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Matriarchy and Prehistory: A Statistical Method for Testing an Old Theory

Julien d'Huy

► **To cite this version:**

Julien d'Huy. Matriarchy and Prehistory: A Statistical Method for Testing an Old Theory . Les Cahiers de l'AARS, 2017, 19, pp.159-170. halshs-01790319

HAL Id: halshs-01790319

<https://shs.hal.science/halshs-01790319>

Submitted on 25 May 2018

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Les Cahiers de l'AARS

No. 19
2016-2017

Association des Amis de
l'Art Rupestre Saharien



<http://aars.fr>

Table des matières

Mohamed Benhamdoune & Jean-Louis Bernezat

L'abri de l'ägelmam de Wa-n-Telôkat, Immīdir (Parc National et Culturel de l'Āhaggar)..... 7

Friedrich Berger

Zur Lage von Jam..... 13

Jean-Louis Bernezat

L'abri Khamdi Sidha, Āhélakan occidental (Parc national culturel du Tassili) 21

Christian Dupuy

Chars sahariens préhistoriques et araires africains actuels. I. L'alimentation des animaux de trait 29

Mohssine El Graoui & Susan Searight-Martinet

Contribution à la connaissance de la céramique néolithique du sud-marocain : le site de l'Adrar n'Metgourine ... 45

Yves & Christine Gauthier, Francis & Françoise Auvray

Nouvel abri orné au Borkou (Tchad septentrional) 49

Yves & Christine Gauthier

Éole, le mauvais élève de la classe ? Remarques sur les peintures dites « archaïques » en Ennedi 69

Du nouveau en Ennedi (Tchad) : remarques sur la chronologie des personnages du type «Niola Doha» ... 105

Yves Gauthier & Jérôme Gayet

Une pipe gravée en Ennedi (Tchad) 119

Pascale Hégy

Le site à peintures rupestres de Kéléo I (Ennedi, Tchad) 121

Benoît Hoarau, Abdelhadi Ewague & Laurent Auclair

Telouet: un jalon dans la chronologie des images rupestres du Haut-Atlas Marocain 139

Nicole Honoré

Un aspect de la vie pastorale au Sahara néolithique : les signes du corps 151

Julien d'Huy

Matriarchy and prehistory : a statistical method for testing an old theory..... 159

Gérard Lachaud

Ethnographie du Sahara : les armes traditionnelles des peuples nomades 171

Suzanne & Gérard Lachaud

À propos de quelques représentations rupestres situées au Grande Riparo (région d'Archei, Ennedi, Tchad) ... 193

Fabio Mastrucci & Gianna Giannelli

Montagne e spiriti del Sahara. Dall'Idinen ai Kel Essuf 211

Mahmoud Marai & Hardy Böckly

Rock-Art sites and dry monuments in the Erdi. A journey through Northeastern Chad..... 221

Alain Rodrigue	
Nouvelles gravures rupestres dans la région de Foum Zguit (Maroc)	237
Ursula Steiner & Friedrich Berger	
Rings of stone circles in the Western Desert of Egypt. Addendum	241
Ursula Steiner & András Zboray	
New rock art sites in the Wadi Wassa (Southern Gilf Kebīr)	243
Claude-Noëlle Vaison	
Gravures rupestres du plateau des Eglab (Nord-Ouest du Sahara algérien)	247
Robert Vernet, Boutarould el-Arby, Wim Van Neer, Veerle Linseele, Jean-François Saliège & Annabelle Gallin	
Économie et milieu dans les plaines intérieures de Mauritanie occidentale à l'Holocène moyen (Nouadhfat, Aouker occidentale)	253
András Zboray	
Four elephant hunt scenes among the Iheren style paintings of Tagelahin, Āharhar Tasset and Tamrit (Tasīli-n-Ājjer)	275
Notes de lecture	283
Carnets	299

Matriarchy and prehistory : a statistical method for testing an old theory

Julien d'Huy *

Abstract: Various statistical methods are applied to mythological motifs to reconstruct the phylogeny of tales that describe primitive matriarchies. The results show a correlation between spread of myths and spread of genes, and allow to identify the form of this mythology before the out-of-Africa migration. This makes it possible to reject some assumptions about interpretation of rock art.

Résumé: Diverses méthodes statistiques sont appliquées à des motifs mythologiques afin de reconstruire la phylogénie des récits évoquant un matriarcat primitif. Les résultats montrent une corrélation entre diffusion des mythes et diffusion des gènes, et permettent d'identifier la forme adoptée par cette mythologie avant la sortie d'Afrique de l'homme moderne. Ils permettent également de rejeter certaines hypothèses interprétatives portant sur l'art rupestre.

Introduction

In a recent book on eroticism and sexuality in the prehistoric rock art of the Sahara, François Soleilhavoup and Jean-Pierre Duhard (2013: 223) write that representations of women sometimes appear to be objects of matriarcal cultic worship. We find here a carefully considered resurrection of a regular refrain in rock art and mythology studies: the hypothesis of a primitive matriarchy. This hypothesis, in view of its influence, deserves to be questioned.

The first matriarcal interpretation involving rock art, if I am not mistaken, goes back to 1931, when Piotr P. Efimenko viewed the feminine representations of the Upper Palaeolithic as a reflection of the social and economic role of the women at this time, as well as their spiritual role within a social organisation of a matriarcal type, dominated by the mothers.

But François Soleilhavoup and Jean-Pierre Duhard (2013: 223) are they right in their interpretation? But in the Saharan rock art, was it necessarily a matriarcal society that created these images of glorified women? Or, conversely, was a patriarchal society necessarily responsible for the images of men and phallus, which are more frequent?

The hypothesis of the matriarchy as a social model, based on the maternal rights and hegemony of women, finds its origin in the work of Johann Jakob Bachofen, *Das Mutterrecht* (1861). His work is chiefly based on the Greek myths, and the historical data left by earlier authors such as Herodotus, and follows the earlier *Mœurs des sauvages Américains comparées aux mœurs des premiers hommes* of Joseph François Lafitau (1724) which compares the supposed gynocracy of the Hurons and Iroquois

with that of the ancient Greeks and Egyptians. Johann Jakob Bachofen defends the existence of a matriarcal society in Ancient Greece: he evokes a primitive domination of the feminine principle in the religion and insists on the importance of the matrilineal filiation, in which the heredity of power is only transmitted from mother to daughter. This matriarcal state would have preceded the patrilineal filiation, and would have followed a generalised stage of reproduction governed by the *ius naturale* of pleasure, where only maternity could be proved. And, in reaction to the abuses of men, the resentment of women would have led to a gynocracy and sometimes even to a community of Amazons. The men would then have turned to hegemonic power, changing the cult of the Earth-mother to a cult of the celestial gods. Bachofen's work has influenced in a significant way many authors like John Lubbock (1867:67-70), Lewis H. Morgan (1877), Friedrich Engels (1900) and Sigmund Freud (1922). Many other authors, such as Jean Przyluski (*La Grande déesse: Introduction à l'étude comparative des religions*, 1950) and Wilhelm Schmidt (*Das Mutterrecht*, 1955), have contributed to popularising this matriarcal view.

