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The past and future of the evolutionary taxonomy of cultures

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Abstract

Anthropology was originally conceived as a bridge between the natural and social sciences. Its remit was to fill in the gaps in knowledge about human history between the emergence of our species and the appearance of the first civilizations in written history. However, this project soon became embroiled in a destructive debate between "evolutionists" and "diffusionists". The evolutionists believed that cross-cultural similarities in social organisation, subsistence technology, etc. were independently discovered by societies as they progressed toward higher stages of civilization. The diffusionists, on the other hand, argued that most cultural innovations were invented only once and spread from their point of origin through migration or contact between societies. While the diffusionists ultimately won that debate, their critique of classical social evolutionism did not extend to Darwinian approaches to culture and were in fact highly compatible with the latter. The failure of Darwinian theory to take root in social anthropology can be explained by a critique of diffusionism launched by Boas and his followers, which has only recently been challenged. Modern phylogenetic analysis of culture provides a new approach for resolving the evolutionist-diffusionist debate, and promises to deliver the still unfulfilled goals of the Victorian founders of anthropology.

The past of the evolutionary taxonomy of cultures

Today, most anthropologists maintain a strong division between the study of human biological diversity on the one hand and cultural diversity on the other. Yet the Victorian founders of the discipline recognised no such distinction. For them, ethnography belonged as much to the natural sciences as the social sciences. Indeed, Charles Darwin drew extensively on descriptions of the lives of so-called “primitive” peoples, whom he believed provided a crucial link between modern humans and their closest living relatives. Darwin emphasised that the need to collect data on these societies was especially urgent because the advancing empires of Europe were wiping out many of the indigenous cultures of the Americas, Pacific and Africa: “At some future period the civilised races of man will almost certainly exterminate and replace the savage races throughout the world. At the same time the anthropomorphous apes will no doubt be exterminated. The break [between man and other primates] will then be rendered wider, for it will intervene between man in some more civilised state than the Caucasian and some ape as low as a baboon, instead of as at present between the negro or Australian and the gorilla” (Darwin 2005 [1871]: 743).

While this passage from *The Descent of Man* has not aged well, it is important to place it in a proper context. Darwin’s point was not that “savages” are closer to gorillas than they are to western Europeans, but to emphasise the continuities among all humans as well as other primates. As Desmond and Moore (2009) have shown in their recent book, Darwin was a passionate opponent of polygenism – the theory that human races evolved independently of one another in different regions of the world and could therefore be effectively treated as though they were separate species. Polygenism was firmly ensconced in the British anthropological establishment, with both the presidents of both the Ethnological Society of London and the Anthropological Society of London confirmed subscribers (Stocking 1968). Across the Atlantic, polygenism had similarly strong academic credentials, which were mobilised in support of slavery (ibid.). In arguing for a common origin for all of humankind, Darwin rejected the very basis of polygenism, and emphasised instead the strong continuities that exist among all peoples, which he found affirmed by his own experiences: “The American aborigines, Negroes and Europeans are as different from each other as any three races that can be named; yet I was incessantly struck whilst

living among the Feugians on board the *Beagle*, with the many little traits of character shewing how similar their minds were to ours; and so it was with a full-blooded negro with whom I happened once to be intimate..." (Darwin 2005: 741).

Thus, whereas the polygenists saw non-industrial peoples as separate and inferior species that could never be educated to European levels, Darwin thought that humans everywhere share a common potential, which has been realised to different degrees in different places. This idea had its roots in Enlightenment thinking on the unity and perfectibility of man, encapsulated by the German philosopher Johann Gottfried Herder's comment that "a few centuries only had elapsed since the inhabitants of Germany were Patagonians" (1800:164). A more proximal influence was the social evolutionism advocated by pioneering anthropologists such as Edward B. Tylor, John Lubbock and John McLennan. These writers proposed that societies could be ordered into a linear series from the most primitive to the most advanced, with each one representing the last historical stage of its successor, regardless of their actual temporal or geographical relationships. Thus, Tylor claimed that "the institutions of man are as distinctly stratified as the earth on which he lives. They succeed each other in series substantially uniform over the globe, independent of what seem the comparatively superficial differences of race and language, but shaped by similar human nature acting through successively changed conditions in savage, barbaric, and civilized life" (1889:269).

