Language Super-Families: From Indo-European to Nostratic

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The purpose of historical linguistics is to examine the changes that languages undergo. In order to do this historical linguistics makes thorough use of descriptive linguistics to analyze languages at different stages which are then held up for comparison. Because historical linguistics deals with multiple stages of time, it is also sometimes called diachronic linguistics, as opposed to synchronic linguistics, which deals with with language at a single point in time.

Even though languages are continually changing and evolving, historical linguists have found it useful to assume that there are stages in the course of a language's development. For example, the English language is assumed to have three periods. Old English extends from about 450 A.D., when the Anglo-Saxon invasions of Britain began, to 1066, the date of the Norman Conquest. The next period, Middle English, is considered to begin there and continue until about 1400-1450, while Modern English runs from about 1450 to the present. In a similar way, virtually any language being studied by a historical linguist can be divided into specific evolutionary stages. These stages are typically marked or determined by extensive or pervasive changes in the phonology, morphology, or syntax of the language being studied. For, example, the sign post that signals the transition from Middle to Modern English is the Great Vowel Shift, in which two long vowels became diphthongs, and the other three long vowels were raised.

Besides studying the stages and the evolution of single languages, historical linguists also study the relationships between languages. The relationships between languages are typically presented via family trees which are intended to show genealogical or evolutionary connections.

When grouping languages into families, historical linguists almost universally believe that a correctly defined family should form a genetic unit, which means that all of the members of that family should be derived from a common ancestor. Any such common ancestor is frequently not directly attested, since almost all languages have relatively short periods of recorded history. However, historical linguists have devised ways to recover many of the features of the common ancestor of related languages through the use of the *comparative method*, which is used to reconstruct certain linguistic features of the common ancestor.

Language families can be subdivided into smaller units, conventionally referred to as "branches". At the base, or root, of such a tree, there is a single common ancestor that is called a

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"protolanguage". For example, the protolanguage that has been reconstructed for the well known Indo-European family is called "Proto-Indo-European". Though this protolanguage is not known directly, it is widely assumed to have existed. Alternatively, a protolanguage can sometimes be identified with a historically known language. This is the case with Latin (or Proto-Romance). Provincial dialects of Latin developed into the modern Romance languages (including French, Spanish, Portuguese, and Italian), so the protolanguage for this family group is effectively Latin. But the process does not stop there: Latin was a branch of the Italic family, and the Italic family included other languages besides Latin. Also, the Italic family itself was one branch of the Indo-European family.

Next, it is necessary to examine the comparative method and to see how it has enabled historical linguists to postulate these genealogical relationships among languages. Linguistic change in a language affects it's phonology, morphology, syntax, and semantic structure. Historical linguists use the comparative method to determine what the changes were in a family of languages, and they also use it to discover how and when these changes occurred. There were three stages in the historical development of this method, and each of these will be examined here in turn.

The <u>first</u> stage begins with the comparison of several widely separated languages by Sir William Jones, a British citizen living and working in India in the 18th century. In 1786 Jones announced that he had observed an "affinity" between Latin, Greek, and Sanskrit—an affinity that was sufficiently strong and so pervasive that it could not have occurred by accident. Jones also suggested that these three languages, along with Celtic and Gothic (the oldest attested Germanic language) must have originated from some "common source". This common source became known as Indo-European.

When Jones first suggested the Indo-European hypothesis, he supported this idea with a methodical examination of what could are called "phono-semantic sets". These are sets of words from different languages which had both similar sounds and meanings. Jones' theory was that there were too many of these sets to be a result of chance or simple coincidence. He hypothesized that those languages must have evolved from one language at some time in the past, and also that they diverged from one another due to geographical separation and the passage of time. It is here with this discovery by Jones that the idea of a "root language" has its seed. These phono-semantic sets were the first evidence of the Indo-European language family, and this was also the first important use of the technique of comparative philology. (Philology is the study of ancient texts and languages, and it formed a part of the foundation of modern linguistics. Philologists focused their efforts on ancient languages. This led to the study of what in the 19th century were exotic languages—such as Sanskrit—for the light that they could shed on old texts. Deciphering ancient texts, ones which had not yet been decoded, was one of the special challenges of philology.)

