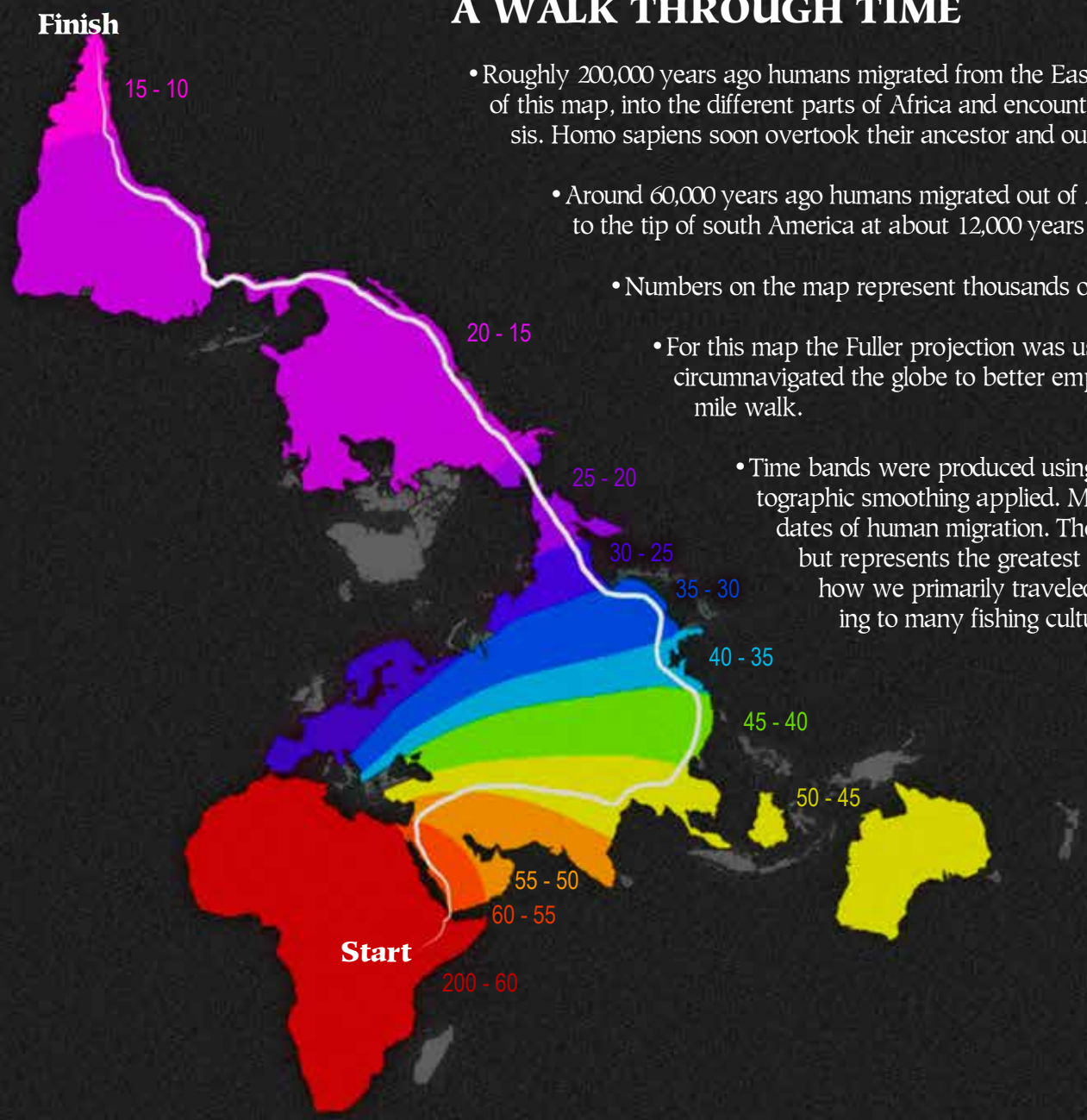
Human Evolution and Migration

A WALK THROUGH TIME



- Roughly 200,000 years ago humans migrated from the East Africa Rift are. This is the Start point of this map, into the different parts of Africa and encountered our ancestor Homo Heidelbergenisis. Homo sapiens soon overtook their ancestor and out survived them, filling in Africa.
- Around 60,000 years ago humans migrated out of Africa to the rest of the world, making it to the tip of south America at about 12,000 years ago.
- Numbers on the map represent thousands of years before the present day.
- For this map the Fuller projection was used to straighten the path of how we circumnavigated the globe to better emphasize the sheer length of the 21,000 mile walk.
- Time bands were produced using interpolation from fossil sites with cartographic smoothing applied. Many theories exist regarding the precise dates of human migration. The white line direction is not a true line, but represents the greatest mean of population movement. Note how we primarily traveled along the oceans and sea routes leading to many fishing cultures all over the world.

Map by Jeff Blossom, Center for Geographic Analysis, Harvard University

Fathom the past – lining up the fossils of our ancestors...

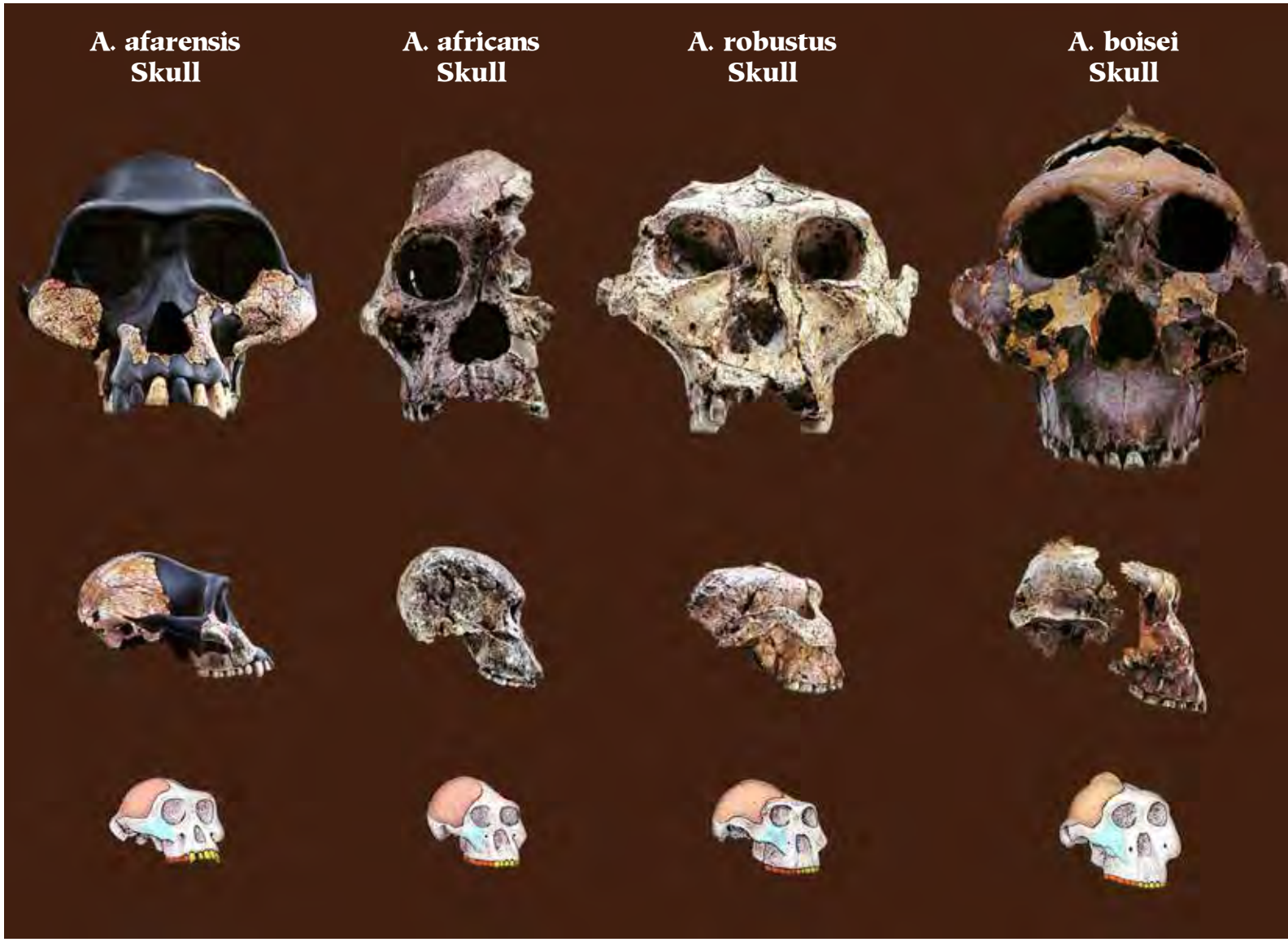
The skull speaks volumes about each of the nine recognized ancestors of modern man. The genus Athropithicus possessed a small brain and a large face. In the Genus Homo a larger brain accompanied a smaller face.

Over time the jaws of Afarensus jutted forward to anchor large incisors and canines, become less pronounced as the jaw muscles become smaller. In A. robustus and A. boisei, the molars increase dramatically to almost an inch across. This is possibly an adaptation for chewing a more diverse and harder diet of nuts and tubers. Such teeth were powered by strong chewing muscles which help control and add power to the lower jaw bone. Some of these led to adaptations in the skull, especially in the male in a center crest.

Another major chewing muscle, the masseter, anchors along the lower edge of the cheekbone, whose forward position produces a flat face.

In Homo sapiens the back teeth became relatively smaller. The lower jaw bone became smaller and the muscles that control chewing became much flatter and smaller compared to our ancestors in the family tree. These changes led to the ability for the brain case to grow in capacity.

At the same time that the teeth and jaw configuration was changing in our species, we learned to cook. This released more nutrients from our food, making it easier to eat, which also provided more nutrition for the brain to grow in size.



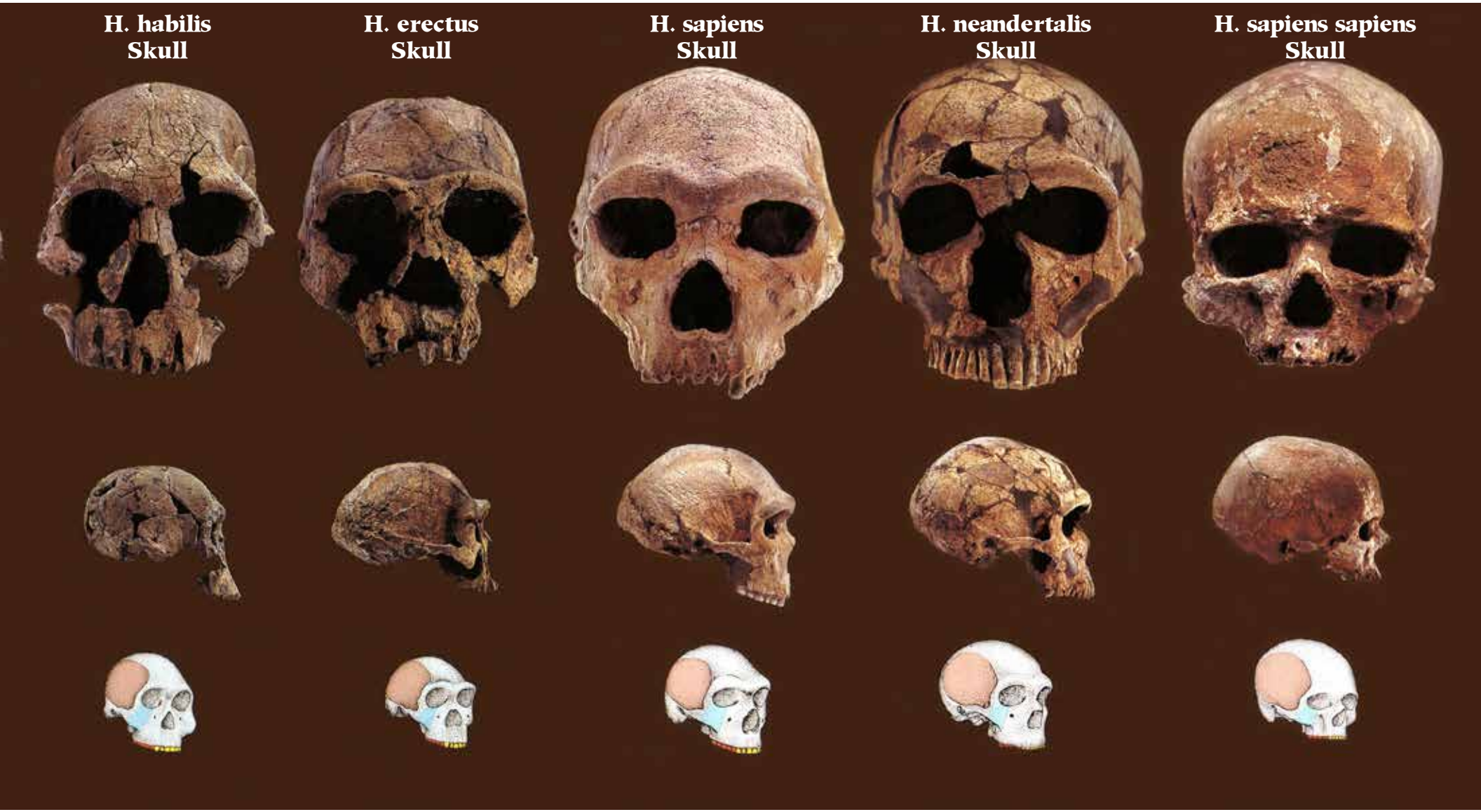
Australopithecus afarensis
Geologic Age: 3 to 3.6 mya.
Discovery: M. Bush, 1975
Site: Hadar, Ethiopia

Australopithecus africanus
Geologic Age: 2.5 to 3 mya.
Discovery: Broom & Robinson, 1947
Site: Sterkfontein, South Africa

Australopithecus robustus
Geologic Age: 1.5 to 2 mya.
Discovery: Quarryman Fourie, 1950
Site: Swartkrans, South Africa

Australopithecus boisei
Geologic Age: 1.8 mya.
Discovery: M. D. Leakey, 1959
Site: Olduval Gorge, Tanzania

Photo Credit: David Brill
Illustrations: Luba Gudz



Homo habilis
Geologic Age: 2 mya.
Discovery: B. Ngeneo, 1972
Site: Koobi Fora, Kenya

Homo erectus
Geologic Age: 1.5 mya.
Discovery: B. Ngeneo, 1975
Site: Koobi Fora, Kenya

Homo sapiens (archaic)
Geologic Age: ~450,000 ya.
Discovery: Greek villagers, 1960
Site: Petralona, Greece

Homo sapiens (Neandertal)
Geologic Age: ~600,000 to 40,000 ya.
Discovery: Peyrony & Captain, 1909
Site: LaFerrassie, France

Homo sapiens (Modern)
Geologic Age: ~200,000 to present
Site: Everywhere

Credit: National Geographic Magazine

The Range of Humanity Through our last Five Major Ancestors

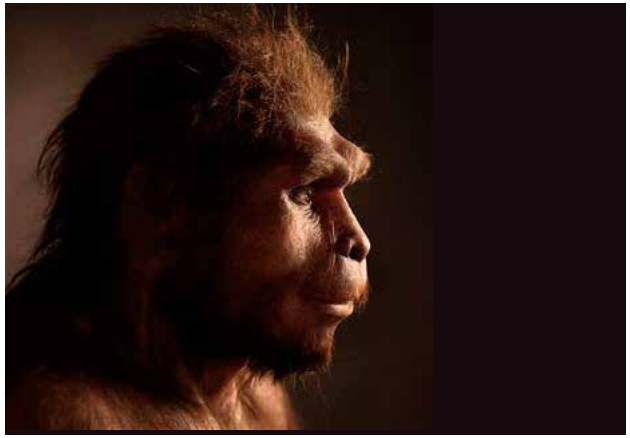
1. Homo habilis: *(2.1 million – 1.5 million years ago)*

H. habilis is the most ancient representative of the human genus Homo and inhabited parts of sub-Saharan Africa from around 2.1 million to 1.5 million years ago.