The key criterion for ordering societies was their perceived level of technological complexity. Thus, savage societies that depend on foraging for their subsistence are characterised by simple tools for hunting and butchering, and by a material culture that is closely based on natural forms (e.g. Pitt Rivers 1875). The stage of barbarianism, as represented by pastoral nomad tribes of Central Asia or Polynesian chiefdoms, was ushered in by the domestication of wild plants and animals and the invention of metallurgy, which together allowed for the production of economic surpluses, hierarchical social structures, and advanced weapons. Last of all, the discoveries of geometry and writing allowed large trading networks and bureaucracies to evolve, paving the way for civilised states and empires like Rome and Egypt (e.g. Tylor 1881, Morgan 1877). While technological progress was seen as the main driver of social evolution, there was considerable debate about the exact course taken by the

latter. The evolution of kinship and marriage systems was a particular source of argument. For example, in *Ancient Law*, Henry Maine (1861) disputed the idea popularised by the French Enlightenment philosopher Jean Jacques Rousseau (1762) that human society originated through the social contracts among free individuals. Instead, he argued from ethnographic evidence that the first societies were made up by groups of families in which individuals' rights and obligations were determined by their status as husbands, wives, sons, etc. Maine's hypothesis was challenged by Lewis Henry Morgan, one of the founders of modern anthropology in the USA. Morgan's comparative analysis of kinship terminologies from around the world (1877), and particularly the indigenous peoples of the Americas, led him to conclude that the institution of the family was in fact a relatively recent invention. The low level of paternity certainty in primitive societies meant that infants rarely knew who their real biological father was. Consequently, they would refer to all men of an older generation as "father". Morgan suggested that this system gradually evolved into one where particular groups of men mated with particular groups of women, giving rise to clan-based systems of social organisation. It was only after the invention of private property that men began to control female reproduction so as to pass on goods to their biological sons. This resulted in a shift from "classificatory" kinship terminologies, which conflated different kinds of biological relationships (e.g. father, father's brother, father's father's brother's son), to "descriptive" kinship terminologies, where relations reflect true patterns of genetic relatedness (Morgan 1877, see Kuper 2005 for a comparison and discussion of Morgan and Maine's ideas).

Unfortunately, the patchy state of the archaeological record meant that nineteenth century anthropologists had little direct evidence to test competing hypotheses about the direction of social evolution. Instead, they were forced to reconstruct the past using largely contemporary data. The most innovative and successful example of this approach was the "doctrine of survivals" developed by Edward Tylor (e.g. 1871, 1889). Tylor defined survivals as "processes, customs, opinions and so forth which have been carried on by force of habit into a new state of society different from that in which they had their original home" (1871:16). Examples included folktales, proverbs, rituals and children's games. Whereas most of Tylor's contemporaries saw these traditions as trivial or anachronistic, he believed that they preserved important information about the lives and institutions of ancestral societies. This was

exemplified by his analysis of the *couvade* (1889). *Couvade* practices are widespread in the ethnographic record and involve a man adopting taboos and other ritual observances of his wife during her pregnancy, and sometimes even simulating labour during the birth itself. According to a theory advanced by Bachofen (1861), the *couvade* expresses the earliest stage of the recognition of paternity, whereby fathers are represented as “second mothers”. Bachofen speculated that the *couvade* is therefore associated with a transition from matrilineal to a patrilineal kinship system. Tylor tested this hypothesis by analysing the distribution of the *couvade* in societies with different kinship systems. He found that the majority of societies that practiced the *couvade* had a combined matrilineal and patrilineal (i.e. bilateral) system of descent. A significant minority of societies had a patrilineal system, while none had a matrilineal system. Tylor concluded that this pattern fitted the predictions of Bachofen’s hypothesis: the presence of the *couvade* in some patrilineal societies represented a survival from an earlier, transitional stage of societal development. Meanwhile, the absence of the *couvade* in matrilineal societies demonstrated that matriliney is a more primitive form of social organisation: “The argument is a geological one. Just as the forms of life, and even the actual fossils, of the Carboniferous formation may be traced to the Permian, but the Permian types and fossils are absent from the Carboniferous strata formed before they came into existence, so here *couvade*, which, if the maternal system had been later than the paternal, would have lasted on into it, prove by their absence the priority of the maternal” (Tylor 1889:257).