And yet, outside these myths, matriarchy may never have existed. No example of gynocracy has ever been observed in the world. Matriarchy or gynocracy, where power is exercised exclusively or mainly by women, is a situation for which no clear examples have ever been found¹ (Barry *et al.* 2000: 728; see also Le Quellec 2009: 247-250). As Françoise Héritier (2011) has said: « societies where the power would be in the hands of the women who dominated men do not exist and never have existed. (...) There are no matriarcal societies, because the

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archaic model dominating all the planet has always been present from the beginning².» If the narrative of a primitive matriarchy that spreads throughout the planet is true, then it may have become widespread at the same time as the first human migrations. The existing matriarchal myths probably reflect not a previous state of human civilisation, but only a prehistoric mythology.

Following this trail, Eugène Beauvois (1904: 324-326) incorrectly proposed that the Amazon story must have reached America across the Atlantic Ocean through some Pre-Columbian immigration of Celtic missionaries and Gudmund Hatt (1949: 72) noted that if one would seek a foreign origin for the American Amazon stories, it should be in Asia and Oceania. According to Yuri Berezkin (2013: 142) «there are similar rituals/myths in Africa, Australia, Melanesia and South America that are associated with the institutionalised opposition of the sexes, and typically include stories about the past domination of women, not only in the social sphere (the story of "a woman's realm" sometime in the past, or in a distant land, is a motif known all over the world), but also in cult and ritual³.» Yuri Berezkin further states that «this worldwide correspondence between narratives and rites, except in Eurasia, implies that we can assume that the male rituals associated with institutionalised opposition originated in Africa and were brought to Australia and New Guinea by the first sapiens. From East Asia, this mythological complex entered the New World along the coast with the first wave of migrants. [...] Then these myths and rituals were gradually supplanted, entirely in Asia and mainly in North America, by new incomers from the Eurasian cultural household⁴» (Berezkin 2013: 147-148). He notes that this hypothesis would be confirmed by the diffusion of the motif F8 (according to his classification, *i.e.* : initially women and men live apart from each other. Later they meet each other and come to live together), F38 (Women were possessors of the sacred knowledge, sanctuaries or ritual objects which are now taboo for them or they made attempts to acquire such a knowledge or objects) and F40B (A man gets into the village of women. Usually he has to satisfy every woman against his will or every woman claims him for herself), which would be explained by an Out-of-Africa diffusion.

According to the anthropologist Joan Bamberger, the principal function of the myth of the primitive matriarchy is to relegate the power of the women to a very remote past in order to guarantee the present state of the domination of one sex over the other⁵ (Bamberger 1974: 280). But if Yuri Berezkin is right, the matriarchal myth already existed during the Out-of-Africa period. That implies that this myth could pass to the later cultures, and that matriarchy never existed, as might be the case in the Saharan Neolithic. How can this be statistically demonstrated?

Material and method

The first person to have applied the phylogenetic method to the mythology is, to my knowledge, Thomas Abler who in 1987 used the techniques of cluster analysis to classify and show relationships among the forty-one variants from the Iroquoian myth of the creation of the world. He showed that most clusters of the statistical trees represent a national or tribal tradition. The idea to use phylogenetic tools to classify tales or many versions of the same tale was taken up by Jun'ichi Oda (2001) and Jamie Tehrani (2013). Since 2012, I have used similar tools to trace lines of transmission of myths, folktales and mythological traditions back to a common ancestor and to test hypotheses about human prehistory and the processes explaining the current geographic distribution of the myths and folktales. I have also used these techniques to quantify patterns of borrowing, reconstruct proto-mythology and test various claims, such as the rate of evolution, about mythological evolution.

Myths are not genes: the biologist's softwares have been used in this particular field of study for convenience. These programs allow researchers to construct statistical trees of relationship based on similarities and differences between the studied units. If we accept that two ethnic groups who are genealogically close share more narratives in common than two more distant groups, or that their tales have more in common with each other than with more distant groups, such programs allow us to reconstruct "trees" of oral traditions (d'Huy 2012a, 2015b). However, these results mean nothing without a point of comparison, and need to be tested and compared to other results.

I used the analytical catalog of the mythological motifs, graciously made accessible by Yuri Berezkin (<http://ruthenia.ru/folklore/berezkin>, accessed February 22, 2016), to identify narratives about the differentiations between men and women, their cohabitation and their confrontations. Narratives as basic units to conduct phylogenetic studies have been used many times before (d'Huy 2015, 2016a, Ross and Atkinson 2016, da Silva and Tehrani 2016). The Berezkin's database is made up of 19th, 20th and 21st century simplified subjective summaries of longer secondary-source summaries of native myths in diverse genre of widely varying types and accuracy. It is necessary to note that such narratives are easily translated from one language to another: translations do not affect the foundations of tales, only their style. Moreover, Yuri Berezkin classifies the tales on an abstract level; the details of the text, and its many alternate versions, are also not very important if the motif itself remains intact. Finally, numerous works, since Charles-Félix-Hyacinthe Gouhier in 1892, showed the durability through time of such motifs (also see, among others, Bogoras 1902, Jochelson 1905, Hatt 1949, Korotayev and Khaltourina 2011, Berezkin

2013, Witzel 2013 and Le Quellec 2014, 2015a, b). The continuous and repeated transformations and simplifications that take place in oral myths when they were passed into literate form have little impact on our analysis which is quantitative, on an abstract level, and not qualitative.

The cultural areas determined by Yuri Berezkin have also been considered as units of analysis. Such a choice implies that cultural areas are more than a convenient fiction : they are a real thing with ancestors, descendants and relations. Moreover, such units should be able to endure historical phenomena and persist over time. An advantage of this approach is that if a narrative has been lost in a given ethnic group, the neighbouring tribe of the same cultural area might remember it.

The following features were selected among the Berezkin's corpus F1, F5, F5A, F8, F16, F16B, F16C, F16D, F38, F40A, F40B, F41, F42, F42A, F43, F43A, F43B, F43C, F44, F45, F45A, F45B, F46, F46A, F47, F47A, F48 and F97 (F39 being not available online). For every cultural area, each motif was coded by 1 if it was present, by 0 if it was absent. Then, to avoid any bias in the study, only geographical areas possessing at least eight narratives were retained. Finally, F45A that is not present in the altered Berezkin's corpus has been deleted from the dataset.

Tools usually used by the biologists to establish filiation between species were used to construct a phylogenetic tree. A bio Neighbor-joining phylogenetic tree (software : PAUP*4.0a147 ; Retention Index = 0.49) has been built. Indeed, the NJ method using cultural databases generally produced accurate results (e.g. McMahon et McMahon 2003; Nakhleh et al. 2005). According to the near-consensus position held within the scientific community about the recent single origin of modern humans and the hypothesis or assumption that a part of the matriarchal mythology may have spread at the time of the Out-of-Africa, the tree was rooted in East Africa.