H. habilis fossils has been found mainly in the Great Rift Valley system of East Africa, however their geographic range may have been somewhat larger.

Early human fossils, thought by many paleoanthropologists to belong to H. habilis have also been found in South Africa in caves at Sterkfontein and Swartkrans.

2. Homo erectus: *(2 million – 300,000 years ago)*



The earliest H. erectus co-existed with H. habilis in East Africa for several hundred thousand years, while a number successfully expanded their geographic range beyond Africa and across the Old World.

Their territorial expansion most likely coincided with cooling global temperatures and lower sea levels. By 1.8 million years ago H. erectus was living in Georgia, at the crossroads of Western Asia and Eastern Europe. By 1.6 million years ago they had spread east across Asia into India, China, and Indonesia. By 1.2 million years ago they had spread west across Europe into Spain.

In terms of longevity and development, H. erectus was the most successful archaic human species. They are thought to be the first hominid to live in small, hunter-gatherer band-societies, hunting in coordinated groups and using complex tools. This, and their ability to control fire, allowed them to adapt to a wide range of new climates, from jungles/rain forest to areas that were cold in winter.

In most of their range, evidence of H. erectus disappears around 300,000 years ago, although they may have hung on in Indonesia for longer.

Despite the extent of their range, their numbers remained very small throughout their 1 million year-plus dominance of the planet. DNA studies suggest that 1 million years ago the total population of early human species was no more than 60,000.

3. Homo heidelbergensis: *(600,000 – 350,000 y.a.)*

H. heidelbergensis also migrated out of Africa, through the Near East and into Europe as far north as Britain.

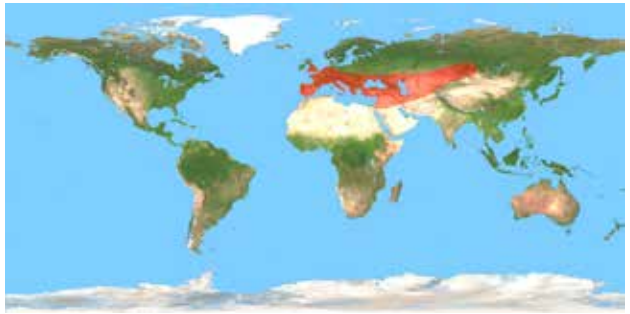
There is evidence in France that H. heidelbergensis was the first to build simple shelters. There is also evidence in Germany that they were the first to use wooden spears to hunt large game animals. Further evidence in northern Spain shows what may have been a ritual disposal of their dead.

The H. heidelbergensis population which migrated to Europe and the population that remained in Africa became isolated during periods of glaciation. The European population diverged to become H. neanderthalensis around 350,000 years ago, while the African population diverged to become H. sapiens around 200,000 years ago.

4. Homo neanderthalensis: (*350,000 – 40,000 y.a.*)

The Neanderthal range included most of Europe south of the line of glaciation, roughly along the 50th parallel north. This included England, France and Portugal in the west; northern Germany; Mediterranean countries like Spain and Italy in the south; and territory in Central Europe, including the Carpathians, the Balkans, and parts of the Ukraine and western Russia. It also extended eastwards into Central and Northern Asia up to the Altai Mountains, and into Western Asia up to the Indus River.

Neanderthals are not known to have ever lived south-west of present-day Israel; their fossils have not yet been found in Africa, but there have been finds close to North Africa, both on Gibraltar and in the Levant. Whenever climate change caused warmer temperatures, the Neanderthals shifted to the northern borders of their range, along with other cold-adapted species of mammals – Middle Paleolithic artifacts have been found as far north as the 60th parallel on the Russian plain.



The total Neanderthal population across this range only numbered around 70,000 at its peak.

Neanderthals, as a unique species, died out in Europe around 40,000 years ago, after the arrival of H. sapiens. The two human populations shared Europe for as long as 5,000 years and DNA evidence has shown that they interbred. Most non-African modern humans carry 1 to 3% Neanderthal DNA, while a total of around 20% of the Neanderthal genome exists in the modern human population.

5. Homo sapiens: *(200,000 years ago – present)*

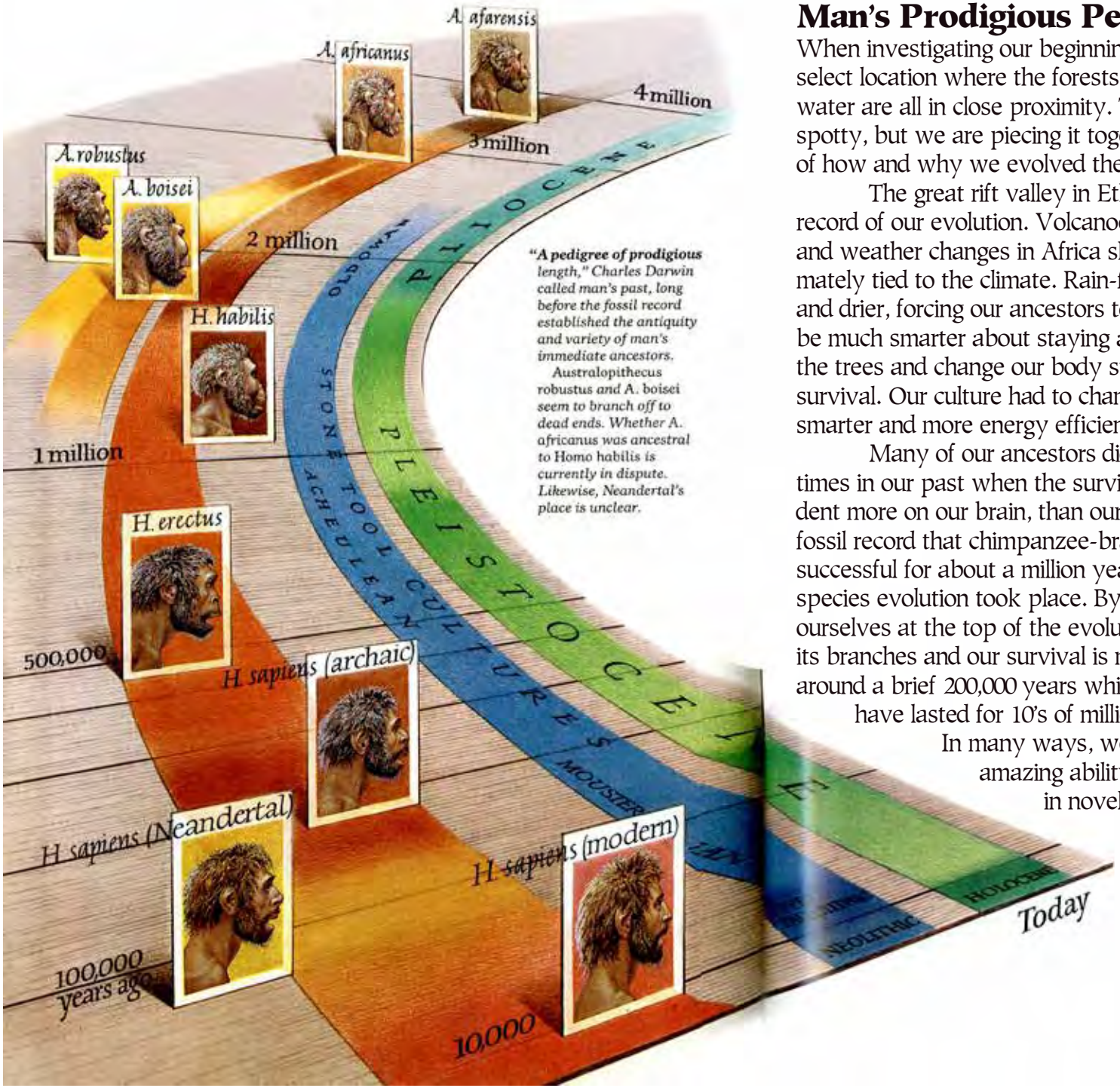
H. sapiens is the only surviving species of the genus Homo. Technology has allowed it to adapt to virtually all climates and extend its range to include all of the planet's continents except Antarctica and most habitable islands in all of the oceans.

The current population of H. sapiens is over 7 billion, with most (61%) living in Asia. The population is expected to peak at around 9 billion by the end of the 21st century. The last point H. sapiens came close to extinction was around 70,000 years ago following the Toba catastrophe in Indonesia. It was one of the Earth's largest known super-volcanic eruptions and the cause of a possible 10 year global volcanic winter and a 1,000-year-long cooling episode. In its aftermath, the world population of modern humans could have fallen to as a low as 1,000 individuals.

Likely descended from H. heidelbergensis, H. sapiens appeared in East Africa around 200,000 years ago. An initial attempt to extend the modern human range beyond Africa occurred around 125,000 years ago, when a small number reached the Near East; however, evidence suggests they retreated back to Africa as their settlements were replaced by Neanderthals.

Around 100,000 years ago, three main lines of H. sapiens diverged within Africa. One group colonized Southern Africa, one group settled Central and West Africa, while one group remained in East Africa.

After the last major ice age Homo sapiens moved out of Africa to settle the entire globe in a period of about 45,000 years of travel. This process started about 60,000 years ago and finishing nearly 15,000 years ago with the colonization of the American continents through the land bridge created during the last ice age.



"A pedigree of prodigious length," Charles Darwin called man's past, long before the fossil record established the antiquity and variety of man's immediate ancestors. Australopithecus robustus and A. boisei seem to branch off to dead ends. Whether A. africanus was ancestral to Homo habilis is currently in dispute. Likewise, Neandertal's place is unclear.

Man's Prodigious Pedigree

When investigating our beginnings in Africa, we are taken to a select location where the forests meet the grasslands and fresh water are all in close proximity. The fossil record is somewhat spotty, but we are piecing it together to get a very good picture of how and why we evolved the way we did.

The great rift valley in Ethiopia (the Afar) offers the fossil record of our evolution. Volcanoes, vast changes in water tables, and weather changes in Africa show that our evolution was intimately tied to the climate. Rain-forests shrank and became drier and drier, forcing our ancestors to maximize their resources and be much smarter about staying alive. We needed to move from the trees and change our body structure to be bipedal for our survival. Our culture had to change and adapt as well. We grew smarter and more energy efficient in our biology.

Many of our ancestors did not make it, and there were times in our past when the survival of our species was dependent more on our brain, than our brawn. It is obvious from the fossil record that chimpanzee-brained, bipedal apes were very successful for about a million years, before the next leap in our species evolution took place. By no means should we consider ourselves at the top of the evolutionary tree. We are just one of its branches and our survival is not certain. We have only been around a brief 200,000 years while many species on this planet have lasted for 10's of millions of years and more.

In many ways, we are a testament to evolution's amazing ability to adapt, change and survive in novel paths.

Faces of our Past

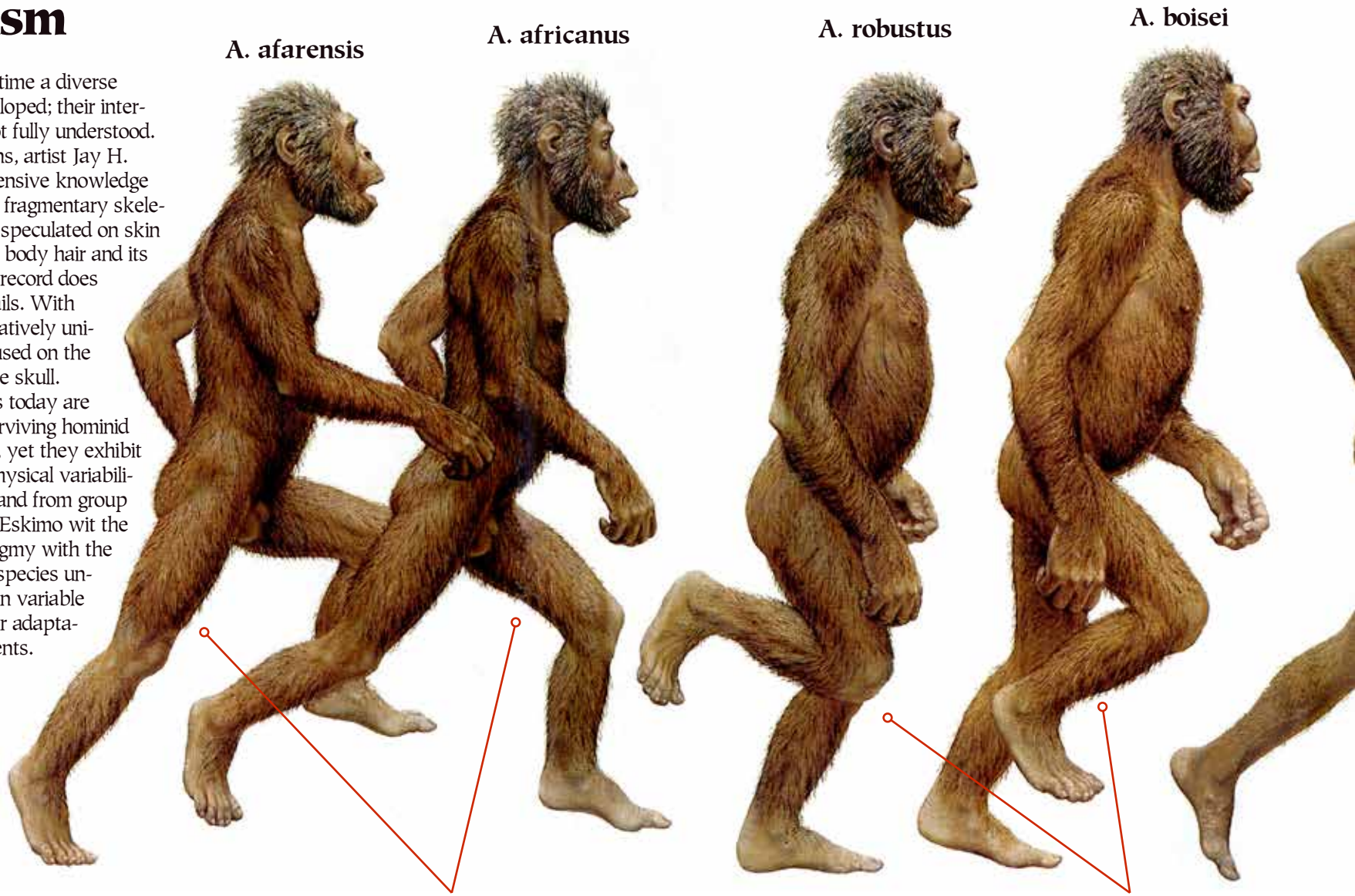
Watch us evolve over 3.6 million years.