From evolutionism to diffusionism

Although Darwin and Tylor were united on the question of the monogenesis of humankind and enthusiastically drew on each other’s fields to support their own theories, their ideas were in many other respects incompatible. Whereas Darwin’s idea of natural selection proposed that the evolution of species occurred through adaptation to external pressures, Tylor, Morgan and other social evolutionists believed that the development of civilisation was driven by an internal impetus – the inevitable fulfilment of humanity’s inherent intellectual and moral potential. In that sense, cultural evolution was conceived in ontogenetic, rather than phylogenetic terms, a

process of maturation, rather than descent with modification. This was reflected in Tylor's frequent comparison between "savages" and children, and his tendency to refer to "culture" as a singular entity that was possessed to different degrees by different peoples, rather than to "cultures" as distinct, bounded entities analogous to species (Stocking 1968: 91- 110). These theoretical differences were reflected in biological and social evolutionary taxonomic systems, which were almost perfect mirror images of one another. In the former case, species are grouped according to traits that were inherited from common ancestor, rather than similarities that evolved separately (i.e. convergences). In contrast, the classification of "savages", "barbarians" and "civilisations" was based on discoveries made independently in each society (e.g. fire, pottery, metallurgy, writing, etc.). Although, as Tylor had shown, inherited behaviours (i.e. survivals) could be useful for reconstructing sequences of evolution, they were nonetheless seen as anomalies from a taxonomic point of view, rather than a basis for classification.

However, by the early twentieth century, the social evolutionary theorists were coming under an increasing challenge from a new school of anthropology known as "diffusionism". The diffusionists developed the modern conception of culture that saw it as much a product of learning and communication as discovery and invention. They argued that similarities and differences among cultures can be better explained in terms of historical patterns of migration and contact, rather than some vaguely understood continuum of mental development (e.g. Bloch 2005). Initially, the difference between diffusionism and social evolutionism was more a matter of emphasis. Tylor himself recognised the potential for new technologies to spread across societies, and devoted a substantial section of the first chapter of *Primitive Culture* (1871) to examples of these patterns. However, he did not appear to realise the possible implications they had for his general theory of cultural evolution. These were spelled out by Sir Francis Galton, who chaired the meeting of the Royal Anthropological Institute where Tylor presented his findings on the couvade. Galton reflected that "it was extremely desirable for the sake of those who may wish to study the evidence for Dr. Tylor's conclusions that full information should be given as to the degree in which the customs of the tribes and races which are compared together are independent. It might be that some of the tribes had derived them from a common source, so that they were duplications of the same original" (Tylor 1889:270). In other

words, correlations (or to use Tylor's term, "adhesions") between cultural traits (e.g. *couvade* and bilateral kinship norms) may be due to them having been acquired from the same source, rather than a functional relationship. Somewhat ironically, the diffusionists came to these conclusions independently of Galton. The most extreme form of diffusionism ("hyper-diffusionism") held that all the technologies and institutions associated with civilised societies had a single common source, which could be traced back to Ancient Egypt (e.g. Elliot Smith 1911). More moderate diffusionists (e.g. Rivers 1914), influenced by the German *kulturkriese* ("culture circles") school, argued that culture spread from several points of origin. Although it was often difficult to identify source cultures with any degree of precision, diffusionism effectively became the default position in anthropology and almost completely displaced previous assumptions that similar cultures evolved independently.