Jones' model is important, because when following the comparative method, a historical linguist puts parallel sounds together side by side, and then reconstructs the sound or sounds

from which they developed. Through such a process of triangulation, the remaining sounds of Indo-European were reconstructed, as well as the sounds of other early languages.

The <u>second</u> stage in the development of the comparative method came with the work of Jacob Grimm. Grimm's proposal was that languages would not evolve in a chaotic or haphazard manner, but that they evolved according to specific rules. He based this proposal on the first description of a systematic phonetic transformation within a language. He had established a set of regular correspondences between early Germanic stops and fricatives and the stop consonants of certain other Indo-European languages. Using these rules, a linguist could theoretically reverse the evolutionary process, and roll back time to reconstruct the root language. This has been done, and a reconstructed language named Proto-Indo-European has been widely described and discussed.

Grimm's law was the first major systematic sound change ever to be discovered, and, even more so than the work of Jones, it's formulation was a major step forward in the development of the comparative method in linguistics. Grimm's law consists of three parts, and since it would take many pages to thoroughly convey its workings, only a very brief summary of what occurs will be presented here. In its modern version, Grimm's Law accounts for the development of inherited Proto-Indo-European (PIE) stops in Proto-Germanic (PGmc). It consists of three parts. An asterisk marks reconstructed sounds.

<u>First</u>, Proto-Indo-European voiceless stops change into voiceless fricatives:

PIE *p, *t, *k > PGmc *f, *T, *x

(*T stands for "th" as in thick, *x for Scots "ch" as in loch.)

<u>Second</u>, Proto-Indo-European voiced stops become voiceless:

PIE *b, *d, *g > PGmc *p, *t, *k

<u>Third</u>, Proto-Indo-European voiced aspirated stops lose their aspiration and change into plain voiced stops:

PIE *bh, *dh, *gh > PGmc *b, *d, *g

There are some exceptions to Grimm's Law, but these were either later accounted for by Grimm himself or by other linguists. The point worth making, however, is that these "sound laws", combined with regular changes that were reconstructed for other Indo-European languages, enabled linguists to define the expected sound correspondences between different branches of the Indo-European family.

The <u>third</u> stage in the development of the comparative method is when it gained credibility by being applied to the Romance Languages, for which the source language, Latin, was known. For linguists, The chance to test the reliability of the comparative method on another language family with a known protolanguage was like icing on the cake. Perhaps because of this, in the mid-1800s a group of young philologists in Leipzig proposed that they could account for *any* change in pronunciation if the conditions were adequately known. Their work was christened the

neogrammarian hypothesis, and their fundamental working principle—that sound changes take place according to laws that admit of no exceptions—has remained one of the basic tenets of historical linguistics.

We can now review and summarize the essential features of the comparative method. The purpose of this method is to detect historical connections between languages and to establish consistent relationships between them by reconstructing a common ancestor for the languages in question, along with a reasonable set of regular changes through which directly known languages can be derived from that common ancestor. The essential steps are as follows:

A genealogical relationship between two (or more) languages might exist if a large number of regular, systematic correspondences are shown to exist in their vocabularies. This means that there is a regular, recurring set of matches between the phonetic structure of words with similar meanings. Linguists usually begin with vocabulary sets like kinship terms, numerals, body parts, common flora and fauna, etc. The idea of regular correspondences is very important. Simple phonetic similarity has no predictive value. And sporadic matches that are due either to chance or to borrowing should be discarded. If analysis reveals that the correspondences are both regular and pervasive, and that it is part of a more general regular pattern, so much the better.

A truly systematic set of correspondences cannot be the result of chance. By ruling out alternative reasons for the correspondences, like massive borrowing, the correspondences can then definitively be attributed to common genealogical heritage. If there is a sufficient number of correspondence sets of this kind (the more sets there are the better), and if they can be accounted for via a sensible pattern of sound change, then it becomes almost a certainty that the languages concerned have a common origin. After the sounds of the protolanguage and their historical transformations are reconstructed linguists then continue on to the comparison of grammatical morphemes, patterns of declension and conjugation, and so on.