This amazing collage is from the work of paleo-sculpture artist John Gurche. It was accomplished using the forensic science of muscle and skin reconstruction from casts of the original skulls of: A. Afarensis (Top Left), A. Boisei (Top Center), early Homo Habilis (Top Right), late Homo Habilis (Bottom Left), Homo Neandertalis (Bottom Center) and Homo Sapiens Modern (Bottom Right). We can look into the faces of our past to about 3.6 million years of evolution and natural selection. We basically come form a successful line of bipedal, chimp-like mammals that survived over 2 million years in the grasslands of Africa.

Four Million Years of Bipedalism

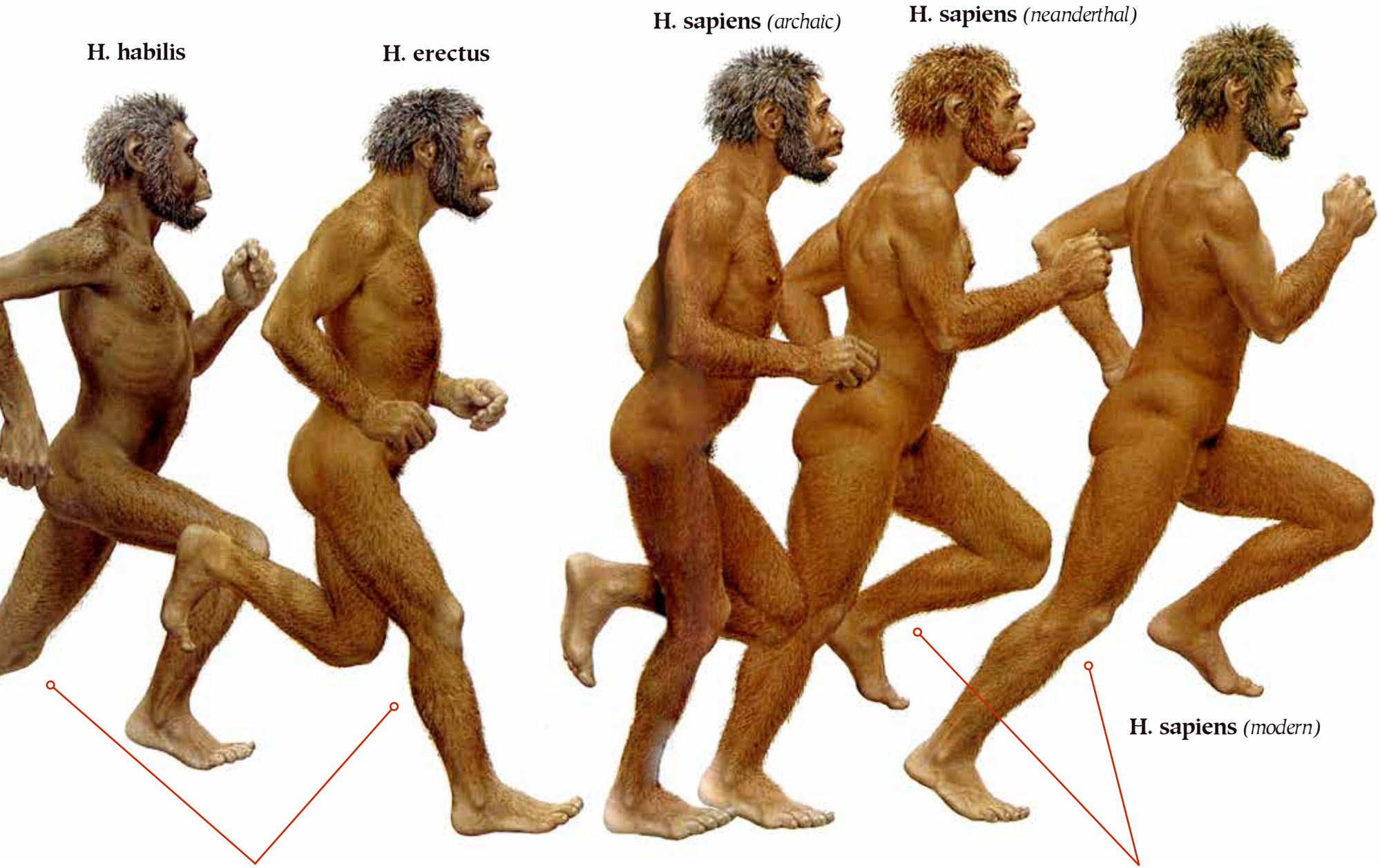
Over the vast reach of time a diverse group of hominids developed; their interrelationships are still not fully understood. For these reconstructions, artist Jay H. Matternes used his extensive knowledge of anatomy to flesh out fragmentary skeletal adult males. He has speculated on skin tone and the amount of body hair and its texture, since the fossil record does not preserve these details. With these characteristics relatively uniform, the artist has focused on the main area of change, the skull.

All populations today are members of the sole surviving hominid species, Homo sapiens, yet they exhibit an immense range of physical variability, both within groups and from group to group. Compare the Eskimo wit the Brazilian Indian, the Pygmy with the Masai. Earlier hominid species undoubtedly also existed in variable forms as a result of their adaptations to local environments.



Known from fossils in eastern Africa, including Lucy, Austrlopithicus afarensis is the oldest hominid species yet found and may be ancestral to all later forms. Most fossils of africanus, including the Taung child, have come from South African caves. Anthropologists disagree over whether africanus was ancestral to all later hominids or only to robustus and boisei.

On the basis of several craniums, more than a dozen jaw bones, and hundreds of teeth in two South African caves, robustus is considered a ruggedly built, massive-jawed hominid. A similar species from East Africa is designated Australopithicus boisei. Both may represent a single variable wide-ranging species. These two forms disappear from the fossil record, apparently as evolutionary dead ends due to a changing climate.



The first of his genus, Homo habilis has been found in East Africa, where his span overlaps that of A. boisei and coincides with the appearance of simple stone tools. Habilis gave rise to the larger brained Homo erectus, first identified as Java man in 1893, and later Peking man, discovered in the 1920s. Erectus fashioned more advanced tools and controlled fire. Enough specimens exist to show physical variability through his 1.3 million year history.

Homo sapiens specimens begin appearing in increasing number and variation at the time erectus disappears from the fossil records, at about 300,000 years ago. The archaic type seems transitional between erectus and later forms. Neanderthals, named after the German site of discovery in 1856, were rugged European and Middle Easterners who survived during the Ice Age. But by 30,000 years ago they had died out or been assimilated into the modern Homo sapiens genus.

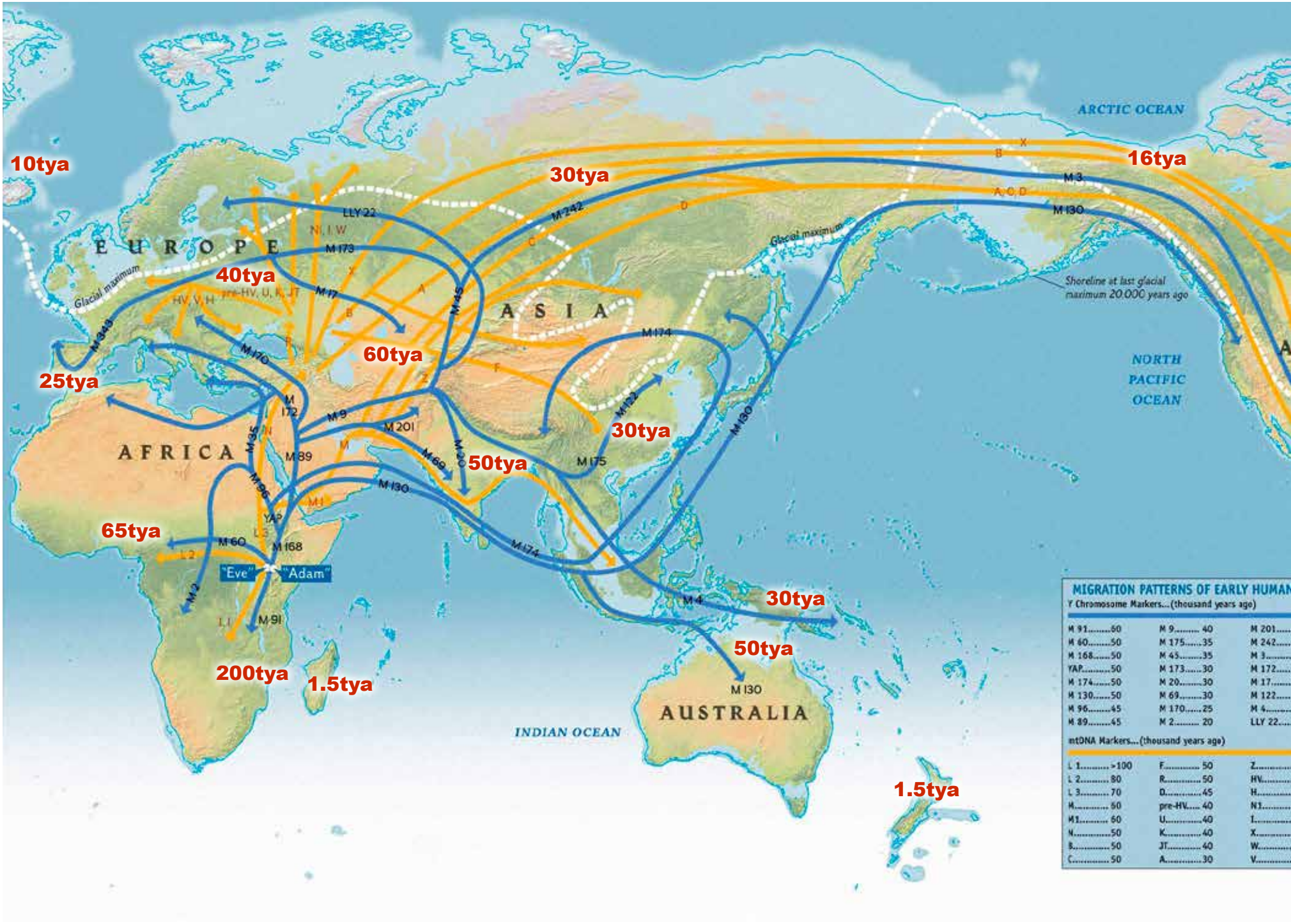

ARCTIC OCEAN
NORTH PACIFIC OCEAN
INDIAN OCEAN
EUROPE
ASIA
AFRICA
AUSTRALIA
Glacial maximum
Shoreline at last glacial maximum 20,000 years ago
10tya
16tya
30tya
40tya
25tya
60tya
50tya
30tya
65tya
200tya
1.5tya
30tya
50tya
1.5tya
"Eve"
"Adam"
M 3
M 130
LLY 22
M 173
M 17
M 343
M 242
M 45
M 170
M 172
M 9
M 201
M 89
M 35
M 96
M 60
M 168
M 91
M 2
M 69
M 20
M 174
M 175
M 122
M 4
YAP
MIGRATION PATTERNS OF EARLY HUMAN
Y Chromosome Markers...(thousand years ago)
M 91.....60
M 60.....50
M 168.....50
YAP.....50
M 174.....50
M 130.....50
M 96.....45
M 89.....45
M 9..... 40
M 175.....35
M 45.....35
M 173.....30
M 20.....30
M 69.....30
M 170.....25
M 2..... 20
M 201.....
M 242.....
M 3.....
M 172.....
M 17.....
M 122.....
M 4.....
LLY 22.....
mtDNA Markers...(thousand years ago)
L 1.....>100
L 2.....80
L 3.....70
M.....60
M1.....60
N.....50
B.....50
C.....50
F.....50
R.....50
D.....45
pre-HV.....40
U.....40
K.....40
JT.....40
A.....30
Z.....
HV.....
H.....
N1.....
I.....
X.....
W.....
V.....

DIAGRAM OF GENETIC EVIDENCE OF THE SPREAD OF MANKIND ACROSS THE GLOBE

Since it has become very simple to take genetic samples in very remote locations, genetics have been building a map of our genes across the globe. The map to the left is significant because it dross references itself through the tracking of our species by sex.

Female genetics can be easily tracked through the techniques of Mitochondrial DNA or the DNA (mtDNA) that exists inside the mitrochondia of the cell, but outside the cells nucleus. Our mothers give us or Mitochodrial parts of our cells and no man can pass these on to his offspring. It provides a full-proof way to track the offspring of women only without any influence of the male genetic data interfering with the migration patterns, except of course, where a man chooses to take a mate. The tracing of female genetic data is shown in gold arrows.

Conversely, males pass the Y chromosome to their offspring and since females do not have a Y-chromosome, this provided an excellent marker to track the male migration of our species. Male movement is shown in blue arrows.

Tracking the sexes independently provides a cross-reference of our ancestors travels and helps us corroborate the data without getting into all the complexities of other genetic tracing methods.

In addition to tracking the movement of both the female and male sexes, major genetic markers, or mutations have been added in to add to the information on the global distribution so that now the location of these genetic subgroups can be traced as well. This is show in the diagram by the first letter of the Chart information and is marked on the trail as well.

Using dating techniques in the genetic markers and mitochondrial DNA can corroborate the times of arrival in specific areas as the rate of mtDNA changes a very regular intervals and other genetic information can help back-up the data. This leads to the dating of the origin of the genetic mutation in the (thousands of years ago) located on the chart and the map.

The African L1, L2 and L3 subgroups gave rise to the 9 female European subgroups and all other groups. Only three main female and two male subgroups crossed over to North America (mainly).

The numbers (in Red) on the map are overlaid from other data to show the arrival of mankind in the area in thousands of years ago (tya). This is based on archaeological data and genetic data.

Because small groups of people decided to move away from the larger group, we can track how their genes changed specifically to their tribes and track the movement.