Although diffusionism was incompatible with social evolutionism, it is interesting to consider its parallels with Darwinian theory. The idea that human institutions and technologies diversified from source cultures has clear resonances with Darwin's notion that all life forms were related by descent from an original common ancestor. In fact, Darwin had already floated the idea that cultures could be classified into hierarchical taxonomic groupings similar to biological families, genera, etc. based on their descent relationships. In a now famous passage in *The Descent of Man*, he observed that "the formation of different languages and of distinct species and the proofs that both have been developed through a gradual process are curiously parallel." (Darwin 2005 [1871]: 676). This idea was taken up – or possibly even anticipated by – August Schleicher (1869), the founder of modern historical linguistics. Schleicher hypothesised that relationships among the Indo-European languages could be directly modelled on the kind of tree diagrams used by Darwin to depict the phylogeny of biological species. Similarly, the collector and anthropologist Henry Augustus Pitt Rivers was convinced that material culture variation was a product of Darwinian processes of descent with modification. As he explained, "human ideas, as represented by the various products of human industry, are capable of classification into genera, species, and varieties, in the same manner as the products of the vegetable and animal kingdoms, and in their development from the homogeneous to the heterogeneous they obey the same laws" (Pitt Rivers 1875:307).

As with species and languages, Pitt Rivers believed that it was possible to trace the development of artefacts that were widely distributed throughout the globe to their original “root form”. For example, he argued that similarities among cross-bows made in different societies across Europe and Asia suggested that these traditions were all derived from a single proto-cross-bow. His theory was tested by Henry Balfour (1889), who literally dissected the cross bow collections with the methodical rigour that we might expect of someone who had first been trained in comparative anatomy. Balfour’s efforts produced the first phylogeny of a material culture tradition that was explicitly based on the branching ‘family tree’ models employed by biologists and historical linguists (Figure 1). It suggested that the cross-bow originated in Central Asia and was then adapted by populations as it spread north to the Arctic regions and then west into Siberia and across the Bering Strait into America, west to Persia and Europe, and south to the Indian subcontinent.

FIGURE 1 ABOUT HERE

Despite the example of these studies, diffusionism did not give rise to a Darwinian taxonomy of cultures in anthropology. Instead, for most of the last century, most social anthropologists have rejected any sort of analogy between biological and cultural inheritance. Their objection is based on the observation that, whereas physical traits can only be transmitted from parents to their offspring, cultural traits can be borrowed from any number of sources. Moreover, whereas members of other species are not usually able to interbreed with one another, there are no inherent constraints on communication among humans belonging to different social groups. Consequently, Franz Boas, the founder of modern American social anthropology, claimed that “animal forms develop in divergent directions, and an intermingling of species that have once become distinct is negligible in the whole developmental history. It is otherwise in the domain of culture. Human thoughts, institutions, activities may spread from one social unit to another. As soon as two groups come into close contact their cultural traits will be disseminated from one to the other” (1940:251). This contrast was famously depicted by Kroeber (1948) in his diagram ‘The Tree of Life and the Tree of the Knowledge of Good and Evil’ (Figure 2). Whereas the branches on the tree of life grow and then split, those on the tree of culture are tangled together and often merge. Researchers following in this tradition continue to argue that the

tree-like models of species relationships are therefore an inappropriate representation of cultural history. Instead, they propose that the latter could be more accurately compared to an ‘entangled bank’ (Terrell 1988) or ‘braided river bed’ (Moore 1994). If the emergence of diffusionism is the reason why anthropology isn’t Tylorian, then we can say that the critique of diffusionism by Boas and his followers explains why it didn’t become Darwinian either.