Finally, it is important to note that the reconstruction of an unrecorded protolanguage can never be complete. The phonology of such a language is the easiest to reconstruct, followed by certain available morphological features. The syntax of a protolanguage is far more difficult to reconstruct than its phonology or morphology. Although several syntactical constructions have recently been traced towards their Indo-European origins, the challenge of completing any thorough syntactic reconstruction is daunting. Therefore, most of the reconstruction done so far has concentrated on phonology, morphology, or vocabulary. However, in spite of the fact that all elements of linguistic structure cannot be recovered, a partial reconstruction is still valuable in order to prove the genetic relationship of the languages concerned.

The third stage in the development of the comparative method extends past the boundaries of historical linguistics and into other fields such as anthropology and archeology. Both historical linguists and others believe that, by analyzing the words in the reconstructed Proto-Indo-European language, one can to a certain extent make conclusions about the time and place that the Proto-Indo-Europeans lived. Words for concepts and objects that were not familiar to the Proto-Indo-Europeans would be named in a haphazard and random way after the time when the

daughter languages began to diverge from the parent, while other vocabulary would reflect a common heritage. Only things that the Proto-Indo-Europeans knew would produce phono-semantic sets in the daughter languages. Through this type of analysis, researchers have found that Proto-Indo-European is rich in words relating to agriculture and animal husbandry, and to a landscape consisting of plains. From this, it has been suggested that Proto-Indo-European was a language that existed some time from 4000-6000 B.C. in the plains possibly to the north or west of the Black Sea. This location is controversial, however. Some argue the reconstructed vocabulary of Proto-Indo-European suggests they lived in northern Anatolia, an area which is does not have much flat ground.

So although a few possibilities have been suggested, the original homeland of Proto-Indo-European speakers is not known for certain. At any rate, most of the groups which diverged from this culture spread out over most of Europe and the Middle East during the third and fourth millennia B.C.

As an academic enterprise, the Indo-European hypothesis has been extremely successful, and naturally linguists have tried to apply the same reconstructive methods to other languages. Many languages, though not all, have been shown to be related to one family or another, forming larger or smaller families analogous to the Indo-European grouping. However, in all of these families the depth of reconstruction has only been as deep historically as the connections that have been plausibly made among them. Reconstruction proceeds back to a protolanguage, perhaps as far as a few thousand years into the past, perhaps much less than that, and then stops. Therefore, protolanguages have been reconstructed for any number of languages families around the globe—each with a different time depth, but these families have not been connected to one another in any way by a great majority of historical linguists. Most feel that the comparative method has already extended the various protolanguages into the past as far as is reasonably possible, and that plausible reconstructions cannot be pursued any further. Superficially though, it is at least possible that the trees of these "separate" language families could converge further, and that some or perhaps all language families could be related to one another in some way.

The first such proposal to this effect was made in 1903 by a Danish linguist named Holger Pedersen. He proposed "Nostratian", which was to be a kind of protoluguage of protolanguages. The name Nostratian comes from the Latin word *noster*, which means "our". Within Pedersen's framework, Nostratian embraced the Indo-European, Uralic, Afro-Asiatic, and Eskimo-Aleut language families. While his hypothesis did not receive much acceptance in the West, it was widely accepted in what was the Soviet Union. Its name was changed slightly, becoming "Nostratic", and Pedersen's original grouping was also expanded to include other language families.

It is important to note that Nostratic, as a macrofamily, is very controversial. Even among its proponents there is no consensus about exactly which specific language families should be linked together. However, this lack of agreement, in and of itself, is not reason enough to dismiss such a project. Some of the macrofamilies that have proposed are:

1. Indo-European, Uralic, Afro-Asiatic, and Eskimo-Aleut.

2. Indo-European, South Caucasian (a rough equivalent of Kartvelian), Dravidian, Mongolian, Tungusic, Turkic, Uralic, and perhaps Afro-Asiatic.