Note: These are the major trends, there is a mass of migrations going on and human beings are complex animals. Although the sexes traveled together to colonize new areas, the differences in the routes show the different genetic trees and not the exact routes so that the trends in movement can be tracked.

There is evidence of an earlier crossing over the Bering Straits at 30,000 years ago and strong evidence that we were crossing the oceans long before anyone has suspected. Sorry Columbus...

Later on we will use this data and overlay it upon the linguistic data as a cross reference to see if we have a close match. If we do, we can be reasonably certain that our genetic and linguistic data sets are accurate.

BACKING UP THE GENETIC DATA OF MODERN HUMAN POPULATION GROWTH AND MOVEMENT OVER THE PLANET WITH LINGUISTICS

Genetic methods have revolutionized research into many aspects of languages, including the tracing of their origins. Gene variants underlie individual language skills. Genetic predisposition might favor the evolution of structural features of languages.

Humans have a unique natural ability to develop highly complex linguistic systems — an ability that lies in our genes but is also shaped by our different environments. We can learn languages from others and use them to share our thoughts, feelings and desires; languages are the foundation of society, culture and science. So it is perhaps not surprising that all aspects of language — including structure, global distribution, acquisition, processing in the brain, role in thought and actions, and links with culture and education — can be considered to be important subjects of research.

What is so special about our genetic make-up that allows us to use language? How does this ability relate to other higher cognitive functions, like human memory and mathematical or musical ability? Until recently, it has been hard to even pose these questions. The past few years, however, have seen the rapid development of methods to analyze genes quickly and relatively cheaply. At last we can begin to study the genetic basis of human cognition and, hence, language. Three examples of ongoing research are described here.

LANGUAGE PROCESSING

The human genome does not 'create' languages; however, it does direct the organization of the human brain and some peripheral organs that are prerequisites for the language system, and is probably responsible for the significant differences in language skills between individuals. At the extremes are people with extraordinary gifts for learning many languages and undertaking simultaneous interpretation, and people with severe congenital speech disorders

Exciting early results have identified a gene underlying one form of speech disorder known as verbal dyspraxia. This serious impairment is characterized by problems in articulation, along with other linguistic symptoms. Genetic studies of an English family with verbal dyspraxia have shown that the condition results from a mutation in the gene, known as FOXP2 – located on chromosome 75, which affects the language areas of the brain via several intermediate steps. Although this speech deficit is rare, it now seems that the same genetic mechanism could play a role in other, much more common congenital speech pathologies. However, FOXP2 is not a 'language gene' — that is a term coined by the media. The same mutation also affects the liver for example, and the non-mutated gene is found in many other animals, such as the mouse, which do not speak. Rather, it is one of many genetic components important in the development of language ability. Nevertheless, its discovery was the first small breakthrough in understanding the genetic basis of human language.

It does bring questions to mind about how far back we as a genus and had the ability to process and create the sounds for complex verbal speech. There are also hints in the brain that can contribute to an inference that speech was used by a species. I strongly feel that speech evolved along side our ability to think in abstract terms and we needed ways communicate on the hunt or to find a mate. To my mind, all Homo species had the ability speak and used sounds as a way of communication, but the scientific community as a whole has not drawn that conclusion as of yet.

LANGUAGE AND POPULATIONS

Anthropologists believe that modern humans originated in Africa. Is there a link between the spread of languages and the genetic differences between the peoples who speak them?

Recent research using modern scientific methods has thrown up some surprises. One of the most interesting shows how genetic and linguistic classifications of populations can diverge. Most European languages belong to the Indo-European group. Two notable exceptions are Basque, which is relatively isolated, and the Finno-Ugric languages, in particular Finnish. Modern Finns have been found to be genetically close to Indo-Europeans, but genetically different from their Saami neighbors whose language is also Finno-Ugric5.

One study is examining the effect of contact between prehistoric populations with different sociocultural backgrounds in different locations, particularly Africa and Siberia, on language and genetics. The types of contact that occurred are unknown, so it is hard to assess their consequences using only linguistic methods. Molecular genetic analyses can help spot a bottleneck, or founder effect, that might indicate a mixing of different populations, or reveal discrepancies between genetic and language relationships indicative of recent language drift.

Languages do change all the time. It is not hard to realize that many words and phrases have been added to the language you speak just over a generation of time. Imagine the changes that can take place over several centuries in isolated communities that often existed through the middle-ages and still exist in remote places.

Another study is addressing the development and spread of languages over larger geographical areas. The traditional methods of comparative historical linguistics, based primarily on similarities in vocabulary, can make sense of language evolution over only the past few thousand years at most. The new project adapts the widely used methods of evolutionary genetics — namely, the construction of phylogenetic trees— with the phonological, morphological and syntactic features of language as raw data, primarily to study the sophisticated languages and peoples.

The methods were developed and tested on a small well-researched subgroup of Austronesian languages and are now being applied to the much more complex relationships between the Papuan languages spoken in the same area. The results suggest that these languages derive from a common phylum that is much older than the Australian languages, which arrived in the area only 3,000 years ago.

STRUCTURAL DIFFERENCES

Languages are not inborn. There are approximately 7,000 languages in the world today, and learning any one of them is a lengthy process that takes around a decade. There is no reason why a Chinese child growing up in Germany should learn to speak German any worse than a German child or a child of any other nationality. A specific genetic predisposition, however, might influence the evolution of particular structural features of a language within a group of genetically similar individuals, for example whether the language is tonal or non-tonal.

Chinese is perhaps the most well-known of the tonal languages, in which a single syllable can convey different meanings according to whether it is spoken in a consistent tone or a rising, rising–falling or falling tone. The distribution of tonal and non-tonal languages corresponds closely with the distribution of two alleles, or forms, of the abnormal spindle-like microcephaly-associated (ASPM) and microcephalin genes. Of course, alleles by themselves do not directly lead to the evolution and use of tonal languages; children with different forms of the genes will still be able to learn tonal languages. A particular genetic predisposition in a population, however, might favor the emergence of languages with particular structural characteristics. It is now possible to study whether there might also be a genetic predisposition to other structural properties, like poverty or richness of spoken inflexion and the number of words.

The languages of the world, which form part of and are the main bearers of cultures, are highly diverse. The capacity to develop, learn and use them, however, belongs to our shared genetic heritage.

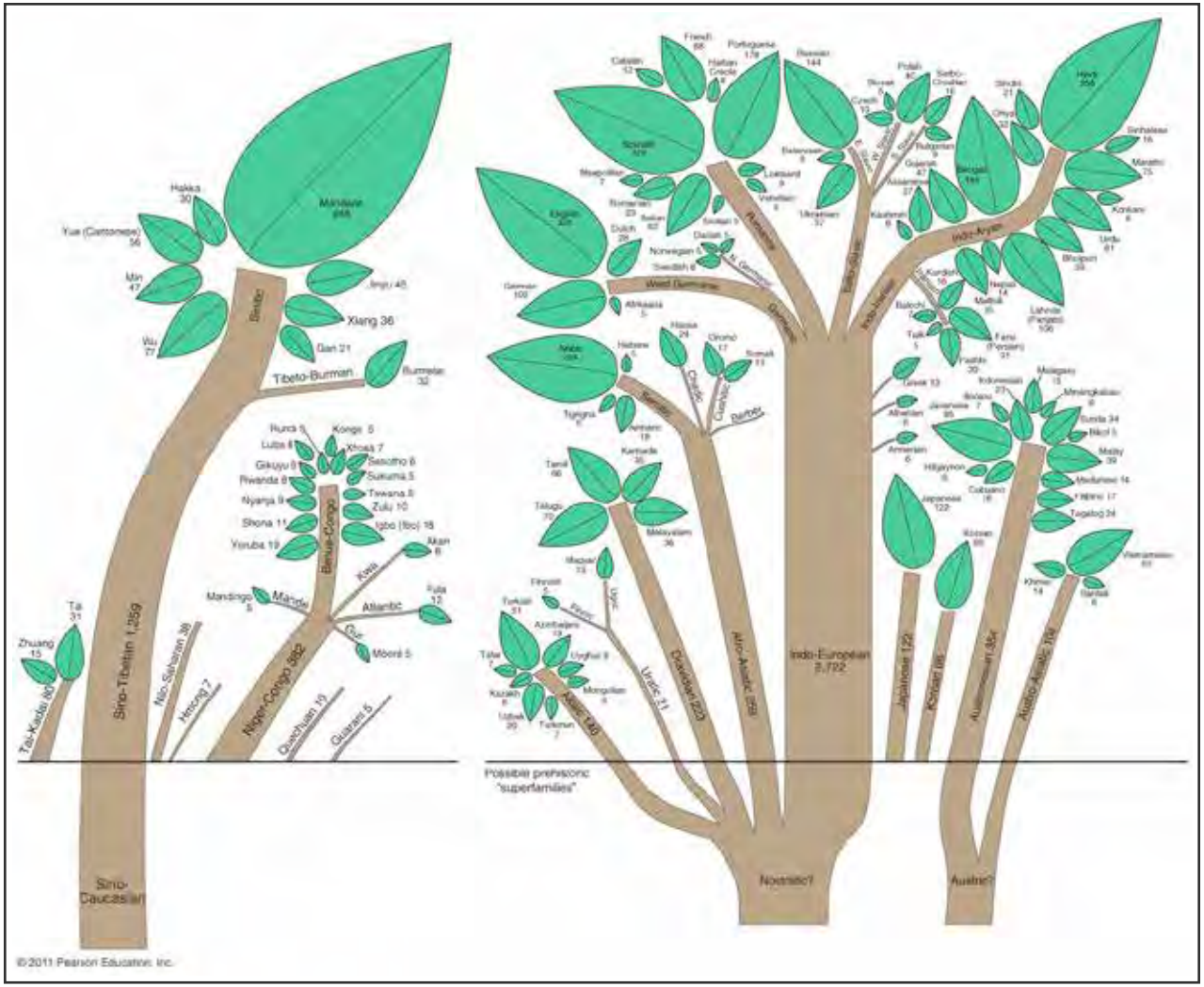
USING LANGUAGE FAMILIES AS A TOOL TO TRACK THE MOVEMENT OF HUMANS

In addition to the numerous genetic markers that are currently being developed and refined that utilize both the X, Y and mitochondrial DNA to track the routes that we humans took in the colonization of the world, language families offer another glimpse into our routes as well.

Modern linguistics has come a very long way in the mapping of related families of languages and is utilizing computer modeling just like the modern geneticists uses genome mapping to figure out the relationships of organisms to each other. This has produced some surprising results and has reinforced the ability to accurately deduce the organization of language development within our species as we traveled form one place to another. Unfortunately, so much time has passed that getting to the root language may be impossible (if it ever existed) with science as the various cultural groups have had too much time to develop their respective languages and have replaced the earliest forms of speaking with later spoken systems. But science has allowed us to at least track back to this point using the relationships of words and the knowledge of how various spoken sounds change over time and how languages develop from local isolation and intermixing of cultural groups.

The diagram at right show how all the major world languages developed from three main branches of Sino-Tibetian, possibly Nostratic and possibly Austric in order to lead to all modern tongues. At present, we do not have the technology to trace back further and no people can be found that can lead us to direct examples of earlier languages. It is unlikely that we will be able really ever know if these three root languages were derived from one place, but we might be able to find anecdotal evidence of such an original spoken dialect. For now it will have to remain an unknown and anything further back would be conjecture.

So you might be asking, how does this language tree aid in discovering how humanity moved about the globe? That would be a relevant question considering that this is really just a pretty way to illustrate the major language groups. It shows how many people speak a given language, how it developed from earlier tongues and the relationship of languages to each other. In order to see how language relates to movement, we need to take the language families and map them. Literally put them on a globe based on who speaks them, and show how they developed over time from the movement of people through the continents. For that we need a globe.



Language families with at least 10 million speakers according to Ethnologue are shown as trunks of trees. The major language families are divided into branches and groups. Individual languages that have more than 5 million speakers are shown as leaves. The number after the language represented the number of speakers in millions. Below ground level, the language tree's "roots" are shown, but these are speculative because they predated recorded history. Almost all languages can be classified into a single branch of the three families.

Indo-European includes English, spoken by 48% of people today; Sino-Tibetan includes Mandarin, spoken by 26% of people today; Afro-Asiatic includes Arabic, spoken by 6% of people today; Austronesian is mostly in S E Asia is spoken by 5% of people today; Dravidain is spoken mostly in India by 4% of people today; Altaic is spoken mostly in Asia by 3% of people today; Niger-Congo is spoken mostly in Africa by 2% of people today; Japanese is spoken by 3% of people today; the 3% left speak a language belonging to 1 of 100 smaller families.

MODELING HUMAN LANGUAGE

The evolution of human culture is often compared to biological evolution, and it's easy to see why: both involve variation across a population, transmission of units from one generation to the next, and factors that ensure the survival of some variants and the death of others. However, sometimes this comparison fails. Culture, for instance, can be transmitted "horizontally" between members of the same generation, but genes can't. Both linguistic and genetic data can be used to draw conclusions about human history, but it's vital to understand how the forces affecting them differ in order to be sure that the conclusions we're drawing are accurate.

By conducting a large-scale analysis on global genetic and linguistic data, the researchers found that languages sometimes behave in ways very unlike genetics. For instance, isolated languages have more, not less, diversity, and languages don't retain the echo of a migration out of Africa—unlike our genomes.

Human languages form a distinct and largely independent class of cultural replicators with behavior and fidelity that can rival that of genes. Parallels between biological and linguistic evolution mean that statistical methods inspired by phylogenetics and comparative biology are being increasingly applied to study language. Phylogenetic trees constructed from linguistic elements chart the history of human cultures, and comparative studies reveal surprising and general features of how languages evolve, including patterns in the rates of evolution of language elements and social factors that influence temporal trends of language evolution. For many comparative questions of anthropology and human behavioral ecology, historical processes estimated from linguistic phylogenies may be more relevant than those estimated from genes.

To conduct the analysis, the researchers focused on "phonemes," which are the smallest linguistic units of sound that can distinguish meaning. For instance, English uses "p" and "b" to distinguish between the words "pat" and "bat," which means "p" and "b" act as phonemes. Other languages may not use these particular sounds to distinguish words—or they may make finer distinctions, basing meaning differences on subtle changes like whether or not a puff of air follows the "p." Every language has a certain number of phonemes, and these phoneme inventories differ in size from language to language. Researchers compare information on global phoneme inventories with data on global genetics and geographic location in order to isolate how phonemic and genetic units track each other.

Some of their results were intuitive. They found that populations with greater geographical distance between them also had larger genetic and phonemic differences. Languages that come from the same family (like French and Italian) could be expected to have similar phoneme inventories, but the finding held true even for geographically close but historically unrelated languages.