One important consideration should be raised. Over time, the original character traits of a species can become diluted, disappear or even be wiped out when new character traits are incorporated into the initial genome without being inherited (e.g. following symbioses or hybridization between species). In the case of myths or oral traditions, these new features are borrowings from other versions or traditions that are added to the original account. Fortunately, the methods used by biologists to study the evolution of genes can also be applied to estimate the extent of borrowing and the role of inheritance. For instance, the Retention Index (RI) allows us to measure the amount of analogous structures created by convergent evolution (homoplasy), but also measures how well the shared derived trait states (synapomorphies) explain the tree. This tool (among others) enables measurement of the per-

centage of traits shared by two or more tales or traditions that are not inherited from a common ancestor, *i.e.* it allows one to distinguish between a version / tradition that moved wholesale and one that was reconstructed out of very simple and common features (d'Huy 2012). Here the RI (0.49) shows a low yet existing vertical transmission. This low score could be explained by the nature of cultural evolution with borrowings that eradicate a great part, yet not the totality, of the phylogenetic signal.

Results and discussion

In the tree obtained from my analysis (Fig. 1 ; appendix A), two major clades can be identified: the first one, the Eurasian, also includes the Arctic area and western Africa; the second one, essentially Amerindian, can be subdivided into two minor clades: the most important group includes the areas of South America and Melanesia, the other contains only an area of North America. This tree is only a model yet its structure fits very well with what is known about the first human migrations⁶. Accordingly, a strong correlation between a number of motifs and genes has been shown by Andrey Korotayev and Daria Khaltourina (2011). A low correlations between the distributions of a set of tales-type and spatial associations among populations is also consistent with vertical processes of

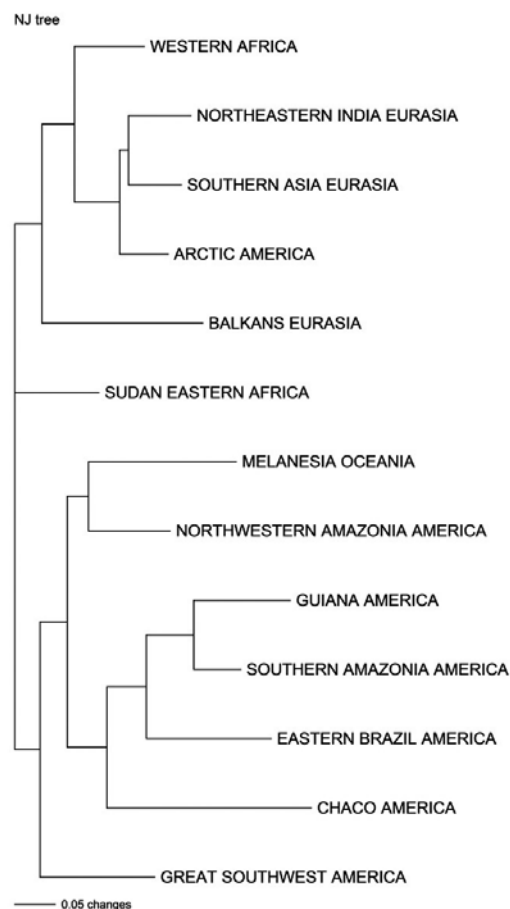


Fig. 1. Bio Neighbor-joining tree of 13 cultural areas ; narratives about the differentiations between men and women, their cohabitation and their confrontation (Berezkin's database).

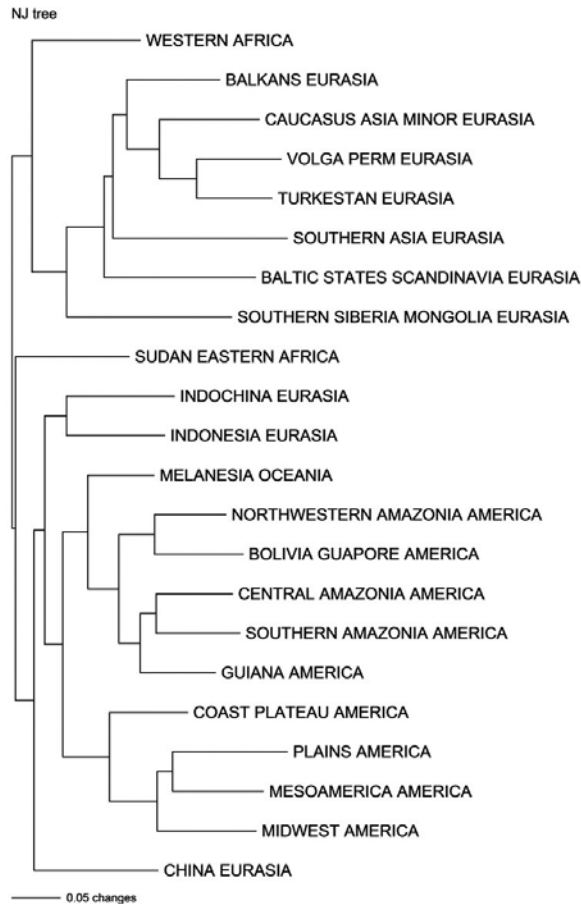


Fig. 2. Bio Neighbor-joining tree of 22 cultural areas ; narratives about serpents (Berezkin's database).

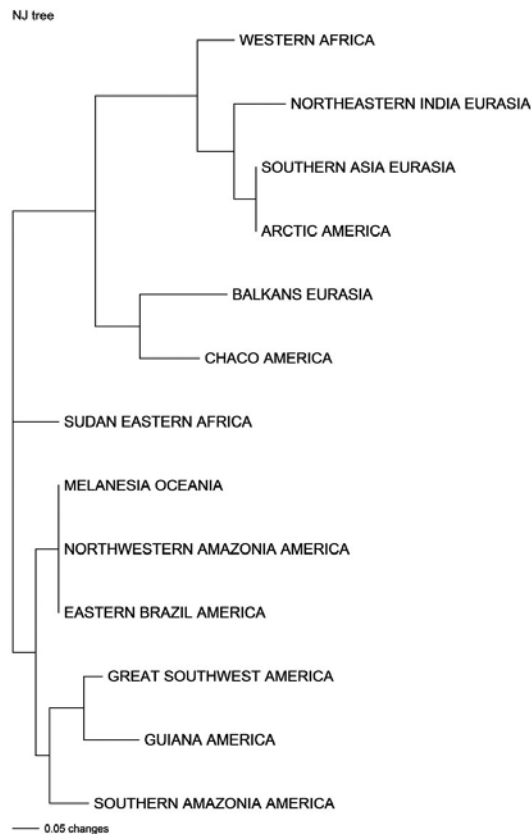


Fig. 3. Altered bio Neighbor-joining tree of 13 cultural areas ; narratives about the differentiations between men and women, their cohabitation and their confrontation.

mythological inheritance (d'Huy 2015b; Da Silva and Tehrani 2016). Moreover, phylogenetic trees based on many versions of the same myths or on many oral traditions associate rather strongly with the distribution of certain genetic types (d'Huy 2012a, b, c, 2013a, b, 2015a, b, c). So myths considered at a general level seems to respond very slowly to changes in environmental or social conditions at a rate similar to genetic changes, and could reflect a particular history of settlement, *i.e.* the cultural history of most of the ancestors of a given area.

