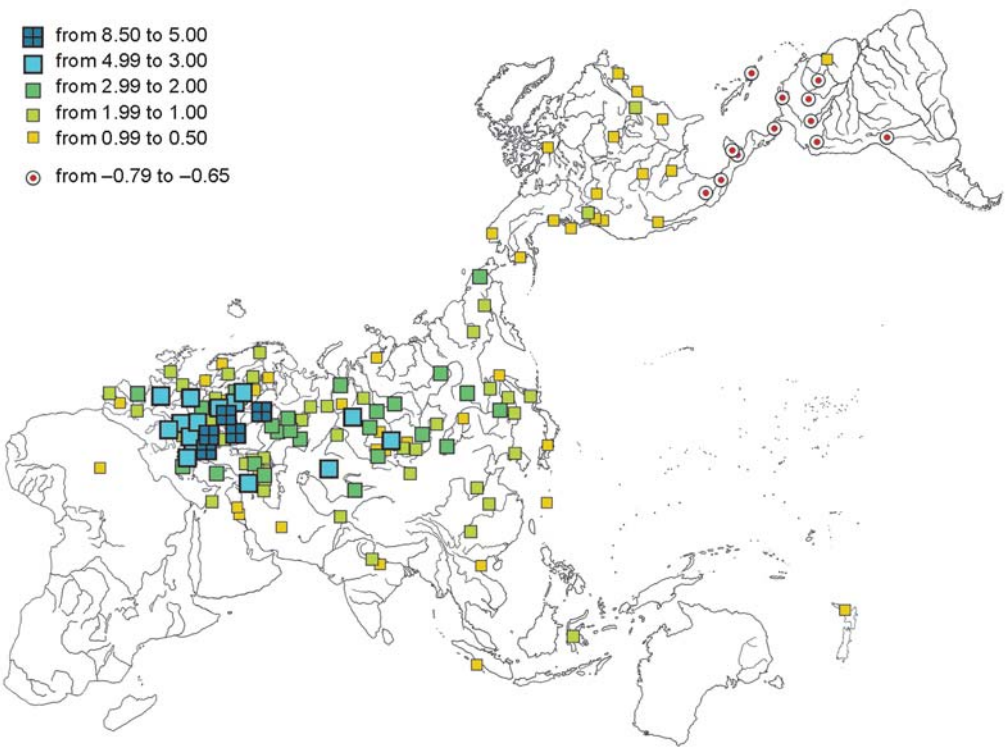

Fig. 6. Statistical data on the distribution of 200 motifs relating to the interpretation of celestial objects, in 815 traditions. 1st PC. Dispersion 5.49 %. Traditions with low absolute values of mathematical indexes (from 0.49 to –0.65) are not on the scheme.

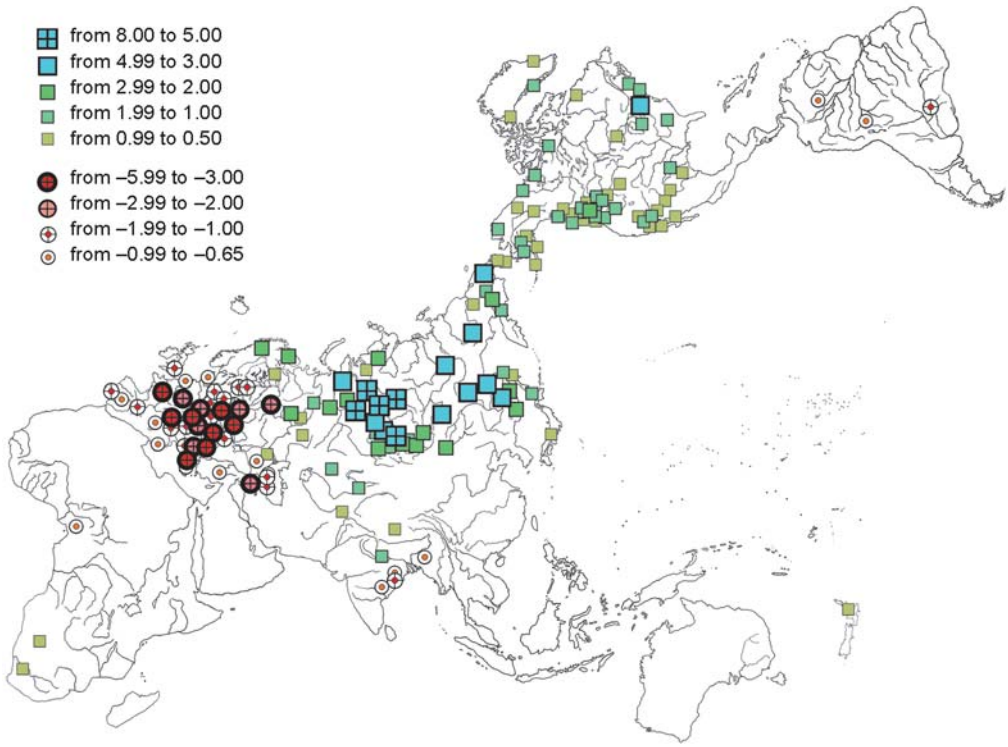

Fig. 7. Statistical data on the distribution of 200 motifs relating to the interpretation of celestial objects, in 815 traditions. 2nd PC. Dispersion 3.53 %. Traditions with low absolute values of mathematical indexes (from 0.49 to –0.64) are not on the scheme.

throughout the rest of the oecumene (Berezkin, 2007a, 2013: 31–54; Berezkin, Borinskaya, 2014; Vasiliev et al., 2015: 354–355). The migrants from Africa brought their mythology with them to South, South-East, and East Asia, and from there much later to America. The set of "mortal" motifs in Central Asia differs from the Indo-Pacific set, although some African parallels can also be traced here. A small variety of corresponding motifs in the Arctic can be explained by the effect of the "bottleneck". Both before and after the Last Glacial Maximum, only a few groups of people could have been involved in the colonization of the northernmost areas of Eurasia, which must have led to the accidental loss of some tales and ideas, and the growth of the popularity of others.