However, some of their results were not quite as intuitive. When populations migrate, genetic diversity goes down, because the group that moves takes along only a portion of the gene pool of their original population. Isolated groups of people, who have no opportunity to mingle with other groups, therefore have limited genetic diversity. Language, on the other hand, shows the opposite pattern: languages with lots of close neighbors seem to be influenced by these neighbors, leading to less phonemic diversity over time. Isolated languages, on the other hand, change over the generations to become more diverse.

THE MOTHER TONGUE

The world's 6,000 or so modern languages may have all descended from a single ancestral tongue spoken by early African humans between 50,000 and 70,000 years ago, a new study suggests. New Zealand researchers have traced every human language — from English to Mandarin — back to an ancestral language spoken in Africa 50,000 to 70,000 years ago.

Scientists say they have traced the world's 6,000 modern languages — from English to Mandarin — back to a single "mother tongue," an ancestral language spoken in Africa 50,000 to 75,000 years ago. This single ancient language resulted in human civilization — a Diaspora — as well as advances in art and hunting tool technology, and laid the groundwork for all the world's cultures.

The research, by Quentin Atkinson from the University of Auckland in New Zealand, also found that speech evolved far earlier than previously thought. And the findings implied, though did not prove, that modern language originated only once, an issue of controversy among linguists. Before Atkinson came up with the evidence for a single African origin of language, some scientists had argued that language evolved independently in different parts of the African continent and possibly in other Homo-Species that we later encountered and interacted with.

Atkinson found that the first populations migrating from Africa laid the groundwork for all the world's cultures by taking their single language with them.

"It was the catalyst that spurred the human expansion that we all are a product of," Atkinson said, the Wall Street Journal reported.

Atkinson traced the number distinct sounds, or phonemes — consonants, vowels and tones — in 504 world languages, finding compelling evidence that they can be traced back to a long-forgotten dialect spoken by our Stone Age ancestors. Atkinson also hypothesized that languages with the most sounds would be the oldest, while those spoken by smaller breakaway groups would utilize fewer sounds as variation and complexity diminished.

The study found that some of the click-using languages of Africa have more than 100 phonemes, or sounds, whereas Hawaiian, toward the far end of the human migration route out of Africa, has only 13, the Times reported. English has about 45 phonemes. The phoneme pattern mirrors the pattern of human genetic diversity as humans spread across the globe from sub-Saharan Africa around 70,000 years ago.

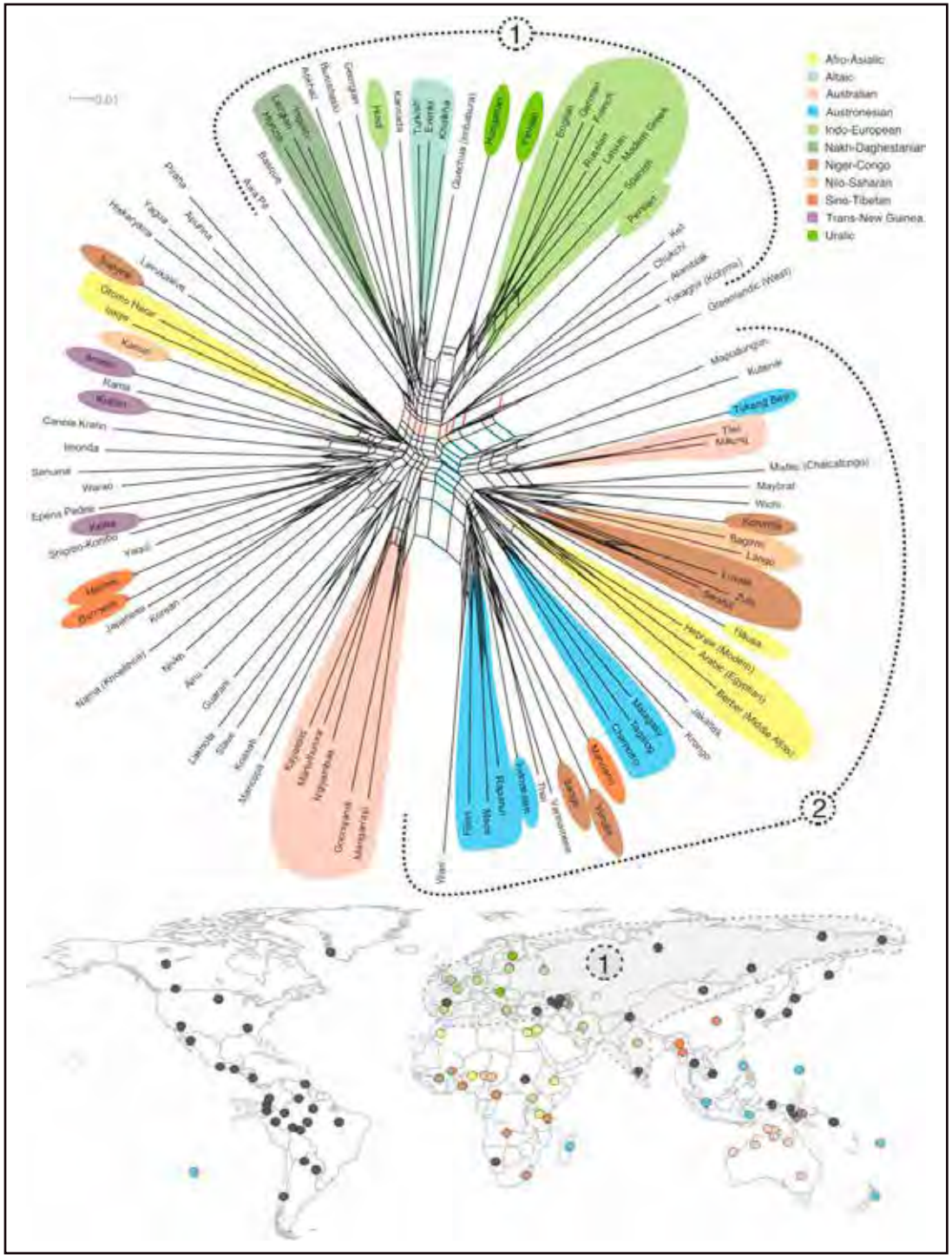
Languages change as they are handed down from generation to generation. In a large population, languages are likely to be relatively stable - simply because there are more people to remember what previous generations did, he says.

But in a smaller population - such as a splinter group that sets off to find a new home elsewhere - there are more chances that languages will change quickly and that sounds will be lost from generation to generation.

Professor Mark Pagel, an evolutionary biologist at Reading University, said the same effect could be seen in DNA. Modern-day Africans have a much greater genetic diversity than white Europeans who are descended from a relatively small splinter group that left 70,000 years ago. 'The further you get away from Africa, the fewer sounds you get,' he said.

Professor Robin Dunbar, an anthropologist at Oxford University, said the origin of language could now be pushed back to between 100,000 and 200,000 years ago. 'The study shows that ancestral language came from somewhere in Africa,' he said. There is now compelling evidence that the first modern humans evolved in Africa around 200,000 to 150,000 years ago.

Left: Phylographic map for the 99 most well-attested languages in the world language database. This network is based on 138 typological characters and shows the signals grouping languages. Branch-lengths are proportional to amount of divergence between languages and the box-like structures reflect conflicting signal. Accepted family groups are color-coded and potential language areas are marked with dashed lines and numbered as described in the text. The dashed area and arrows on the map show the extent of the large Eurasian cluster (1). Cluster (2) appears to be a residual grouping containing languages from Australia, Africa and the Pacific.



How far back we can trace this linguistic history depends largely on the rate at which the different components of language evolve. Rates of lexical evolution are widely thought to impose an upper limit of 6000 to10,000 years on reliably identifying language relationships. In contrast, it has been argued that certain structural elements of language are much more stable. Just as biologists use highly conserved genes to uncover the deepest branches in the tree of life, highly stable linguistic features hold the promise of identifying deep relationships between the world's languages. This image is the first global network of languages based on this typological information. We evaluate the relative evolutionary rates of both typological and lexical features in the Austronesian and Indo-European language families.

The first indications are that typological features evolve at similar rates to basic vocabulary but their evolution is substantially less tree-like. The results suggest that, while rates of vocabulary change are correlated between the two language families, the rates of evolution of typological features and structural subtypes show no consistent relationship across families. This language map is most likely the shape it is in because the original, older languages are no longer spoken and have been muddied by cross-cultural movement. This alone can account for the loss of a more tree like structure as we are simply in the branches with no trunk in sight.

Observations:

1. We see all Euroasiatic languages marked as "group 1" here. While we see that the Indo-European languages are closely related with other, Uralic and Altaic languages doesn't show this amount of relation between each other.
2. Most notable language at "Group 1" is 'Quechua(Imbabura)" Native American language family, shown in between Uralic and Altaic languages. This can be considered as a linguistic proof for the immigration of Caucasus people from Siberia to the continent of America, who later founded the native American societies.
3. We see that the Bulgarian language has different typological features than other Slavic languages but its highly influenced from them in terms of lexical features. So, we can say that Bulgarian had a different form of proto-language then Slavic ones but at later times, Bulgarians highly absorbed Slavic vocabulary. We can also say the same for "Armenian and Greek", "Lithuanian and Latvian".
4. It seems that Persian is also effected by Hindi and Kashmiri vocabulary while having different proto-language from them. Same for Romanian which absorbed Spanish-Italian-French vocabulary.
5. There are holes in the data to date, like Turkish, Irish and Albanian.
6. Onur, Persian and Hindi come from the same 'mother group' called Indo-Aryan, and as they developed into their own separate languages (and subsequent languages and dialects) they influenced each other. Hence, the term 'Indian' itself has a Persian origin, they both have historically (in addition to Sanskrit) used the word 'Bagh' for 'God' (for example, Baghavit Gita in the Hindu holy books, Baghdad as a Persian city-name meaning god-given), which is related Macedonian 'Bog', also meaning 'God'.
7. Humanity, in its early migration, seems to have become isolated into three groups before moving off in separate directions.

What we can infer from the map is that all the languages of the world are indeed, related back to a single small area that gave birth to all the modern languages. Or at least, if there were other pockets of language speaking peoples, their influence was erased in todays spoken libraries. This is somewhat startling in the realization that human language started in one place and then migrated to the whole of humanity. One would assume that it arose in our species earlier, than later as it has obvious ramifications on our ability to survive and learn. I would surmise that the older, towards 200,00 years ago, is more likely than 100,000 years ago. It also remove all doubt that Homo sapiens evolved in one location and not is various locations around the world as the genetic data bears out. In some ways I am sad, for I was hoping that there could be evidence that our cousins, the Neanderthals, had a spoken tongue as well, but today's evidence does not bear out that they had any influence on our language other than a very small one. It does not rule it out, it just seems that they did not have a language that any modern humans adopted.

But just because we have managed to build a computer aided map in finding the relationships between languages does not mean that it helps us to see how humanity spread across the globe any more easily than the genetic data does. We are still missing many pieces to correlate the language data points, such as age, language ancestry and movement over time, if we are to use language as a way to further back up the genetic information.

EVIDENCE FROM PRE-HISTORY BACKING UP AN IGBO ORIGIN OF HUMANKIND, LANGUAGE, CULTURE AND CIVILIZATION

Our claims to an Igbo origin of language, culture and civilization are not based on spoken language alone, but on the equally compelling fact that among the archaeological discoveries at Igbo Ukwu by British archaeologist Thurstan Shaw, were several inscriptions on pottery and bronze, which when compared with ancient Middle Eastern inscriptions (Egyptian and Cretan Hieroglyphics, Hittite, Old Phoenician, Old Sumerian, Proto-Palestinian, etc) show several striking similarities. This shows that there was a civilization of note, based in Igbo land, now lost, which might have birthed the Middle Eastern civilizations and writing systems, but also their spoken languages.

Equally compelling is the discovery of an Early, Middle and Late Stone Age Homo Erectus (the ancestor of Homo sapiens Sapiens or Modern Man) habitation in Ugwuele, Isuikwuato, Abia State in Igbo land in the early seventies by a team of archaeologists from the University of Nigeria, Nsukka. This adds weight to an Igbo origin of the 'Out of Africa' migrations of Early Man; but to also an Igbo origin of human language and culture; while the Igbo Ukwu inscriptions backed up by the mythologies and written records of the Egyptians, Sumerians, Dravidians, Hebrews and Kwa peoples of Nigeria lend credence to a Post-Deluge Kwa-Igbo origin of civilization.

INDELIBLE SIGNALS OF THE MOTHER-LANGUAGE ARE RETAINED THROUGH THOUSANDS OF YEARS

Dr. Pegel noted, most interestingly, that "What's so remarkable about this (Atkinson's) work is that it shows language doesn't change all that fast — it retains a signal of its ancestry over tens of thousands of years". What we are about to demonstrate in this article is how signals of Igbo language has been retained in some of the most ancient as well as the most modern languages (and cultures) of the world, proving without any shadow of doubt that the Igbo was the mother of languages such as Sanskrit, Egyptian, Sumerian, English and Semitic languages, or at least that Igbo is the longest surviving child of a global mother language spoken by men.

Linguists believe that when words from two or more separate languages share similarities in sound and meaning, it is a sign of borrowing or common origin. Using this method, it has have found that hundreds of words of similar sounds and meanings to those of Igbo language across several languages of the globe, showing, indeed that signals of the mother language are retained "through tens of thousands of years". There is evidence of several traces that Igbo was the language spoken by God when he 'spoke' creation into being and that it was the language spoken by the first Homo Sapiens family.

Here we list words from diverse ancient and modern languages that have retained Igbo signals in the form of common sounds and meanings with the mother language, and in some cases, powerful evidence of having originated in an Igbo cultural environment.

EGYPTIAN WORDS OF IGBO ORIGIN

The Egyptian word for 'gods' is NTR or Neter. It means 'Guardian or Watcher'. Its Igbo equivalent/original is Onetara (meaning – 'He who guards and watches' over a thing on behalf of someone else). The Igbo original is more explicit, for it shows that these lesser gods are answerable to a Higher Being.

The highest and oldest of the known gods of Egypt was Ptah. He was the father of all the other gods. His name, Ptah, means in Egyptian, 'He who fashions things by carving and opening up". The Igbo original of this word is Okpu-atu (meaning 'He who molds/fashions things by carving and opening up'. Igbo word tuo/atu means both 'to carve and to open a hole'). Ptah's godly rule over Egypt began as early as 21,000 BC. If his name and the collective name for the gods of Egypt, Neter, were Igbo in origin, it implies that an ancient civilization of Igbo extraction existed in West Africa. That Egypt was an originally Igbo-speaking civilization and that early Egyptians were Igbos. These linguistic pieces of evidence suggest that the earliest Egyptian civilization before Pharonic rule began in 3,100 BC was based in West Africa and not in North Africa – the civilization, now lost to which the Igbo Ukwu archaeological findings belong. We have found several pieces of evidence supporting this assertion.