3. Indo-European, Afro-Asiatic, Sumerian, Uralic, Altaic, Elamo-Dravidian, and Kartvelian.

4. Indo-European, Sumerian, Uralic, Altaic, Elamo-Dravidian, Kartvelian, Ainu, Japanese and some eastern Siberian languages.

5. Indo-European, Afro-Asiatic, Dravidian, Altaic, Kartvelian, and Uralic-Yukaghir.

The common elements are not hard to see. They are: Indo-European, Afro-Asiatic, and Uralic. Researchers after Pederson all accept Kartvelian, while Dravidian, and Altaic are also prominent inclusions. With this much consensus, the claim that there is no agreement among the proponents of Nostratic is relatively weak.

Before moving on, there is another example that illustrates the extremes of how widely separated languages or language families can be connected. Bryson (1990, pp. 14-15) states that:

> There is increasing evidence to suggest that languages widely dispersed geographically may be more closely related than once thought. This is … demonstrated by the three language families in the New World: Eskimo-Aleut, Amerind, and Na-Dene. It was long supposed that these groups were unrelated to any other language families, including each other. But recent studies of cognates … have found possible links between the most unlikely language partners: for instance, between Basque and Na-Dene, an Indian language spoken mainly in the northwest United States and Canada, and between Finnish and Eskimo-Aleut. No one has come up with a remotely plausible explanation of how a language spoken only in a remote corner of the Pyrenees could have come to influence Indian languages of the New World, but the links between many cognates are too numerous to explain in terms of simple coincidence.

Could Pederson and the other proponents of Nostratic be on to something? Will they eventually come to be seen as having been too cautious and too unwilling to speculate? Perhaps only time, and further research, will tell.

As described earlier, many linguists feel that the the comparative method cannot be used to extend reconstructions past the time depth that has already been reached. It might be useful to recall the time of the Indo-Europeans in order to get a feel for the concerns and possible problems involved.

The Indo-Europeans were a Neolithic people. Two characteristic traits of a Neolithic people, as opposed to those before them, are that they practice agriculture, and that they have domesticated animals. Secondary traits are they they might manufacture pottery or they might improve basic stone tools by grinding and polishing them. The Indo-Europeans can be identified

as having been Neolithic due to the lexical items in the reconstructed vocabulary of their language—it contains many words which clearly refer to agriculture and domesticated animals.

As stated previously, the Indo-Europeans are thought to have lived some time from 4000-6000 B.C. However, after about 4000 B.C. their common existence came to an end and from then until about 2500 B.C. they spread out over most of Europe and west and south Asia. These migrants took their agriculture and their animal husbandry along with them. They are even known to have reached western China, since about a hundred years ago Buddhist documents were found in what is now Xinjiang in western China. These documents were written in two related, previously unknown languages which were clearly Indo-European.

Since Nostratic is a macrofamily that includes Indo-European, it is therefore postulated to have existed before Indo-European, as well as before any of the other members of its family. While researching and making claims about such a language and culture may appear tentative to some, the impact on and significance to the understanding of human history and prehistory could be enormous. Because of this, theories of Nostratic and the information that could possibly be gained from its reconstruction have attracted the attention of prehistoric archeologists (along with molecular geneticists) who are also concerned with the reconstruction of histories of early populations and their movements.

Aharon Dolgopolsky is one of the more recent purveyors of the Nostratic theory. In his book he connects the following language families: Indo-European, Hamito-Semitic (Afro-Asiatic), Kartvelian, Uralic, Altaic, and Dravidian. Based on a thorough examination of these language families, he has reconstructed the roots of more than 2000 common words, claiming that he has established regular sound correspondences among them (1998, p. 17). Dolgopolsky has also identified many grammatical morphemes, such as interrogative pronouns and the inflectional person-markers of the 1st and 2nd persons. As is the case with the comparative method and the Indo-European hypothesis, Dolgopolsky examines his reconstructed vocabulary to see what light this might cast on the way of life, geographical, and cultural scope of the Nostratic community. He calls this type of analysis *linguistic paleontology*.