FIGURE 2 ABOUT HERE

The present and future of the evolutionary taxonomy of cultures

How valid was the critique of diffusionism? Recent applications of biological phylogenetic analysis suggest that, contrary to the assumptions of Boas and Kroeber, it is often possible to trace coherent lineages of cultural descent with modification over many hundreds of years. A number of these studies have focused on relationships among languages, and found strong support for Schleicher’s hypothesis that language families grow by branching processes of diversification, usually resulting from population dispersals (e.g. Rexová et al. 2003, Gray & Atkinson 2003, Gray & Jordan 2000, Holden 2002). Applications of phylogenetics to material culture data, on the other hand, have borne out Pitt-Rivers’ belief that the crafts and technologies of different populations are often linked by common descent, and can be traced back to their original root forms. Examples include prehistoric stone tools (Buchanan and Collard 2007, O’Brien and Lyman 2003, Lycett 2007, 2009), ancient scripts (Skelton 2008), textiles (Tehrani and Collard 2002, 2009, Tehrani et al. in press) and musical instruments (Temkin 2004, Temkin and Eldredge 2007).

These studies indicate that anthropologists have tended to overestimate the differences between biological and cultural evolution. Indeed, ethnographic studies contradict the idea that sources of cultural learning are necessarily much more diverse than sources of genetic inheritance. Instead, they suggest that in most non-industrial contexts individuals initially acquire their core skills from a single role model or ‘cultural parent’, who is often also their biological parent (e.g. Hewlett & Cavalli-Sforza 1986, Shennan and Steele 1999, Tehrani and Riede 2008). Second, it is important to take

into account that even when individuals do acquire traits from multiple individuals, this does not automatically lead to widespread cultural borrowing and blending among populations. Whereas horizontal transmission among members of the same group is facilitated by their physical proximity, pressure to conform and shared norms and language and shared cultural norms, communication among members of different groups is often impeded by the existence of ecological boundaries, language barriers, endogamy and out-group prejudices (e.g. Durham 1992, Gil-White, 2001).

This point is illustrated by a recent study I carried out with Mark Collard on the evolution of Iranian tribal weaving traditions (Tehrani and Collard 2009). Ethnographic observation and interviews with weavers suggest that there are important differences in the way that different types of craft knowledge are transmitted among individuals. Whereas weavers learn techniques during childhood from their mothers, they continue learning designs throughout their lifetime and often adopt new patterns from unrelated weavers. However, a phylogenetic analysis of these traits showed that, as far as inter-group patterns of variation are concerned, designs have just as strong a descent signature as techniques. The reason for this is that endogamy and social norms restricting the movement of women mean that weavers have few opportunities to interact with members of other tribes, with the result that designs tend to circulate within, rather than across, ethnic boundaries. We also found evidence that even when there were opportunities to copy patterns from external sources (through participation in commercial textile production), they appear to have had little effect on weaving traditions. This is in line with the suggestion put forward by cultural evolutionary theorists that social learning is often heavily influenced by a tendency to conform, which helps to sustain lasting cultural differences among populations even in the face of trade and interaction (e.g. Henrich & Boyd 1998). Consequently, despite the clear differences in the mechanisms of cultural and genetic transmission at the individual level, group-level patterns of biological and cultural diversity can be highly similar (e.g. Collard et al. 2006).

Of course, this is not to suggest that populations never exchange cultural traits with one another. Researchers in this area recognise that horizontal transmission among groups, like independent invention, is likely to be an important source of conflicting signal in their analyses. Nevertheless, simulations (e.g. Greenhill et al. 2009) have

shown that phylogenetic methods are robust under realistic levels of borrowing among societies. Empirical studies similarly show that, even in cases where there is extensive borrowing and blending among neighboring groups, as among Californian Indian basket-weavers, they do not appear to have completely wiped out all traces of cultural descent (Jordan & Shennan 2003). A more fundamental issue is how far phylogenetic analysis of cultural traits can be used to infer population histories (e.g. Rogers et al. 2009). The difficulty here is that since genes and cultural traits are transmitted via separate mechanisms (i.e. biological reproduction versus social learning) they may evolve and split at different rates, leading to divergences between the two systems (Tehrani et al. in press). Furthermore, many of the cultural ideas and practices that are transmitted within groups may have initially been acquired from an external source. The above example of carpet weaving in Iranian tribal groups is a case in point. Although Iranian-speaking groups in the Zagros Mountains appear to have inherited their traditions from a common ancestral tribe, ethnohistorical and linguistic evidence suggests that this ancestral group probably borrowed the craft from incoming Turkic peoples about 500 years ago. This is in keeping with the expectations of the diffusionists, who believed that culture spread through both population dispersals *and* contact between groups.