Ptah's son was called Ra, meaning 'Sun/Daylight'. It's Igbo original was Ora (which in Afa – the cult language of Igbo native priests, also meant 'Sun/daylight').

The grandson of Ra was called Osiris by the Greeks and Asar by the Egyptians. Osiris' was associated with the number 'seven'. No one knows the meaning of his name in Egypt, but in Igbo language Asaa means 'seven'.

The son of Osiris was called Horus. This is a Greek version of a native Egyptian word Heru, which means 'Face', as in 'Face of the Sun'. Its Igbo original is Iru – 'Face'. Horus was known as the Lord of the Horizon. The Horizon being known to the Egyptians as the land of the Rising Sun, a place located in the Southwestern direction from Egypt - the original mythological home of the gods of Egypt. Our analyses shows that this land of the Rising sun was known in several other world mythologies as the Center/Navel of the Earth. The actual cartographic center of the earth, as indicated in all old maps of the world is 'Median Biafra', for median means 'Center'. Biafra is the ancient name for the place now known as Igbo land. It's location on world maps shows that Igbo land was the true 'navel of the earth'. Igbo land was thus, that Land of the Rising Sun/that Horizon Land to which Egyptian mythologies and pyramid records refer as the Heaven of the Egyptians. The international word 'Horizon' is thus derived from the name 'Horus', which in itself is derived from Igbo word Iru – 'Face of the Sun'. To demonstrate their genetic claim to being the true god-men who lived in this land of the gods, Igbo initiates marked themselves with the symbol of the sun – ichi, a word derived from another name of the Sun/daylight, chi, which is also the name of the spirit of God in Man and from which originated the Greek word Christ.

Egypt's most ancient god is called Amun/Amen/Ammun. He is a god residing under the earth and his name implies 'Hidden inside the bowels of Earth'. According to Martin Berna the word Amen is derived from 'imn' which is pronounced Amana. These two words have Igbo origins. Igbo equivalent of imn (Egyptian words are usually not written with vowels) is ime ana, and means 'inside the earth', while

amana is equally an Igbo word referring to the Earth religion, further supporting an originally Igbo-based Egyptian religion and civilization.

Egyptian words with Igbo sounds and meanings are legion. They include but are not limited to the following: Egyptian: Musi/mose/msi – 'to give birth' (Igbo – mmusi 'to give birth to many children'). From this word is derived names of Pharaohs such as Thoth-mose ('Born of Thoth'), Rameses ('Descended from Ra'), etc. The fact that many pharaohs of Egypt bear this word in their names would tend to add weight to an Igbo origin of Egyptian civilization and divinities.

1. Egyptian: tuf - 'to throw away' (Igbo: tufuo – 'to throw away')

2. Egyptian: akhu – 'fire/light' (Igbo: oku – 'fire/light'). Akhu is the sacred vernacular name for the Giza Pyramid – one of the greatest wonders of the world. Its native Igbo name implies that an Igbo-speaking team of ancient engineers possibly constructed it, especially because as we demonstrated in They Lived Before Adam, many key words in Egyptian Engineering lexicon are cognates of Igbo language.

3. Egyptian: aru - 'body/form' (Igbo: aru - 'body')

4. Egyptian: ba - 'heart'(Igbo: obi – 'heart')

5. Egyptian: Busiris 'House of Osiris' (Igbo/Nri/Nsukka dialect: 'Obu Osiris' – 'House of Osiris').

6. Egypt was known as 'Black land'. Probably the word 'Egypt' could have been derived from the Igbo word Ojikputu, which means 'Pitch Black' (Orlu dialect)

7. Egyptian: hike – 'power/strength' (Igbo – ike – 'power/strength'

8. Egyptian - hekau – 'word of power' (Igbo - ike okwu – 'word of power')

9. Eguptian xut/pronounced kut 'sunrise' (Igbo ukutu 'dawn' – Orlu dialect)

10. Egyptian sa 'to shine' (Igbo saa 'to shine' - Orlu dialect)

11. Egyptian satu 'shine down' (Igbo satuo – ' shine down' - Orlu dialect)

12. Egyptian tua 'glorify' (Igbo too 'glorify' Orlu dialect)

13. Egyptian hru 'the day dawns' (Igbo horo 'the day dawns'- Orlu dialect)

14. Egyptian xerkert (pronounced kirkir) 'pieces' (Igbo kirikiri 'pieces' - Orlu dialect

15. Egyptian transitive –k 'you' Igbo transitive –k 'you' as in si ku - 'say to you' - Nsukka dialect).

Egyptian borrowings from Igbo are in two groups: words borrowed from Orlu/Okigwe dialectal family are far older in chronological time that those borrowed from the Anambra dialectal family since Orlu/Okigwe are held by Igbo historians to belong to the autochthonous group. This implies that the earliest roots of Egyptian civilization, when the gods and not men ruled Egypt, began among the autochthons of Igbo land, but did not end there. Latter-day migrant Igbo priest-kings continued to exert influences in Pharonic Egyptian civilization.

SUMERIAN/SEMITIC

As in ancient Egyptian, some of the names of the earliest gods of Sumer were derived from Igbo language. Some of these gods, according to Sumerian cuneiform records lived on earth before the creation of human beings. One such god was called ZU. His name means in the language of the gods: 'He Who Knows'. The word Zu has an equivalent in sound and meaning in Igbo, namely Izu, which means 'Wise and Knowledgeable'.

Another Sumerian god with an Igbo name was the Stone God Ullikimmi, for his name means in Igbo 'Stone Cable' – Illi nkume. Also an early Storm god of Sumer, who fought a protracted war with the stone god was called Kummiya. In Igbo this name translates as Nkume Iyi. Nkume Iyi is the pebble used by rainmakers to make rain. Iyi implies 'Rain' and 'Storm'. It is noted that Ulli Kummi means 'He who contends with Kummi', which in Igbo would translate into Olu Kummi 'He who fights Kummi'. Again we see that these gods had Igbo-speaking roots, leading us to conclude that Egyptian and Sumerian mythological origins are traceable to one and the same language.

A Babylonian tablet in the British Museum (No. 74329) cataloged as containing an otherwise unknown myth, but narrating aspects of the story of Cain's lineage, (the tablets call him Ka'in), says Cain's descendants are called Amakandu – meaning 'People Who in Sorrow Roam'. After the death of Kain, his family buried him in a place called Nudun, which means 'Excavated Resting Place' (Biblical 'Nud'), also called Dunnu. The last settlement of this group of people was called Shupat, meaning 'Judgment'. All these vernacular Sumerian words are Igbo words. In Igbo (Owerri dialect), Ama ka nduu means 'To roam is better than to settle'. Igbo equivalent of Nudun ('Excavated Resting Place') is Onu Nduu, and has the exact same meaning with Nudun. Onu means in Igbo 'mouth/excavated hole', while nduu means 'to rest/to sit' in Owerri dialect. The Igbo equivalent of Sumerian Shupat ('Judgment') is Ishi ikpe, which also implies 'Judgment'. There is a clan in Anambra State in Igbo land called Dunukofia. The name means 'To settle is better than to roam'.

Sumerian texts say that the first city built by the gods on earth was called Eridu. There they placed the members of Adam's family. Adam's great grandson was named Yared, meaning 'He of Eridu', 'person from Eridu'. Its Igbo equivalent, with the same meaning, is Oye Eridu. The father of Yared was Enosh/Enu-Esh. His name meant 'Master of humankind', for the first people were called Esh, Adam too was called Esh in vernacular Hebrew. In Sumerian this sacred word Esh means 'Righteous Shepherd'. All Sumerian kings bore the title Esh. Equally in Igbo land Esh/Eshi/Nshi is a sacred word implying divine origins of the first people, who indeed were wielders of supernatural powers. Igbo people from the area occupied by the autochthons (Orlu and Okigwe) begin time reckoning with 'Kamgbe Eshi' – 'From the time of the Eshi'. The term 'Oha-eshi' refers to the generality of the people descended from the autochthons. These would tend to suggest that the Hebrew Esh ('first people'), Igbo Esh ('First People') and Sumerian Esh (Sumerian kings who bear the "ESH" title do so in other to legitimize their reign through association with the autochthons of Igbo land) all have the same root. In fact Sumerians called themselves 'Black-headed people' to distinguish themselves from the Egyptians, who were called 'Black-footed People". King Assurbanipal was said to have claimed to posses the secrets of writing "from the days before the Flood".

Sumerian word ommia means 'expert'. Igbo omaya means 'the one who knows it well'. Sumerian town of Kish, according to Sumerian records, was where the gods first handed down kingship to men. Igbo Ki ishi means 'The First' (Orlu dialect). Actually the anglicized spelling 'Orlu' is derived from a word pronounced Ele. The people of Orlu town in Orlu local government believe that they are descendants of an ancestor known as Okwara Ugwu-Ele – 'Heir of the Hill of Ele'; Ugwuele being the very place of habitation of the autochthons.

Sumerian word Tug means dress. Igbo tuiga means 'dress up' (Orlu Dialect). Like the Igbo Sumerians also wore wrappers for total wrap-round cover-up, which were called Tug-tu-she, which in Igbo (Orlu Dialect) would be pronounced tuiga tushie 'cover-all dressing'. We have

demonstrated in They Lived Before Adam that Sumerian customs, religious practices and traditional ways of life as described by Wallis Budge was the same in most details with those of ancient Nigerians.

Hebrew word hyssop ('to cleanse') derived from Sumerian word zupu ('to clean'). Both go back to the Igbo word hisapu and sapu – 'to clean off' or 'wash clean' (Orlu Dialect). In They Lived Before Adam we listed several Akkadian, Canaanite and Hebrew words along with Sumerian ones which derive from Igbo, with several place names in Hebrew – including names of rivers and mountains. These all fall under the Semitic group of languages, leading us to conclude that Semitic languages are of Igbo extraction and that Igbo is the mother of Semitic.

Hebrew Hayawu (name of the creating deity), Igbo Anyanwu ('Sun'). This links up with the Igbo word Ora (Sun) being the name of the Igbo god known among the Egyptians as Ra (Sun). Research shows that this name was first borne by the Hidden god Amun (Amana) before it was usurped by the son of Enki. This would suggest that it was this God lodged inside the bowels of the earth that carried out the act of creation described in Genesis.

The god of scribes is Thoth, who is also known among the gods of Sumer (though by a different name). In Igbo Nri mythology, he is known as Eri. In Igbo land as in Sumer, writing was a secret and sacred art of the gods, which only the initiates were allowed to indulge in. The clan of scribes of Igbo land was called Ar/Aro. They are also the guardians of the Mouth of the labyrinthine Cave where God/Chukwu/Ukpabi (a local version of the Supreme Being and of Egypt's Hidden God Amun) dwells unseen. Characteristically this Cave is called Obini-ukpabi, which translates into 'Tomb Palace of God' or 'Underground Dwelling of God' – a sure reference to the Egyptian Duat home of Amun, which Thoth calls Amenti ('Halls for Listening'- Igbo exact equivalent is Amanti).

We know from Biblical sources that the Babel incident that brought about the separation of languages from the one original mother tongue happened at Babel. The fact that in Sumer and in Igbo land, El was associated with the heights and also in Hebrew, shows a common origin of both the god and the peoples that worship it. The ancient base of El in Igbo land, according to mythology was the same place where the Homo Erectus habitation was found by archaeologists, namely Ugwu-Ele. Ugwu-ele means 'Hill/Heights of Ele'! The Biblical term Beth-el means 'House of El' or 'Lord's House', for El was the God whom the Jews called 'Lord'. Its Igbo original was Be-Ele/Obi Ele 'House of El'.

All these linguistic piles of evidence are powerful testimonies that Sumerians and Hebrews, Benins and Yorubas were originally speaking an Igbo mother language, still spoken in Igbo land to this day, but not among the other nation states that were originally part of the mother-entity. They also suggest that the origins of civilization lie in ancient Nigeria in the area of the River Niger. One can venture further and adduce from the foregoing that the Great Benin Empire of Old and the Oyo/Owo empires of Yoruba land, of which nothing remains in present times, were perhaps offshoots of the original civilization of ancient Nigerians.

All this is interesting to note that the many examples of common root words and meanings from Igbo to other ancient languages is profound, you cannot draw conclusions on which language is the origin language until much more work is done. It is possible, thought genetics does not bear this out, that the Semitic languages influenced or crossed cultures to African lands through Egypt and beyond. One has to be very careful with language to not draw conclusions based on a few word or even a few hundred words. Many things are taken into account.

What does hold true is that there were ancient African kingdoms and they influenced Egypt and in reverse as well. There is anecdotal and uncorroborated evidence that the bases of the Egyptian culture started as early as 21,000 BCE, but before the stone age cultures started building and writing down their history, it becomes very difficult to find any evidence of large scale settlements who were doing much more that just live off of the land on a daily basis, and doing little to build any type of lasting civilization that we can find evidence for.

THE CASE FOR A SYSTEMATIC WAY OF DISCOVERING THE AGE OF A LANGUAGE, WHEN IT WAS SPOKEN AND HOW TO FIND ITS PLACE OF ORIGIN

Believe it or not, there have been amazing strides in the logical deduction of linguistic history. From sources that can what can be easily found, the research is in the Indo-European language families and not as much focus is being directed towards the African landmass. This is unfortunate since it is fairly obvious that language developed there first and them moved to the Anatolian Plane. Some of the oldest known languages like Hittite, Dulum and Assyrian are well researched and little seems to be progressing to finding the ancestors and locations of the large family branches like Nostric, Austronesian and Sino-Caucasian which may be too old and forgotten to be rebuilt, properly categorized or dated with any certainty anymore, but the longer it takes linguistic scientists to really focus on the African languages, the less likely we will find these important answers to our speaking past. With the constant movement of peoples, the loss on much of Africa to the Sahara desert and the rapid colonization that has taken place, the hope is that it is not too late for us to find the root language location and feel with some scientific research that this is where language first happened and spread outward all over the globe for modern humans.

HOW IS THIS DONE?

Step 1 – Building a Database of Cognates

Cognates are similar words shared across languages and taken to indicate relatedness via common ancestry. To be diagnosed as cognate the words must have similar meaning and, most importantly, show systematic sound correspondences indicating a common origin. For example, the English word five has cognates in German (funf), Swedish (fem) and Dutch (vijf), reflecting descent from proto-Germanic (*fimf). Cognate identification can be tricky. For example, other cognates of these words for five include Irish cuig, Italian cinque, Armenian hing and Polish piec. Conversely, known borrowings, such as English mountain from French montagne, reflect more recent contact, rather than common ancestry, and so are not treated as cognate.

Step 2 – Location Data

To work out where languages have come from, we use information about where the contemporary languages in our sample are spoken today and where the ancient languages are thought to have been spoken. Rather than fixing each language to a single point location, we assign them an approximate range onto a map of the region.