According to the tree, human beings would have gone out of Africa, followed the southern coastline of Asia and colonised Australia around 50.000 years ago (in the current tree: Melanesia). The early Amerindian people moved via the Bering Strait to South America when sea levels were significantly lowered due to the Last Glacial Maximum (in the tree: Guiana, Northwestern Amazonia, Southern Amazonia, Eastern Brazil, Chaco). The American mythology of this period is distributed throughout the Americas. The second migration from Asia, maybe during or shortly after the initial peopling of America, has left an impact only in North America (in the tree: Great Southwest); the third migration, subsequent to the first migrations, has only left a trace in Arctic populations. The African mythology was largely lost in Continental Eurasia (in the tree: Balkans, Southern Asia, Northeastern India), likely because the decrease of population density during or soon after the Late Glacial Maximum. The place of western Africa could be explained by an early Back-to-Africa, or by an influence of the more northern regions, themselves bound to the Mediterranean culture.

It is remarkable that the structure of the tree is widely compatible with the distribution of the male rites suggested by Yuri Berezkin. It is also remarkable to find a similar tree from a completely different databases of narratives based on the motifs of dragons and serpents (d'Huy 2016a; Fig.2); the fact that results from an independent and unrelated source "converge" on the same conclusions (also see below) shows that the result of the phylogenetic method is very strong and that the output obtained by this method may be directly proportional to the input.

Once the structure of the tree is checked by what we know about the settlement of the planet, it becomes possible to reconstruct statistically the proto-folklore about the dichotomies between men/women before the Out-of-Africa diaspora. Only the features reconstructed both at the root of the tree and the cluster Melanesia / Northwestern

	F16	F38	F39	F40A	F40B	F41	F42	F43	F44	F45
Current paper		X	Not covered	X	X		X	X	X	x
Korotayev & Khaltourina	X	X	X	X		X	X	X	X	X

Tableau I

Amazonia were retained. The reconstructed features are: F38. Women were possessors of the sacred knowledge, sanctuaries or ritual objects which are now taboo for them or they made attempts to acquire such a knowledge or objects; F40A. An anthropomorphic male or an androgyne is the only possessor or leader of women; F40B. A man gets into the village of women. Usually he has to satisfy every woman against his will or every woman claims him for herself; F42. The men feel themselves offended by the women and abandon them; F43. Women of the ancestral community kill or abandon the men; F44. Women and men quarrel and abandon each other; F45. There are (or were) women who live apart from men in their own village or villages.

In order to control the reconstructions, the results (Tab.I) could be compared to those obtained by Andrey Korotayev and Daria Khaltourina (2011). Using principal component analysis, these researchers show the existence of a mythological cluster associating the Melanesian and the Amazonian areas. This group is associated with the distribution of mtDNA haplogroup B: it is believed to derive from the first waves of human migration from Africa along the southern edge of Asia and to correspond to the first colonisation of Oceania and America. Significantly, only one reconstructed feature (F40B) is not found in Korotayev and Khaltourina's reconstructions.

Additionally, according to Yuri Berezkin, the distribution of the motif F38 and F40B at the world level fits with an African origin: this author supposes a diffusion by the first human migrations in Australia and in New Guinea before reaching the New World via the Bering Strait (Berezkin 2013: 147-148). The phylogenetic reconstruction is thus supported, at least partially, by the results from two others methods⁷.

To control for the existence of a possible “glue” holding the various elements of the reconstructed folktales together since the out-of-Africa diaspora, a new tree based only on these traits has been created. The general structure of this new tree (Fig. 3; appendix B) is very similar to the first one (with the exception of the Chaco area) and shows a high Retention Index (0.7) which suggests a cohesive transmission of a set of folktales as a core tradition. According to these results, the core matriarchal folklore seems to exhibit sufficient coherence and integration to create a recognisable history when the core and the peripheral elements are taken

together. Consequently, a part of the matriarchal stories should have a common origin and should have followed the diffusion path. Integration of these reconstructions seems to protect the core of the tradition, even if cross-cultural borrowings could locally distort the transmission.

Verification of the results

A reasonable prediction can be made about these results: if the women were supposed to dominate the men in a remote time, they also had to possess fire. To test this hypothesis, 39 other features of Berezkin's database (D1, D1A, D1a1, D1a2, D1B, D2, D3, D4A, D4AA, D4B, D4C, D4c1, D4D, D4E, D4E1, D4F, D4G, D4H, D4h1, D4i, D4J, D4K, D4L, D4M, D4N, D4O, D4P, D5, D5A, D6A, D6B, D7, D8, D9, D10, D11, D12, D12A, D13F) concerning the acquisition of fire by the human race were used.

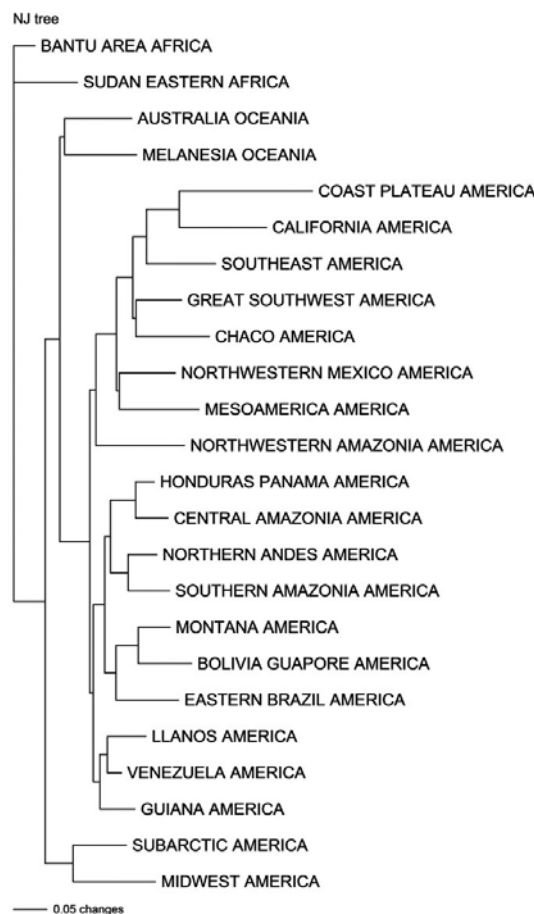


Fig.4. Bio Neighbor-joining tree of 24 cultural areas ; narratives concerning the acquisition of fire by the human race (Berezkin's database).

Berezkin's database.	D4A	D4L	D5	D9	D12
Frazer's database.	4 ; 5.	2 ; 3 ; 6.	1	Not reconstructed	Absent from the database

Tableau II

After identifying the geographical areas possessing at least 8 narratives, a tree BioNeighbor-joining (Retention Index = 0.4), rooted on East Africa, was built (Fig.4 ; appendix C).