Here is a summary of Dolgopolsky's extended investigation and analysis of the reconstructed lexical items. Based on his analysis, he quickly rules out both central Europe and central Asia, instead focusing on a subtropical region. Then, after discounting southern Europe he concludes that the Nostratic linguistic community must have lived in southwestern Asia. In determining when they might have lived and under what conditions, Dolgopolsky finds a strong contrast between the apparent lives of the Nostratics and the Indo-Europeans. The Indo-Europeans, as reflected in their reconstructed vocabulary, were a Neolithic culture with domesticated animals and agriculture, but the Nostratic community seem to have no words for agriculture, animal husbandry, or even pottery.

Instead, Dolgopolsky finds that there are words for bows, arrows, and fishing nets, all characteristic of both the Mesolithic and pre-Mesolithic (or late Paleolithic) periods. Based on the reconstructed vocabulary of the Nostratic community, Dolgopolsky is unable to discern whether

it is one or the other. Still, depending on location, the pre-agricultural Mesolithic period stretches from roughly 8000-9000 B.C. back to around 13,000 B.C. This is consistent with the reconstructed vocabulary of the Nostratic community: they were hunter-gatherers, whose vocabulary included words for wood, rods, wicker, sinew, tendons, thorns, teeth, claws, hooks, bark, leather, hides, footwear, and 'sharp piercing tool', besides, of course, stone. It appears that the Nostratic community also had a sense of the supernatural—not of gods, but for magical activity such as casting spells, burning something as a sacrifice, and speaking in a way that would turn ordinary speech into an incantation.

The suggestion is that the distribution of the languages of the Nostratic macrofamily may be due, at least in part, to processes of agricultural dispersal which took place during the transition to and development of the Neolithic era. Depending on the areas of departure around 7000-8000 B.C. for the early processes of farming dispersal, we can imagine a rather earlier Proto-Nostratic, perhaps already with regional dialects, spoken over a territory then inhabited by these people. Since this type of theory involves movements of people it may be evaluated by means of molecular genetics. It is already the case that gene distribution frequencies in the relevant areas are beginning to suggest early population movements that lend support to the Nostratic hypothesis.

However, the validity of the entire Nostratic hypothesis has been attacked by the majority of linguists. This criticism of the Nostratic hypothesis has been ongoing, in spite of the fact that its central themes are that (a) the constituent families of the Nostratic macrofamily are related, and that (b) this relationship has been documented using the traditional and well-tried comparative method of historical linguistics.

In colloquial terms, individual linguists could be classified as tending to be either 'lumpers' or 'splitters'. Linguists who are lumpers are relatively quick to see relationships among languages, and also to acknowledge or even propose the existence of larger linguistic units such as macrofamilies. On the other hand, the splitters are painstaking and scrupulous in their work, and they are very likely to find problems with individual etymologies and comparisons.

The historical linguist with the highest standing among the lumpers is Joseph Greenberg. The main criticism of his work is that he did not follow the previously established comparative method, and that he did not proceed according to the normal practice of historical linguists. Instead, he relied upon multiple lexical comparisons—directly comparing the words in contemporary languages, without attempting the reconstruction of the relevant protolanguages. More on this below. However, the criticisms of Greenberg's method of multilateral comparison are not appropriate in the case of the Nostratic macrofamily, whose proponents claim that they have established plausible phonological correspondences through the use of the comparative method.

The evidence for the relationships that allow linguists to propose families of languages (or macrofamilies) has almost exclusively come from individual words, and when there are collections of individual words that evidence is seen as being even more persuasive. But any sets

of words that are offered as evidence in favor of linguistic relationships can be criticized in at least three ways. First, the semantic correspondences may not be close enough to inspire confidence in most linguists. Second, the proposed regularities for sound change may not be precise enough to determine the two versions in the two languages concerned. Alternatively, the postulated sound changes may be of a new type that has not been attested in other cases of linguistic change. Third, the formal equivalences may not carry adequate conviction—the similarity may not be sufficient enough to convince a more conservative group of researchers. Finally, skeptics can also claim that when the number of constituent languages is as large as it is in the Nostratic case, there is a greater likelihood that some apparent formal equivalences occurring here and there among them is a product of chance or coincidence.