Step 3 – Building Family Trees of Languages

Languages evolve through time in a manner similar to biological species. As groups of speakers become separated, their speech drifts apart forming new descendant languages, and eventually whole families of related languages. Over thousands of years this process has generated the 6000+ languages in the world today.

We can represent the relationships between languages on a family tree, otherwise known as a 'phylogeny'. A simple example of a phylogeny is a family tree where the leaves of the tree represent the children in a family and branches represent relationships between parent and child.

Create a model that was best supported by the data that allows for variation in rates of evolution for different cognates (some words can evolve more quickly than others) and assumes that cognates are only ever gained once but can then be lost multiple times in descendant languages. This fits with linguists' intuitions about the nature of cognate replacement – by definition, true cognates cannot be independently gained more than once and can then be lost

multiple times at differing rates.

Step 4 – Calibrating the age of the Language Tree

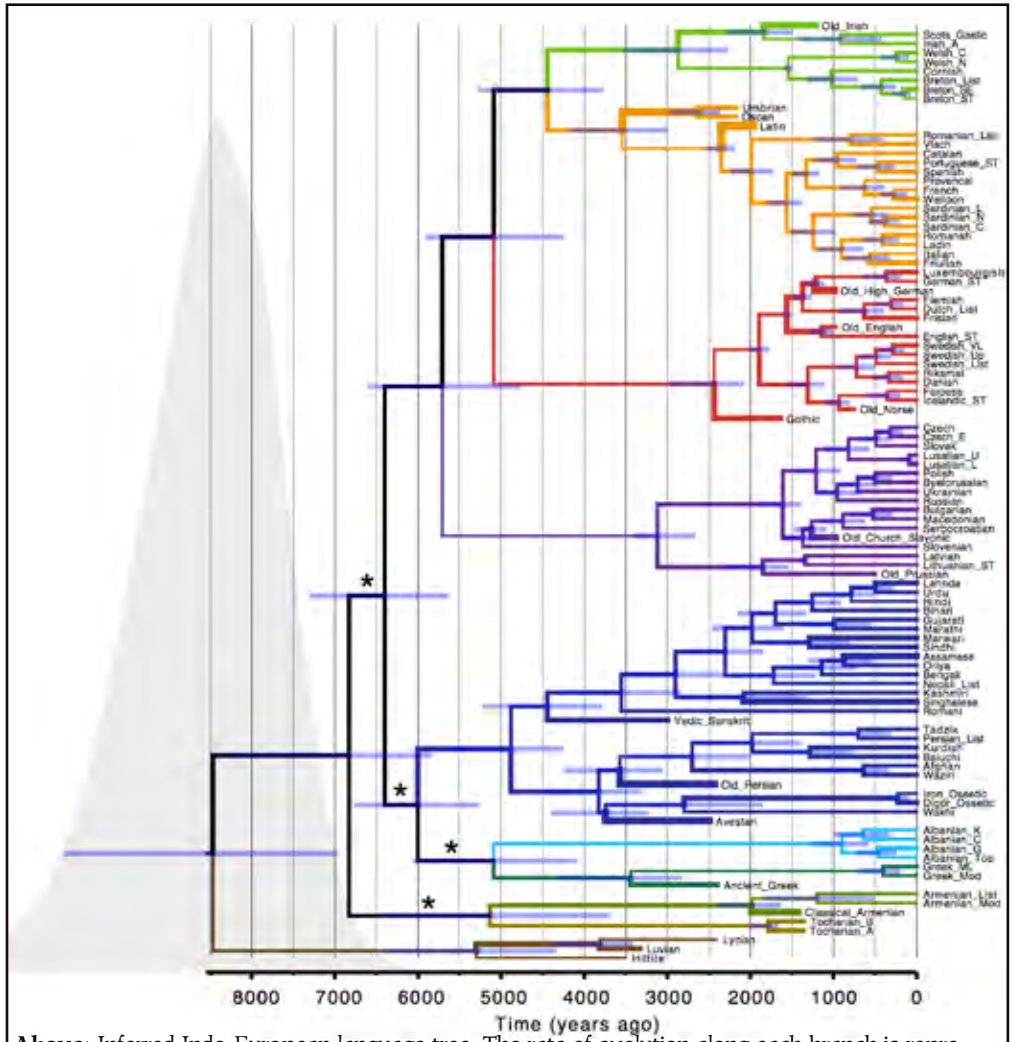
In order to provide a timescale for the expansion of the language family, we need some information about how fast languages change. We do this by constraining the age of known calibration points on the tree. For example, there is good reason to think that the Romance languages had begun to diverge by the time that the Roman Empire began to break up (often tied to the fall of Dacia in 270AD), so we can constrain the age of the sub-family based on that information. One advantage of this approach is that we do not need to assume a specific age for any calibration, but can instead assign a range, the width of which depends on how confident we are in our prior beliefs about age of the group.

It is well known that rates of language change can vary through time, so rather than assuming a strict clock-like rate of cognate gain and loss, we allowed rates to vary along the branches of the tree.

Step 5 – Modeling Language Expansion

We combine our inferences about the language family tree with information about where these languages are spoken (or were spoken in the case of the ancient languages). From the known locations at the 'leaves' of the tree, we can trace back along the branches to estimate the location at the root.

To do this, adaption to a phylogeographic approach initially developed for tracing the origins of virus outbreaks, but rather than tracing viral lineages, we are tracing languages. The method models spatial diffusion of languages as a Brownian 'random walk' in two dimensions (latitude and longitude) along the branches of the tree. Put simply, this means that for a given time interval, the geographic distribution of languages expanding from some point of origin is assumed to be approximated by Brownian motion – some languages will have moved far, some will not have moved at all, but most will have moved somewhere in between. In fact, the assumptions of the model are even less restrictive because we 'relax' the random walk to allow the average rate of movement to vary across the tree – like with variation in rates of cognate replacement, the extent to which rates of expansion varied was estimated from our data.



Above: Inferred Indo-European language tree. The rate of evolution along each branch is represented by the thickness of the branch, where a thicker branch implies faster evolution.

Step 6 – Testing Between the Homeland Hypotheses

The approach we employ means that we can directly test support for a certain homeland hypothesis versus another homeland hypothesis. This is because the method we use does not produce a single answer – e.g. the homeland is at x degrees longitude and y degrees latitude. That would not be all that useful, because if you want to test between competing theories, you need some estimate of uncertainty – how sure are you that the origin is at one location versus another?

There is uncertainty in the relationships between the languages (nobody can say with absolute certainty that one particular family tree is the true one – for 100 languages there are more possible trees than there are atoms in the universe!), there is uncertainty in the time scale (we can't know for sure exactly how fast languages change), and even if we knew the family tree and time scale exactly, there is uncertainty in the geographic expansion process so we cannot pin down the location of the root exactly.

One of the major advantages of the probable approach is that we do not produce a single answer, but instead account for all those uncertainties using some clever algorithms (called Markov Chain Monte Carlos methods) that sample language trees, divergences times and locations at all points on the tree, in proportion to how likely they make our observed data. In terms of the origin location, if an origin is twice as likely, and we do not prefer any location over any other a priori, then we should see it twice as often in our sample.

REALLY ANCIENT TONGUES

It also seems very probable to most anthropologists that since our ancestors first became separated from the Australopithicine species, we have probably had the ability to speak and form many words. We (Homo Sapiens) may not have been the first to speak a legitimate language and we might have seen it spoken first in Homo Erectus and even before then in Africa. We know from the genetic data in Neanderthals that they had the anatomy to speak and carried the FOX2 gene that plays an important role in our species to process spoken language. There are still some languages that don't quite fit neatly in the human language tree and it may be that there were a few small pockets of some other seed languages that were largely erased from our migration and expansion out of Africa.

AFRICAN LANGUAGE BEGINNINGS

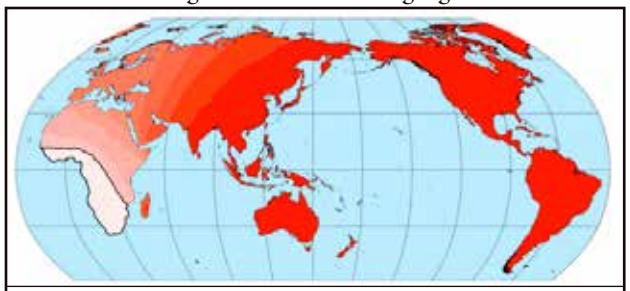
The origin of the human language is a complex question. The oldest language tree known so far is the Indo-European family (English, German, Norrois etc...) which is at least 9000 years old. Words changing so fast, it is very hard to trace them back any farther.

However, Quentin D. Atkinson, a biologist at the University of Auckland in New Zealand, changed the methods and worked on phonemes instead of words. This lead him to find a recurrent signal in some 500 languages. He also found its source in southwestern Africa, based on "pattern of decreasing diversity with distance, similar to the well-established decrease in genetic diversity with distance from Africa".

A language area uses fewer phonemes the farther that early humans had to travel from Africa to reach it. Some of the click-using languages of Africa have more than 100 phonemes, whereas Hawaiian, toward the far end of the human migration route out of Africa, has only 13. English has about 45 phonemes. This study was prompted by a recent finding that the number of phonemes in a language increases with the number of people who speak it. This gave him the idea that phoneme diversity would increase as a population grew, but would fall again when a small group split off and migrated away from the parent group.

This is also based on a well-known biological phenomena : "Each time a smaller group moves away, there is a reduction in its genetic diversity. The reduction in phonemic diversity over increasing distances from Africa, as seen by Dr. Atkinson, parallels the reduction in genetic diversity already recorded by biologists".

While there are language/locational data that refute this supposition, such as borrowing form other local cultures and stationary, well developed cultures building a larger vocabulary over time, the overall trend can be useful in the search for that magic location where language started.



Above: Likely area of language origin under a founder effect model of phonemic diversity, controlling for population size, population density, language area and local language diversity. Whiter areas are a higher number of phonemes to red areas that are lower numbers of phonemes.

Performing mathematical analysis to bring together the number of phonemes a language had and its location on the globe, Atkinson found a linguistic founder effect: The farther from Africa, the fewer phonemes a language had—the less diverse its sounds were. This distance from Africa explained 30% of the variation in number of phonemes a language had, and still explained nearly 20% of the variation when modern population size was taken into account (since smaller populations are also linked to a smaller number of phonemes).

Using the traditional methods of tracking how words evolve, linguists have only been able to trace particular languages back less than 10,000 years, since words change so quickly (and there are no written records going back further). By taking a different approach, Atkinson may have gleaned information about language much further back in time, as much as 100,000 years ago.

The model and analysis show a strong indication that language arose once in the South-Western side of Africa and spread out from there to encompass the world. However, it should be noted that this is a relatively untested idea, although it is based on several proven biological models, but biology and linguistic do not alway go hand in hand.

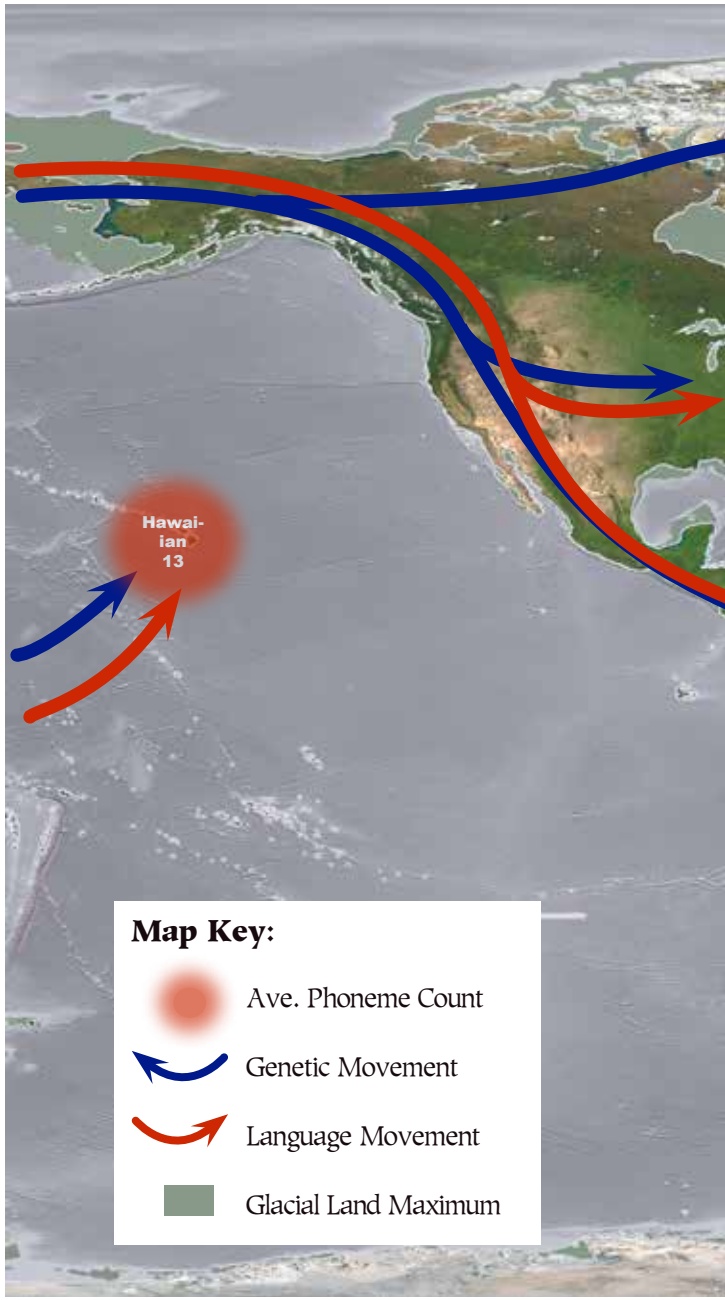
OTHER TRACKING METHODS

On top of looking at the language structures, cognates and phonomes, there is a rich linguistic history in Africa that can be mined for the origin locations. We are just beginning to understand that there is an unwritten history to African cultures that predates the modern stone age and sites like Adam's Calendar and Gobekli Tepe are examples of this. It is certain that more will be found to give us hard proof of a much older exchange of sophisticated cultural ideas and an earlier start to the Agricultural Revolution than has been previous proven in the European Continent.