However, there is one important issue on which cultural phylogenetics departs from diffusionism. It concerns the role of independent evolution. To recall the earlier discussion, diffusionists rejected any notion that similar institutions and technologies evolved independently, which was the central hypothesis of progressive evolutionist theory. However, as Galton realised, the dichotomy of diffusion versus independent invention is a false one. For it is precisely through identifying what he called “duplications” that we are able to locate true instances of independent change in different societies. Far from being incompatible, diffusion and convergence are two sides of the same coin. To date, efforts to address Galton’s problem in a phylogenetic context have used language trees to control for relatedness among populations. Thus, if a given institution or cultural practice is found in two populations that speak closely related languages but is absent in a third population that speaks a less closely related language then it is assumed that the former two groups inherited the trait from a common ancestor. Conversely, when a practice is found in two groups that are distantly related but is lacking in their close relatives, it can be assumed to have arisen

independently. This approach makes it possible to investigate issues that were central to the concerns of Victorian social evolutionists like Tylor and Morgan, such as the correlated evolution (“adhesion”) of economic practices and social organisation. For example, Holden and Mace (2003) tested the hypothesis that pastoralism is associated with patrilineal inheritance systems in Africa by mapping both traits onto a language tree of Bantu populations. Their findings suggested that not only is there a correlation between pastoralism and patrilineality, but that the relationship is causal: the adoption of cattle in matrilineal groups generally results in a shift toward a patrilineal system of wealth inheritance. This is because men can better defend herds against raiders, and often use livestock as bridewealth to obtain wives. Consequently, the transfer of livestock to sons confers greater fitness benefits than transfer to daughters (Holden et al. 2003). Phylogenetic comparative methods have been used to shed light on several other classical anthropological questions, including the evolution of bridewealth and dowry (e.g. Fortunato et al. 2006) and postmarital residence norms (Jordan et al. 2009).

Conclusion

It is often said that academic disciplines are destined to forever go round in circles. Ideas that were rejected by one generation are often reinvented or recycled by the next, before once more falling by the wayside. In the case of anthropology, efforts to revive the evolutionary ideas of Tylor and Morgan (e.g. White 1959) have generally been short-lived, snuffed out by the long shadow of diffusionism. However, diffusion and independent invention should not be seen as mutually exclusive explanations for human cultural diversity. Modern phylogenetic approaches to culture recognise the potential roles of both processes, the relative importance of which can be established on a case-by-case basis. By resolving the debate between diffusionism and social evolutionism, anthropologists working in this area are beginning to reclaim the original mission of their discipline. Yet, in travelling this particular circle, we do not find ourselves exactly where we started: Whereas Darwin thought that models of social evolution could illuminate the biological history of humans, cultural phylogenetics uses a biological model to study cultural histories. Thus the relationship between biological and social anthropology has been turned on its head. Many anthropologists will no doubt object to the new evolutionary taxonomy of cultures for

the same reasons that Boas did. Yet there are reasons to be optimistic. As Tylor pointed out, although old ways of thinking can survive long after they are useful, they usually die out eventually.

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Figures:

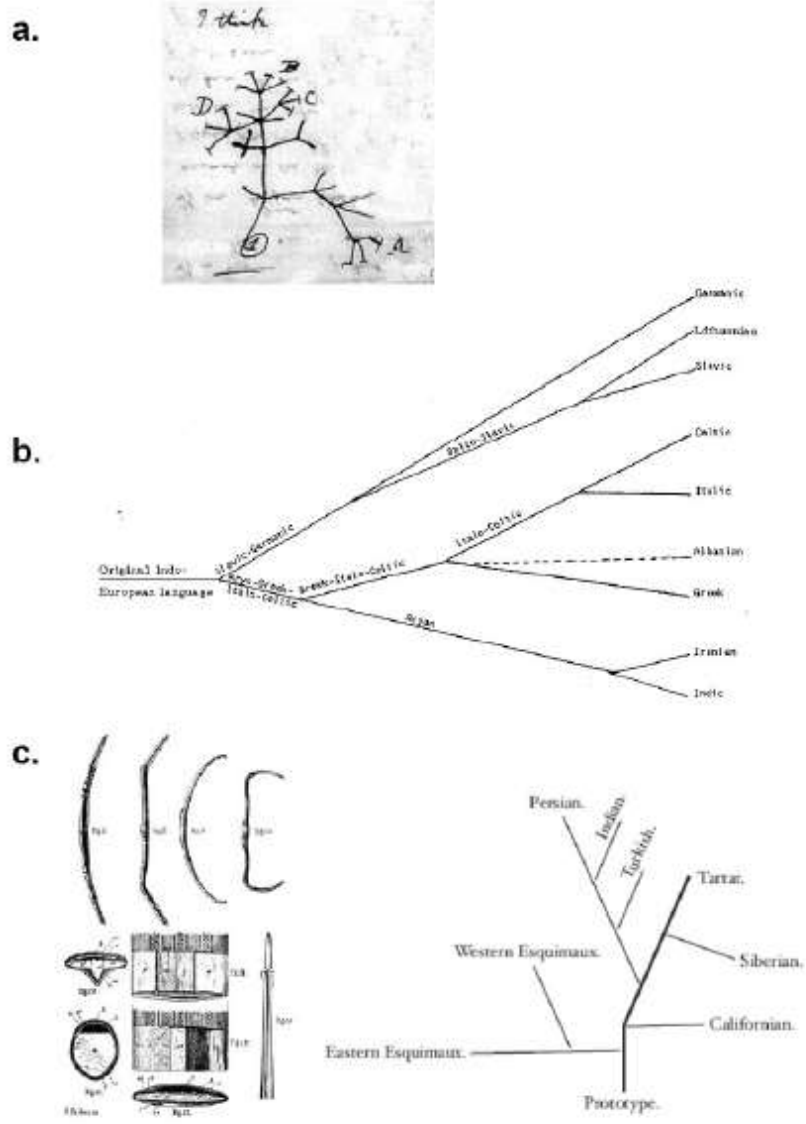


Figure 1. Branching lineages drawn by Darwin (1837) for species (a), Schleicher (1869) for Indo-European languages (b) and Balfour (1889) for cross-bows (c).

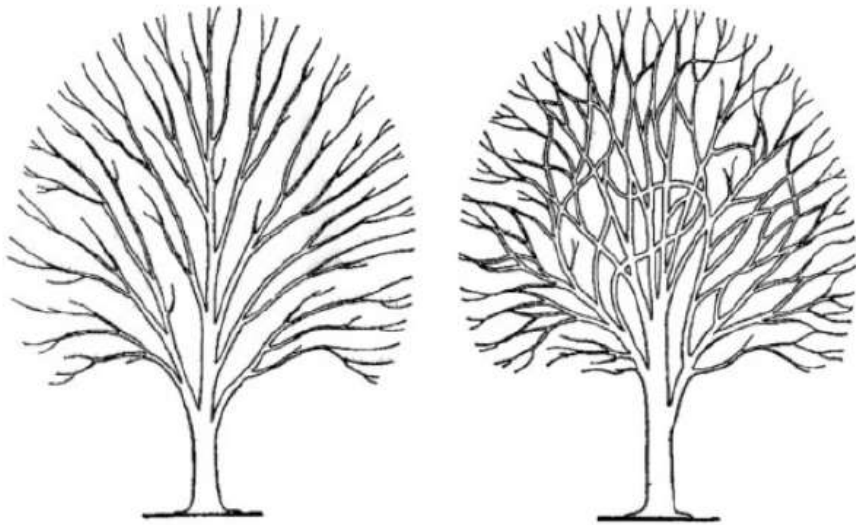


Figure 2. Kroeber's 'Tree of Life and Tree of the Knowledge of Good and Evil – That is, of Human Culture' (Kroeber 1948).