This tree presents two major amerindian clades. The first one clusters in the Midwest and the subarctic zone and would represent the second expansion in North America from Eurasia (*i.e.* Fig.1, the Great Southwest ; Fig.2, the Coast Plateau, Midwest, Great Plains and Mesoamerica) or the third expansion (*i.e.* Fig1, Arctic). The second cluster, rooted in Australia and Melanesia, groups all other versions. This clade is divided into two sections: a set of areas belonging to the south of North America, Central America and the north of South America on one hand (with the exception of the Coast Plateau), and a set of South American areas on the other hand. This cluster is probably the residual trace of the first expansions in America.

The place of North-West Amazonia at the root of the first subtree suggests that there was a reverse flow across the Panama isthmus after the initial settlement of South America (also see Reich *et al.* 2012). The Coastal Plateau, Mesoamerica and the Great Southwestern areas have a rich and complex history, lying on the route of both waves of settlement, between the influence of North Amerindian and South Amerindian folklores. That explains their changing place in Fig. 1, 2 and 4.

The features reconstructed at the level of both the root of the tree and the node clustering Australia and Melanesia are : D4A. Fire is stolen from its original owner or brought back to the people from the person who had stolen it before ; D4L. 1) First fire is sent to earth from the sky. 2) Ancestors come from the sky and bring fire or warmth from there ; D5. A female personage is the owner or inventor (but not the personification) of fire ; D9. A raven or other big dark-feathered scavenger bird is the owner, personification, spouse, obtainer or stealer of fire, daylight, or the Sun ; D12. 1) The first people or inhabitants of a distant country cook food in the sun. 2) The fire owner lies that he or she cooks food in the sun.

The reconstruction of the feature D5 shows the predictive capacity of the phylogenetic method. It explains the widespread idea according to which women possessed fire before men and/or that fire springs from the body of a woman. Besides, if Frazer's analogy between the use of the fire plough (Collina-Girard 1998) and the relationships between the sexes is accepted (according to a primitive link between the masculine stick and the feminine support) (Frazer 1930 : 220-221), this reconstruction would tend to prove that such a firelighting tool was known before the Out-of-Africa diaspora. Note that it is nonetheless tricky to precisely determine the meaning of these primitive stories, which depends a great deal on the context, including the social and historical context. However, the fact that the feminine power was again relegated to the remote past shows that the matriarchal myth would have been known before the Out-of-Africa diaspora.

Frazer's large collection of fire myths (1930 ; completed by Schmidt 2013) was used to create a new database to check roughly the plausibility of the previous results about the acquisition of fire. 36 features were taken into account for 9 geographic areas (with a number of features greater than 8 ; see appendix D) and a tree bio Neighbor-joining (Fig.5 ; Retention Index = 0.34), rooted on Africa, was built. The amerindian clade is probably the result of the first expansions into America. The features

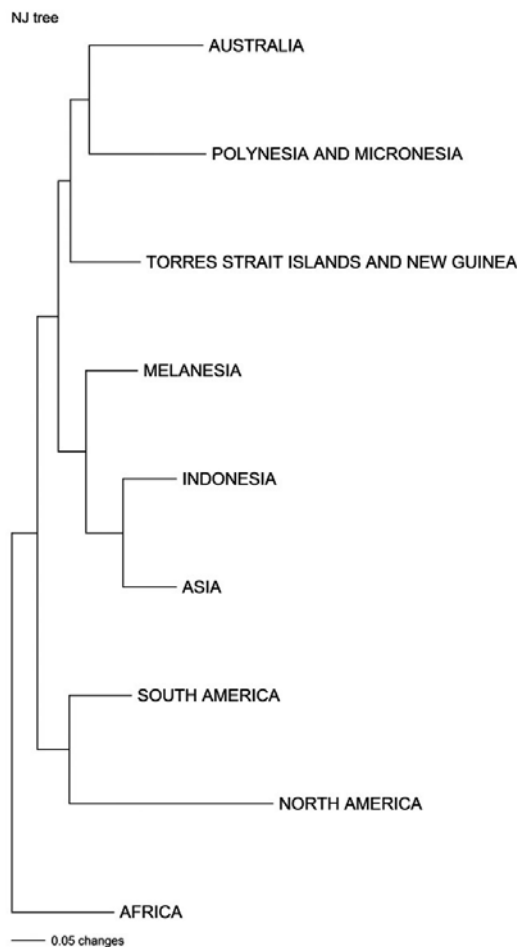


Fig.5 Bio Neighbor-joining tree of 9 cultural areas ; narratives concerning the acquisition of fire by the human race (Frazer's database).

reconstructed at the level of both the root of the tree and the node clustering Oceania, Asia and America, are: 1/ Fire in possession of women before men; 2/ Fire derived from lightning; 3/ First fire came from the sky / heaven; 4/ Fire is stolen by an animal; 5/ Fire is stolen from an animal; 6/ Tree set on fire by lightning or fire in tree.

In order to provide a control on the reconstructions, the two results could be compared (Tab.II). Only one reconstructed feature (D9) is not found in Frazer's reconstructions.

Conclusion

These results can be harmoniously integrated into the model constructed from the trees previously reconstructed with the phylogenetic method. Indeed, taken together, mythological trees show the African origins of modern humans, who followed the southern coastline of Asia, colonised Australia around 65.000 years ago and reached America from an East Asian source.

A second migration again reached North America maybe at more or less the same time from a North Eurasian source. An admixture between the two mythological complexes took place in Siberia and in North America. However, during the Last Glacial Maximum in Eurasia, the two complexes mostly evolved in isolation, separated by natural barriers.

After the Last Glacial Maximum, new stories emerged in Eurasia and spread across the continent, blurring boundaries between the primitive areas. Finally, a last flow reached America, limited to the circumpolar area, or migrated back to Asia, bringing Native American folklore (for the Out-of-Africa diffusion, see d'Huy 2013c, 2014, 2016a, b, d; for the second flow in America: d'Huy 2012a, b; 2013a, b; 2015b; 2016c; 2017; for the third and last flow in America: d'Huy 2016c, d). This super-tree of the myths would correspond to that of the genes (e.g. Raghavan *et al.* 2014, Skoglund *et al.* 2015). Additionally, several papers in comparative mythology based on different methods lead to the same conclusions (Berezkin 2007a, b, 2009, 2013; Le Quellec 2014, 2015). The fact that multiple sources of evidence are in agreement leads to very strong conclusions. The existence of the matriarchal myth during the Out-of-Africa process indicates that the tales in which females hold primary power, predominate in roles of political leadership, moral authority, social privilege and control of property at the specific exclusion of men was already relegated to the mythical past, at least 65.000 years ago.

Consequently, the hypothesis of a matriarchal society should be inappropriate in the context of the later Saharan rock art, contrary to the suggestion of François Soleilhavoup and Jean-Pierre Duhard.

Many reconstructed myths, using phylogenetical myths, go back to the Out-of-Africa period. The use of phylogenetic methods to reconstruct the past evolution of myths and folktales has been applied since 2012 (d'Huy 2012a) to numerous families of narratives⁸.