The greater diversity and popularity of the motifs of the second group (the origin of man, his anatomy, relations between the sexes) in the Indo-Pacific world than in continental Eurasia is also hardly to be considered a natural result of the influence of some powerful and long-term factors. Most likely, this is again a historical accident. There is nothing to show that the inhabitants of Siberia or Europe gave more or less attention in their daily lives to this sphere of culture than the American Indians or Melanesians; and how could such attention be quantified at all? This is not about ethnography, but about folklore, which is only indirectly connected with other spheres of culture. Since many of the specific motifs of this group are the same across the Indo-Pacific margin of Asia and across the Americas, especially South America, it can be concluded that to the west and to the east of the Pacific they could hardly have arisen independently, and must have appeared in Asia before the peopling of the New World, i.e. before 15,000 and possibly 20,000 ca BP.

The greater popularity of the motifs of this group in the Circum-Pacific region than in continental Eurasia, as well as the differences in the specific sets of motifs recorded in both regions, can be interpreted as a consequence of a prolonged isolation of these parts of the oecumene from each other. Some of the arid areas, especially the highlands, were only colonized with the advent of a productive economy (Chen et al., 2015). In sub-Saharan Africa, stories about "strange marriages", "strange anatomy", etc., as well as detailed anthropogenic myths, which are so characteristic for the American natives and peoples of Southeast Asia or Melanesia, were hardly ever widespread.

The third group of motifs, i.e. the ones relating to cosmogony, cosmology, and the etiology of various phenomena and beings, probably appeared simultaneously with the second group and also in the southern Eurasia. The northward dispersion of these motifs to Siberia, from where many motifs were brought to America, can be compared to the eastern Eurasian genetic continuum revealed by Oleg Balanovsky and his colleagues

(Balanovsky, 2014: Fig. 10, *3*). What stories were retold by the inhabitants of the Yana site, or what mythopoeic ideas were peculiar for the creators of the Upper Paleolithic cultures of Europe, is impossible to say.

The most renowned set of motifs of the third group that connects India, Siberia, and North America, is represented by the different versions of the earth-diver myth (Berezkin, 2007b; Napolskikh, 1991; Vasiliev et al., 2015: 371–379). Another characteristic example is the "council on seasons", according to which the animals discuss and determine how many units of time a particular season of the year or part of the day should contain (Vasiliev et al., 2015: 379–381). This theme is represented in Indonesia, in the north-east of India, in South Siberia, North America and Patagonia, with the Siberian-North American and North American-Patagonian variants being similar in detail. There is also an extensive set of motifs relating to the origin of domesticated plants or wild edible plants, shared by many Circum-Pacific traditions but unknown in the continental Eurasia. In tropical Africa, where natural conditions, the prevailing forms of farming, and the level of social complexity were about the same as in Indonesia and Amazonia, such "agricultural" myths are also absent. The set of motifs in question must have appeared before the transition to a productive economy, and later transferred from wild to domesticated species independently in Asia, Oceania, and America (Berezkin, 2015b: 59–60).

The fourth group of motifs, which is related to cosmonymy, developed in Northern Eurasia. From Siberia, many motifs were transferred to North America, but only a few reached South America. The Australian natives also had elaborated ideas concerning stars and constellations, but here particular tales and images are different from those in Eurasia or America, while the lack of data does not allow to outline motif complexes within the Australian continent itself. Some stories relating to the sun and the moon may already have originated in Africa, before the peopling of other continents by modern man. The interpretation of the Milky Way as a river or a snake is mainly characteristic of the Circum-Pacific region, and could have been brought to the New World by the very first migrants (Berezkin: 2017: 31–46). However, the combination of stars into constellations that have a mythopoeic interpretation, and varied interpretations of lunar spots are unlikely to have become widespread before 14–12 cal ka BP. The diversity and popularity of the corresponding ideas in North America, Siberia, and Europe far exceed all that is known for more southern regions. The cosmonymy of Europe is particularly diverse, but this is a result of a rather late development. Most of the cosmonymic motifs peculiar to Europe could not have emerged before the Bronze Age, if not the Iron Age, and many variants of the interpretation of moon-spots and the Milky Way clearly appeared after the spread of Christianity.

Conclusions

The areal trends in the distribution of mythological motifs contain information on various epochs. In terms of the depth of coverage, these data are comparable to the materials of archaeology and genetics, shedding light on the evolution of culture over the past 15,000, and in some cases 30,000 and even 60,000 years. If we talk about the epochal trend in the development of mythology, then the theme of the mortal nature of man was, apparently, comprehended first, or at least nothing earlier has reached us. In contrast, the interpretation of the objects of the night sky began to develop late and not everywhere. Another conclusion is no less important: namely, that the development of mythology, like evolution as a whole, has no laws, except for the general trend towards greater complexity, and the element of randomness is very great. The differences between the Pacific and Continental-Eurasian mythologies are due to the fact that the contacts between corresponding populations were limited for thousands of years.

The assessment of the time of appearance of certain features of mythology is based on a comparison of data from the Old and New World, the time of the peopling of America being known. Another benchmark is the time of the migration of the modern man from Africa. Some features of the mythology of the Indo-Pacific periphery of Asia ca 20,000 cal BP can be reconstructed considering South American parallels, and the same can be done for the Siberian mythologies of the Terminal Pleistocene thanks to the parallels with North America.

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