It's time to examine how and why linguists criticize theories such as Nostratic. A typical historical linguist would claim that most of the proposed "phono-semantic sets" offered as evidence by Nostratic theorists are much more speculative than those used to group languages into the accepted families. However, the key phrase in this type of criticism might be "much more speculative".

The following example of a Nostratic reconstruction comes directly from Bomhard and Kern (1994, p. 219) (who are there referencing the work of other researchers):

Proto-Nostratic *bar-/*ber- 'seed, grain':

A. Proto-Indo-European *bhars- 'grain': Latin far 'spelt, grain'; Old Icelandic barr 'barley'; Old English bere 'barley'; Old Church Slavic brasheno 'food'. Pokorny 1959:111 *bhares- 'barley'; Walde 1927-1932. II:134 *bhares-; Mann 1984-1987:66 *bhars- 'wheat, barley'; Watkins 1985:5-6 *bhares- (*bhars-) 'barley'; Gamkrelidze-Ivanov 1984.II: 872-873 *bhar(s)-.

B. Proto-Afroasiatic *bar-/*ber- 'grain, cereal;: Proto-Semitic *barr-/*burr' grain, cereal' > Hebrew bar 'grain'; Arabic burr 'wheat'; Akkadian burru 'a cereal'; Sabaean brr 'wheat'; Harsusi berr 'corn, maize, wheat'; Mehri ber 'corn, maize, wheat'. Cushitic: Somali bur 'wheat'. (?) Proto-Southern Cushitic *bar-/*bal- 'grain (generic) > Iraqw balang 'grain'; Burunge baru 'grain'; Alagwa balu 'grain' K'wadza balayiko 'grain'. Ehret 1980:338.

C. Dravidian: Tamil paral 'pebble, seed, stone of fruit'; Malyalam paral 'grit, coarse grain, gravel, cowry shell'; Kota parl 'pebble, one grain (of any grain)'; Kannada paral, paral 'pebble, stone' Kodagu para 'pebble'; Tulu parelu 'grain of sand, grit, gravel, grain of corn, etc.; castor seed'; Kolami Parca 'gravel'.

D. Sumerian bar 'seed'.

This example of a phono-semantic set shows what many linguists find difficult to accept about the Nostratic hypothesis. The same word is being suggested as meaning barley, wheat, pebbles, and seeds. And at least within this example, readers are asked to accept that *bar-

evolved into "paral" without providing a regular rule for this change. Without that evidence, skeptics claim that one could find similarities between any two languages regardless of whether there were any genealogical relationship between them.

It has been shown above how historical linguists have used the comparative method to, in effect, run time backwards, and to reconstruct protolanguages for groupings of languages around the world. It is critical to this project that the languages themselves can be assumed to have developed in specific ways—that they have evolved in a genealogical manner. However, while the reconstructed protolanguages that have resulted from this effort have made valuable contributions to the field of linguistics and to our understanding of distant periods of history, for at least the past century there have been those who would like to extend the range this project even further back in time. Proponents of the Nostratic theory have tried to do this by creating one or another macrofamily, as described above. And again, while they have tried to use the comparative method, they have been criticized for overextending it. In this way they may have revealed a limit past which this type of evolutionary genealogical reconstruction cannot effectively go.

Second, while historical linguists using the comparative method have been able to genealogically classify the languages of Eurasia and the islands of the Pacific, they have been unable to do the same for the Americas, Australia, and Africa. The fact that in some parts of the world languages have been susceptible to genealogical classification, while it is clearly not the case in many other areas, has been an embarrassment for historical linguists.