The first reconstruction of myths going back to the Out-of-Africa period concerned the motifs of the *dragon* and the *snake*: «The mythological serpents guard water sources, releasing the liquid only under certain conditions. They can fly and form a rainbow. They are giant and have horns or antlers on their head. They can produce rain and thunderstorms. Reptiles, immortal like others who shed their skin and thus rejuvenate, are contrasted with mortal men and/or are considered responsible for originating death, perhaps by their bite.» (d'Huy 2013c, 2016a). This analysis was based on several datasets (borrowed in part from existing and already published databases such as Fontenrose 1980) and was built by varying both the definition

of the “dragon” (e.g. chimera with serpentine traits; horned serpent; rainbow drinking water; snake; structural plot where a giant or lion may replace the dragon; etc) and the units of analysis (individual versions of the same tale-type, types of dragons, cultural or geographical areas) to avoid as much as possible a potential for judgments of what stories / motifs to analyze to bias the results. Many statistical methods were also used for the same purpose. The proto-narrative, reconstructed from these various sources and analysis, probably existed prior to the Out-of-Africa diaspora. This reconstruction was confirmed by studying the distribution of various narratives around the world and the prehistoric diffusion of these motifs (d'Huy 2016a). It was also corroborated by the comparison of many rock art images throughout the planet and by the local mythology that accompanies each of them (d'Huy 2014).

The second phylogenetic reconstruction was based exclusively on African narratives. It is a tale of the

origin of death: «The Moon sent the Hare to the people with a message of life: that men will die but be reborn as the Moon. The Hare modified the message, which then introduced death to human beings, which is why the Hare is hated by them. In punishment, the leap of the Hare is stopped, perhaps by the Moon, which explains the Hare's lip.» The ancient age of this narrative, and its likely presence during the Out-of-Africa migration, was demonstrated by observing the existing patterns in the distribution of motifs (Quellec 2015a).

The third reconstruction is also exclusively based on an African corpus (Le Quellec 2015b) and the world distribution of this motif is elegantly explained by an Out-of-Africa diffusion (Berezkin 2007b; Le Quellec 2014, 2015b). The prototale is this: «Animals and men came directly out of the ground, women came first and a portion of the human beings remained underground. Rock art testifies today to this emergence, which can also explain the origin of death.»

Notes

[1] «situation, dont il n'existe pas d'exemple attestés, où l'autorité est exercée exclusivement, ou principalement, par les femmes.»

[2] «Des sociétés où le pouvoir serait entre les mains des femmes avec des hommes dominés n'existent pas et n'ont jamais existé. [...] Il n'y a pas de sociétés matriarcales, parce que le modèle archaïque dominant sur toute la planète est en place dès le départ.»

[3] «В Африке (...) встречаются аналогии тому характерному главным образом для Австралии, Меланезии и Южной Америки ритуально-мифологическому комплексу, который связан с институализированным противостоянием полов и обычно включает рассказы о былом господстве женщин не только в социальной сфере (истории о "женском царстве" в прошлом или в далекой стране известны по всему миру), но и в области культа и ритуала.»

[4] «Можно предполагать, что мужские ритуалы, связанные с институализированным противопоставлением полов, возникли в Африке и были принесены в Австралию и на Новую Гвинею первыми сапиенсами. Через Восточную Азию этот ритуально-мифологический комплекс проник в Новый Свет вместе с первой волной шедших по побережью мигрантов. (...) Из Азии полностью, а из Северной Америки в основном соответствующие мифы и ритуалы были постепенно вытеснены другими, связанными с континентально-евразийским очагом культурогенеза.»

[5] «Myth and rituals have been misinterpreted as persistent reminders that women once had, and then lost, the seat of power. This loss accrued to them through inappropriate conduct. (...) The myths constantly reiterate that women did not know how to handle power when they had it. The loss is thereby justified so long as women choose to accept the myth. (...) In fact, if women are ever going to rule, they must rid themselves of the myth that states they have been proved unworthy of leadership roles. The final version of woman that emerges from these myths is that she represents chaos and misrule through trickery and unbridled sexuality. (...) Such visions will not bring her any closer to attaining male socioeconomic and political status, for as long as she is content to remain either goddess or child, she cannot be expected to shoulder her share of community burdens as the coequal of man. The myth of matriarchy is but the tool used to keep woman bound to her place.»

[6] A recent study has pointed out a phylogenetic signal in animal folklore that may reflect a cultural exchange between anatomically modern man and Neanderthals (d'Huy 2015b). However, such cultural exchanges between our species and other

ancient hominids have not been taken into account here because of the small number of tales studied.

[7] The creation of a tree also allows us to estimate the contents of certain tales at several steps in human history. For instance, it is possible to reconstruct the proto-folklore at the node of the Balkans to estimate the contents of the European Palaeolithic myths about matriarchy, i.e. F38, F40A, F40B, F44, F45 and F97 ("After eating certain fruit, berry, tuber, etc. people become sexually aware"). Such a reconstruction is of obvious interest — allowing us, for example, to rule out the hypothesis of a primitive matriarchy in interpreting the Palaeolithic Venus and representations of vulvas. Conversely, the phylogenetic reconstruction of an African myth about the emergence of humanity from the underworld (Le Quellec 2014, 2015b) or of a Palaeolithic tale about the appearance of game, delivered by a person who enters the dwelling of the master of animals (d'Huy 2013, 2015a), give an additional breadth to the interpretation of a part of this prehistoric art, seeing it as an illustration of a mythological emergence from the earth (Le Quellec 2017). It is also possible to use the West African node attached to the Eurasian cluster to reconstruct the Neolithic Saharan folklore and to propose an explanation of some rock art images of this area: F1. Woman, or a female supernatural, is created by changing the sex of a man; F38. Women were possessors of the sacred knowledge, sanctuaries or ritual objects which are now taboo for them, or they made attempts to acquire such knowledge or objects; F40A. An anthropomorphic male or an androgyne is the only possessor or leader of women; F40B. A man gets into the village of women. Usually he has to satisfy every woman against his will or every woman claims him for herself; F45. There are (or were) women who live apart from men in their own village or villages; F97. After eating certain fruits, berries, tubers, etc. people become sexually aware. The idea of such a mythological past where women possessed power (F38) may have been illustrated in many images of Saharan rock art, e.g. women riding lions or other dangerous animals (Soleilhavoup and Duhard 2013 : 90-91). Similar stories could be found in the Kabyle folktales (i.e. the Amazons, Frobenius 1921 : 55-60; 1922 : 3-11; the first woman with sacred knowledge, Frobenius 1921 : 70-83). F40A (or bigamy) may also have been illustrated in an image of the Wadi Taleshut representing two women on both side of an anthropomorph (Soleilhavoup and Duhard 2013 : 81-82).

[8] The worldwide distribution of these motifs is not uniform and a phylogenetic message and a geographical progression have been demonstrated, consequently the simplistic neurobiological explanation should be rejected. However, it remains possible that certain innate human reflexes, such as fear of snakes (Jones 2000, d'Huy 2013c) or a

tendency to animate images of living beings (d'Huy 2013d), could contribute to a proper conservation of certain myths over time. Yet the unequal and variable distribution of the studied tales strongly implies that archetypal, neurobiological or physiological factors can not be the unique explanation of complex similarities between mythologies (d'Huy and Le Quellec 2014).

The author thanks Brian Hayden, Jean-Loïc Le Quellec and George Sumner for their constructive comments.

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Supplementary material

Appendix A : "opposition" between men and women; nexus format ; more than 8 motifs.

```
#NEXUS
begin data;
dimensions ntax=13 nchar=28;
format datatype=standard [interleave] missing=?;
```

Matrix

```
WESTERN_AFRICA
1001000011100000000100000001
SUDAN_EASTERN_AFRICA
0111000010101011001100000001
MELANESIA_OCEANIA
10010010111111011100001000
NORTHEASTERN_INDIA_EURASIA
1110100000100000000101000001
SOUTHERN_ASIA_EURASIA
0110101001100000000100000001
BALKANS_EURASIA
0000100110000001001101000001
ARCTIC_AMERICA
1110000001100000000100100001
GREAT_SOUTHWEST_AMERICA
0110001001101010001100100000
GUIANA_AMERICA
011001000100111101100111100
NORTHWESTERN_AMAZONIA_AMERICA
100010011111010001100000000
SOUTHERN_AMAZONIA_AMERICA
0110110011001011101100110000
CHACO_AMERICA
1001100000011100001100111110
E A S T E R N _ B R A Z I L _ A M E R I C A
000000001110111101101110110;
END;
```

Appendix B : "opposition" between men and women; nexus format ; amended database.

```
#NEXUS
Begin data;
    Dimensions ntax=13 nchar=7;
    Format datatype=Standard interleave=yes
missing=?;
```

Matrix

```
WESTERN_AFRICA 1110001
SUDAN_EASTERN_AFRICA 1011111
MELANESIA_OCEANIA 1111111
NORTHEASTERN_INDIA_EURASIA 0010001
SOUTHERN_ASIA_EURASIA 0110001
BALKANS_EURASIA 1000011
ARCTIC_AMERICA 0110001
GREAT_SOUTHWEST_AMERICA 0111111
GUIANA_AMERICA 0101111
```

```
NORTHWESTERN_AMAZONIA_AMERICA
1111111
SOUTHERN_AMAZONIA_AMERICA 1101111
CHACO_AMERICA 0001011
EASTERN_BRAZIL_AMERICA 1111111
;
END;
```

Appendix C : Origin of the fire; Berezkin's database; nexus format.

```
#NEXUS
Begin data;
Dimensions ntax=24 nchar=39;
Format datatype=Standard interleave=yes
missing=?;
```

Matrix

```
BANTU_AREA_AFRICA 00000001000
0001000001010010100000100100
SUDAN_EASTERN_AFRICA 00000001010
0011000000010010000000100110
AUSTRALIA_OCEANIA 000000010?0
0000000100010001101000100101
MELANESIA_OCEANIA 00000001000
0001000000010000111000011100
SUBARCTIC_AMERICA 000010010011
000000000010100000001100000
COAST_PLATEAU_AMERICA 110010110010
01010001111110000011101100
MIDWEST_AMERICA 0000000100110000001
01000110000000000100
SOUTHEAST_AMERICA 100010110000
100000001001010100001100000
CALIFORNIA_AMERICA 000010110000
111010001011110100010111101
GREAT_SOUTHWEST_AMERICA 1000
1011000001001000000100010010100000
NORTHWESTERN_MEXICO_AMERICA0000
10110000100000000101000100000000
MESOAMERICA_AMERICA 000010110000111
010000000000101000001000
HONDURAS_PANAMA_AMERICA 0000
101100000000000000000010111001000
NORTHERN_ANDES_AMERICA 0000
1111000000010000000000101011001100
LLANOS_AMERICA 0000101100000001000
00000001101010000100
VENEZUELA_AMERICA 00001011000
00000000000?0000101010000101
GUIANA_AMERICA 000010110000000000
000010000111010100100
NORTHWESTERN_AMAZONIA_AMERICA
100000110000000010000000010111010001101
CENTRAL_AMAZONIA_AMERICA 0000
1001000000000000000000010111100000
MONTANA_AMERICA 000001110000000000
000010001100010100100
```

```

BOLIVIA_GUAPORE_AMERICA      1000  26/ Raven first bringer of fire or steals fire.
01110000000010000000001100111100100  27/ Fire-myths told to explain the red colouring of
SOUTHERN_AMAZONIA_AMERICA    0000  birds.
11110000000100000000?00100110101100  28/ Squirrel steals or helps to steal fire.
EASTERN_BRAZIL_AMERICA       00000011000  29/ Fire obtained from the sun.
0000100000010000000111000100        30/ Tree set on fire by lightning or fire in tree.
CHACO_AMERICA                 0000111100000100100  31/ Vulture first possessor or first bringer of fire or
00000010100011110001;              steals fire.
END;                                  32/ Fire in wood.

```

Appendix D : Origin of fire ; Frazer's data-base ; nexus format.

- 1/ Bat brings first fire or help to steal fire.
- 2/ Bird shows how to make fire by friction.
- 3/ Bird in possession of fire.
- 4/ Bird steals fire, fetches fire or brings fire from its first possessor.
- 5/ Branches rubbing against each other, fire produced.
- 6/ Cockatoo the first fire-bringer, or brings first fire.
- 7/ Crow associated with discovery of fire or tries to fetch fire.
- 8/ Dog brings or fetchs first fire.
- 9/ Fire originally unknown.
- 10/ Fire in possession of women before men.
- 11/ Fire extracted from body of woman.
- 12/ Fire derived from lightning.
- 13/ Fire is stolen by an animal.
- 14/ Fire is stolen from an animal.
- 15/ Fire is stolen by fox / coyote.
- 16/ Fire procured from the sun / moon.
- 17/ Fire stolen, passed down a line of animal runners.
- 18/ Fire produced by branches rubbing against each other in the wind.
- 19/ War of fire and water.
- 20/ Frog steals fire for men or swallows fire.
- 21/ Fire fetched from or sent by God / Great Spirit.
- 22/ Hawk first bringer of firer or steals fire.
- 23/ Humming-bird first bringer of fire or steals fire.
- 24/ Fire stolen from a feline.
- 25/ Pigeon steals fire.

- 33/ Woodpecker steals fire.
- 34/ Wren procures fire or fetches fire from God.
- 35/ First fire comes from the sky / heaven.
- 36/ Origin of fire : hand.
- 37/ Origin of fire : stars.