While the proponents of the Nostratic theory have attempted to use the comparative method, there are other, perhaps more radical approaches. As mentioned above, Joseph Greenberg has made a controversial attempt to marry several major language families in a manner that differs in the way that comparisons are made. Greenberg has claimed that very distant relationships can be revealed by applying a technique that he calls *mass comparison*. Rather than using the comparative method and trying to wind a clock back in time, modern languages are compared using a specific, limited set of words. The resulting number of cognates is then simply counted. Greenberg successfully used this method to establish a new and very complete classification of African languages—which up to that point had resisted classification via the comparative method. This new method attracted considerable interest from outside of linguistics, besides being very controversial within it.

According to traditional historical linguistics it has been impossible to show that all the world's languages are *genetically* related. Critics of Greenberg's approach say that from the purely statistical point of view, among any two unrelated languages, there would be at least a "certain percentage" of words sharing a roughly similar sound and meaning. Therefore, the concept of comparing languages based only on general comparisons between their vocabularies should be considered inaccurate. However, there is no general agreement, even among historical linguists, about what that "certain percentage" should be, nor what would be an acceptable way to determine what a roughly similar sound and meaning might be.

Third, in addition to the genealogical type of evolution that results in the familial relationships described by historical linguists, it is also accepted that unrelated languages which are geographically in close proximity can trade not only vocabulary, but even morphological features and syntax. Such sharing, though not genealogical, does reflect another type of relationship, or connectedness, between languages.

It has also been suggested that the present-day "family" structure of languages may be an anomaly rather than the norm. Technology might might have advanced more rapidly in one part of the world and then spread from there, allowing one language to expand geographically as the people speaking it migrated and either overtook or displaced their neighbors. Once carried away, that language would then evolve differently in different regions, thus creating a language family. In fact, archeologists have suggested that the Indo-European languages spread as far as they did due in part to the domestication of the horse, which gave advantages in war to one small group of Proto-Indo-European speakers.

Prior to the Neolithic period (beginning about 8000 B.C.), there was an apparent absence of any technological change that was comparable to the onset of agriculture and the domestication of animals. Therefore, the tendency for languages in geographical proximity to trade features between each other could have been the prevalent type of linguistic change. The tendency for languages to evolve genealogically into families could have been a type of linguistic change that began to occur only in much later period of cultural development. If this is the case, one of the axioms of historical linguistics—that languages change in a manner that can be reversed—will not be true before a certain point in the past. Likewise, it will not be possible to reconstruct older protolanguages, Nostratic or otherwise, via the techniques used to reconstruct the protolanguages of the accepted major language families. (All of these major language families are considered to have originated after the invention of agriculture.) So, although it may never be possible to reconstruct earlier protolanguages via the comparative method, researchers may have to pursue any more ancient evidence among language families that points toward a macrofamilial relationship by using alternative, less widely accepted methodologies.

It is unfortunate that the comparative method leaves behind it one of the great mysteries of prehistory: how it could be that people in widely separated places spontaneously and suddenly developed language at approximately the same time. This puzzle has been likened to a situation in which humans may have had in their heads a kind of genetic alarm clock that started ringing all around the world at about the same time, and led different groups of humans scattered as far as every continent to create languages. Even those groups of humans who were cut off from the major language families developed their own languages. How all the various languages began springing up all over is something that no one knows.

In its most extreme form, it has appeared to some linguists that all the languages of the world must have a common ancestor. And not only linguists have had such ideas. People have wondered for centuries if there might have at one time been a single Proto-World language from which all human languages have since descended. Of course one famous example concerning

this is the Biblical story about the Tower of Babel.

The significant number of such global cognates leads some linguists to conclude that all the world's languages ultimately belong to a single language family. This speculation about a further level of the family tree of language, which ties Nostratic with all other language families into what is called Proto-World. Genetic evidence suggests that the first humans migrated from the Horn of Africa into Yemen, and some research has speculated that early human migrations might have been caused by climatic change along with other factors. This could have happened as long as 50,000 years ago—people coming out of Africa at that time could have spoken a language that we could now call Proto-World. Indeed, the Great Rift Valley in eastern Africa has been a source of many anthropological discoveries, where fossilized bones of several of the possible ancestors of modern humans have been uncovered.

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