#NEXUS

Begin data;

Dimensions ntax=9 nchar=37;

Format datatype=Standard interleave=yes missing=?;

Matrix

```

AUSTRALIA      000001101110110100000100101
0010001001
TORRES_STRAIT_ISLANDS_AND_NEW_
GUINEA         10000101111011000000000000
10110000110
MELANESIA     01010001111011000000000000
00000000110
POLYNESIA_AND_MICRONESIA      0100
100011110001010000000010010000010
INDONESIA      01010000000011000010000010
00010000100
ASIA          00110000100011000010000000000001
0100
AFRICA        001000110101110000001001000
0111000100
SOUTH_AMERICA 00110000111111000001
00100010011100000
NORTH_AMERICA 10010000100111111001
1111011110110000;
END;

```


Association des amis de l'Art Rupestre Saharien

Association (loi de 1901) fondée en 1991 et dont le but social est de «promouvoir les études sur l'art rupestre saharien, faire connaître les documents s'y rapportant, et toutes les opérations liées directement ou indirectement à cet objet. L'association se propose en particulier de réunir périodiquement les personnes, amateurs et/ou professionnels de la recherche, intéressés à des titres divers par l'art rupestre saharien; communiquer tous renseignements utiles, par échange d'informations et d'opinions, au sein de l'association ou par des publications; publier une *Lettre de l'AARS* informant les membres de tous les événements, scientifiques ou autres, liés à cet objet.»

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Datations

Les datations mentionnées dans les articles sont exprimées soit par rapport à l'ère commune (AEC pour « avant l'ère commune » et EC pour « de l'ère commune »), en se référant au calendrier grégorien, soit en CalBP auxquelles il suffit de retirer 1950 pour obtenir leur valeur par rapport à l'ère commune.

Orthographe et accords

En berbère, les noms commençant par un [t] étant féminins, les termes s'y rapportant seront accordés en fonction (ex.: la Tasīli-n-Ājjer). Les toponymes et ethnonymes sahariens, souvent déformés sur les cartes et dans la littérature, seront restitués dans la mesure du possible, sauf dans les citations, dont l'orthographe originale sera respectée. Pour les termes arabes et touaregs, on utilisera les correspondances du tableau suivant:

arabe	tifinay	AARS	Description, valeurs, commentaires
ء		,	Explosive glottale (attaque vocalique comme dans « assez ! »)
ا	ⵏ	ā	Voyelle longue (â), souvent intermédiaire entre [a] et [e]
ب	ⵉ	b	Labiale occlusive sonore (comme dans <i>bateau</i>)
ت	ⵜ	t	Dentale occlusive sourde (comme dans <i>tableau</i>)
ث		ṯ	Interdentale spirante sourde (émise avec le bout de la langue entre les dents)
ج	ⵓ ⵙ # ⵔ	j dj g	Spirante palatale sonore (comme dans <i>jeune</i>) pouvant, selon les régions, être articulée dj (articulation affriquée connue notamment en touareg de l'Ājjer et en arabe algérien) ou g (en touareg de l'Āhaggar et en arabe égyptien)

arabe	tifinay	AARS	Description, valeurs, commentaires
ح	ⵇ	ħ	Spirante laryngale sourde
خ	ⵁ	ħ	Fricative vélaire sourde (comme dans l'allemand <i>Buch</i>)
د	ⵎ	d	Apico-dentale dentale occlusive sonore (comme dans <i>date</i>)
ذ		ḏ	Interdentale spirante sonore (émise avec le bout de la langue entre les dents, comme le <i>th</i> anglais).
ر	ⵝ	r	Vibrante linguale ([r] «roulé» ou «liquide») comme il peut l'être par exemple en italien
ز	ⵣ	z	Dentale spirante sonore (comme dans <i>zéro</i>)
س	ⵉ	s	Dentale spirante sourde (comme dans <i>sortir</i>)
ش	ⵛ	š	Palatale spirante sourde (comme dans <i>chuintier</i>)
ص		ṣ	Dentale spirante sourde vélarisée (s emphatique)
ض	ⵢ	ḍ	Interdentale spirante sonore vélarisée ([ḍ] ou [ḏ] emphatiques)
ط	ⵉ	ṭ	Apico-dentale occlusive sourde ([t] emphatique)
ظ	ⵣ	ẓ	Interdentale spirante sonore vélarisée ([ḏ] ou [z] emphatiques)
ع		c	Spirante pharyngale sonore
غ	ⵛ ⵉ	ɣ	Vélaire spirante sonore ([r] grasseyé du français)
ف	ⵉ ⵣ	f	Labiodentale spirante sourde (comme dans «faux»)
ق	ⵛ	g	Occlusive vélaire sonore (comme dans «gamin»)
ك	ⵛ ⵉ	q	Occlusive arrière-vélaire sourde avec explosion glottale (se prononce [g] en arabe libyen, et [ʔ] en arabe égyptien)
ك	ⵛ	k	Palatale occlusive sourde (comme dans <i>kaolin</i>)
ل	ⵉ	l	Linguale correspondant au l français (comme dans <i>loi</i>). Peut être exceptionnellement emphatisée, et se note alors avec un point souscrit [ḷ]
م	ⵉ	m	Bilabiale nasalisée (comme dans <i>marteau</i>)
ن	ⵉ	n	Dentale nasalisée (comme dans <i>numéro</i>)
	ⵛ	ɲ	Nasale vélaire voisée (comme à la fin de <i>parking</i>)
ه	ⵇ	h	Spirante sonore (comme dans le [h] anglais de «hello!»)
و	ⵛ	ū w	Voyelle longue (comme dans poule) ou spirante labiovélaire (comme dans <i>ouate</i> ou <i>tramway</i>)
ي	ⵛ ⵉ	ī y	Consonne longue (comme dans <i>pile</i>) ou semi-consonne (comme dans <i>yeux, lien</i>)

Remarques:

- Ā ā ɛ ə : voyelles brèves; [e] se prononce toujours (comme un [é] ou un [è]);
- ā ē ī ō ū : voyelles longues;
- ḏ ṭ ḷ ẓ ṣ : consonnes emphatiques;
- les consonnes palatisées seront notées dy ḏy ty ;

- r : c'est le [r] roulé, vibrant, alors que γ note le [r] fortement grasseyé, fricatif et vélaire, souvent noté gh dans la littérature (ex. : l'oasis de Ghat / γāt) ;
- g note toujours le son [g] de « garder »;
- k note le ك arabe et le ⵍ touareg (*ekk* « aller »);
- q note le ق arabe et le ⵍⵍ touareg (*eqq* « manger »);
- s se lit [ss] (jamais [z]); seules les consonnes tendues sont redoublées à l'écrit;
- š note la chuintante [ch] du français *chapeau* ;
- ḥ note le ح arabe et le ⵝ touareg (fricative vélaire sourde correspondant à la jota de l'espagnol ou au son final de l'allemand « Bach ») souvent notés [kh] dans la littérature (ex.: Takharkhouri / Taḥarḥūrī);
- ñ note la nasale uvulaire [ŋ] qui est rare (ex.: Ti-n-Abañher).

N.B.: Le même son peut être rendu par des caractères tifynāy différents selon les régions et les dialectes. Le tableau et les remarques qui précèdent ne visent pas à l'exhaustivité, mais devraient permettre de faire face à la plupart des cas usuels.