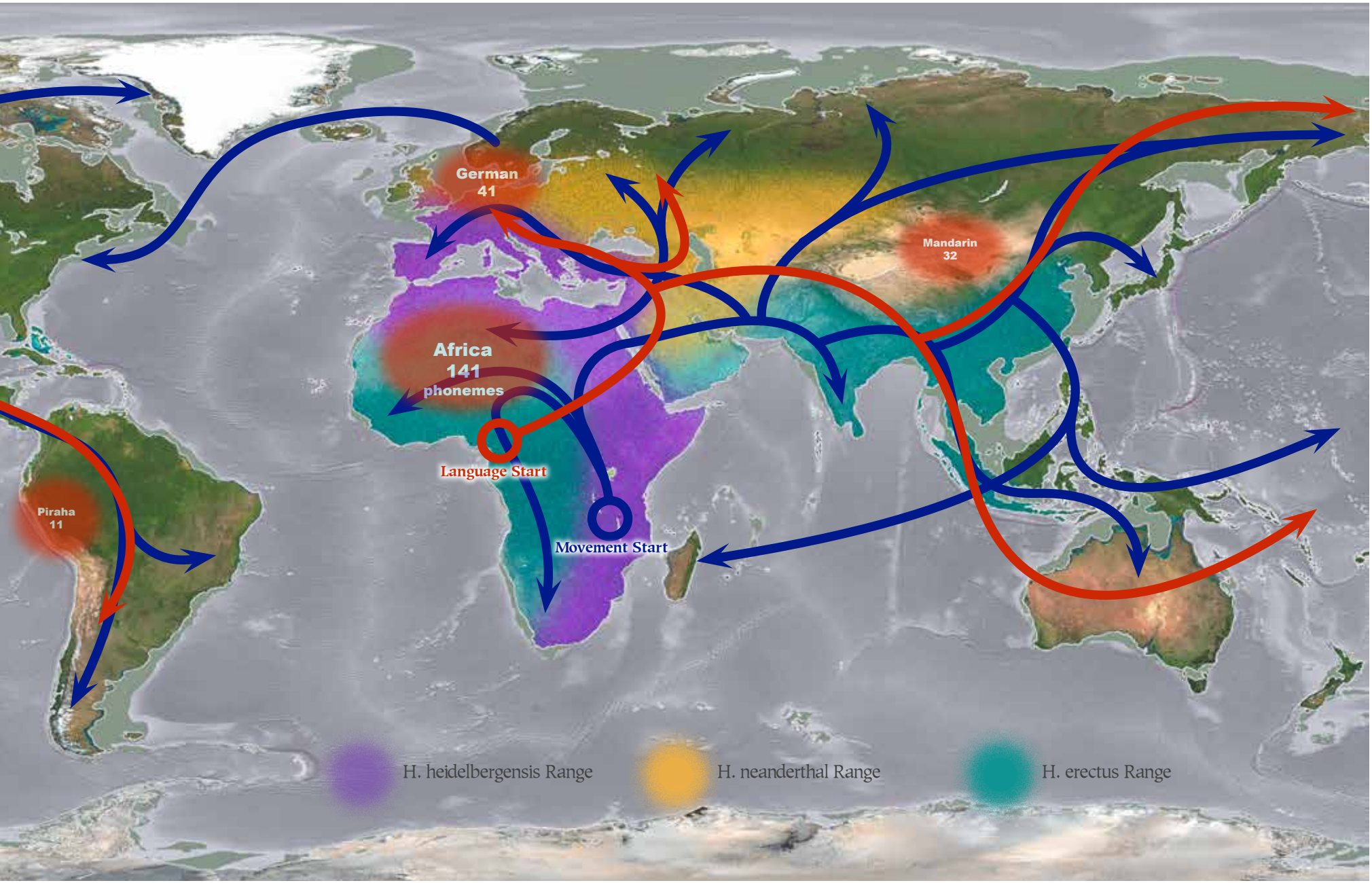
Local Folklore, stories and the knowledge of previous cultures and their stories can provide us with very important clues to origins in languages that are no long spoken are long forgotten. Story evolution can be traced in much the same way as language and many of the African tails are rich in symbolism and themes that can be tracked much as human migration can be traced.

The recorded history of early civilization arose in Sudan (Kurma civilization) originally as a part of the Kingdom of Kush pre-dating its recorded history. Without any written records or archaeological sites, it becomes mere opinion in dating many of the concepts here but it is certain there is vast amounts more to know and discover.

Map of Human Migration Based on Gen



etic Data & Human Language Migration Based on Linguistic Phonemic Data Over the Last 300,000 Years

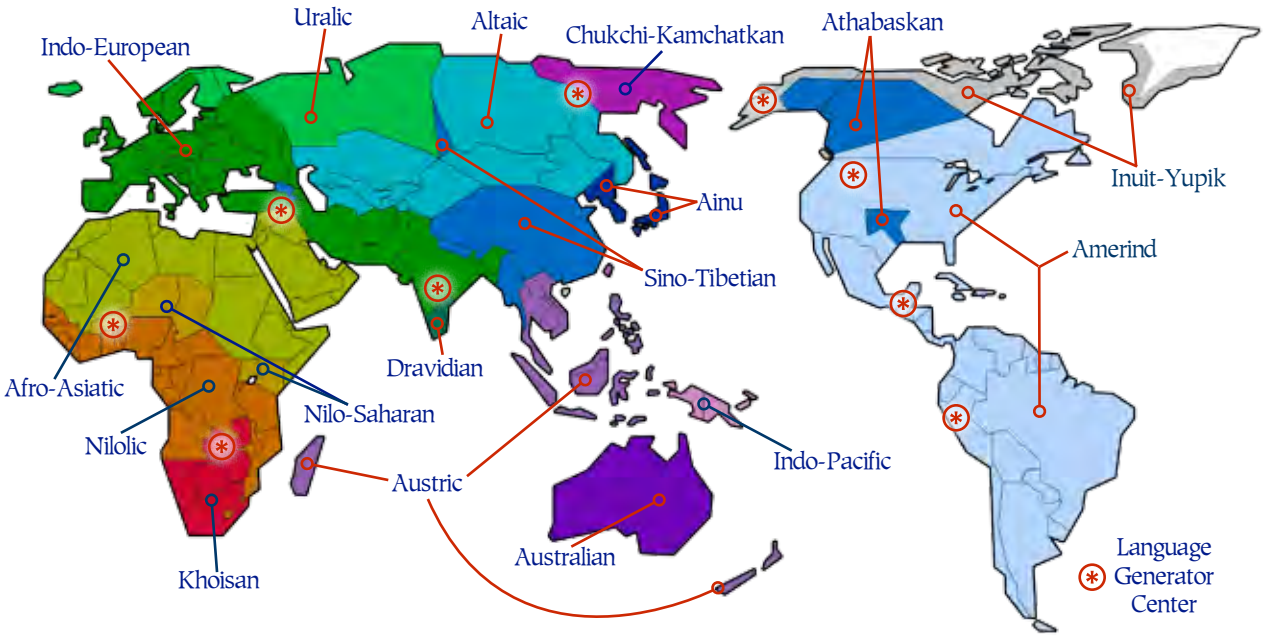


Above: The Generalized trends of Homo sapiens movement (in blue arrows) and the movement of Language families (in red arrows) line up very closely in so many ways and in so many places that its hard to refute that both our genetic & linguistic history share a common path and ancestry in Africa. It also shows that our language development and genetic migrations align as well.

Genealogy from Population Genetics Leading to the Language Families over Time

Another way of looking at Linguistic and Genetic Data together…

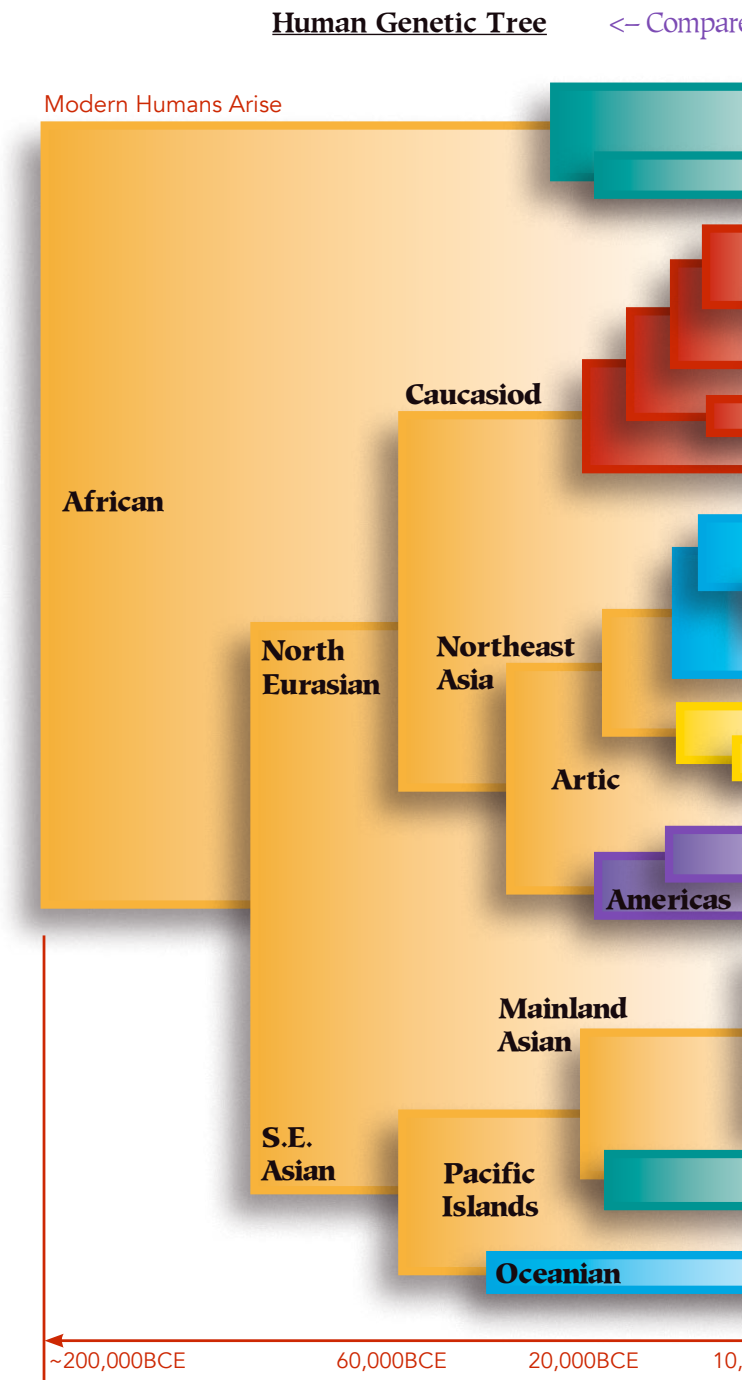
Right: This complex chart is a bit daunting at first, but if you break it down from left to right, it can be digested. On the left side is a representation of the Human Genome. It is broken down by geneticists as people descended from our ancestors in Africa and spread around the world (a family tree of all humanity). It starts with our roots and wide genetic diversity in Africa(~200,000 BCE) and moves (from left to right) to today's population names in the center column. Language evolution moves to the right side of the table to the center world populations today. The language start at 75,000 years ago (based on current understanding) branches from pre-history to modern linguistic data. It is startling to look at the symmetry between the genetic and the language data groups.

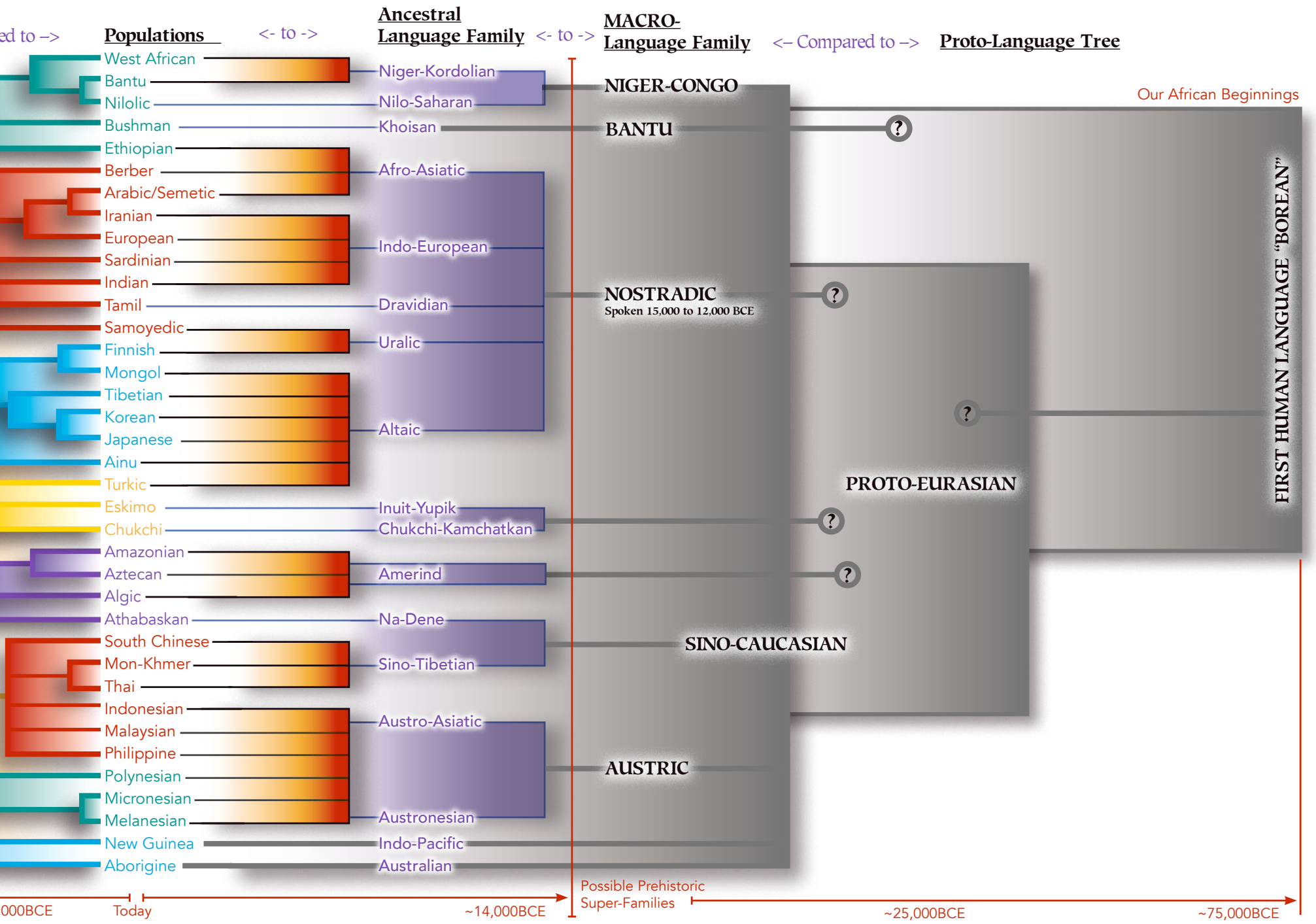


Above: Main ancestral language families Broken down by the location on the world landmass. As seen in this chapter, language seems to have started in the west-central part of Africa and spread to the other parts of Africa and then moved to the Anatolian plane. From there, Language moved into Europe, India and Aisa just as Humans moved and displaced Neanderthals and Homo erectus (Dravidian), interbreeding with them in small percentages as they co-mingled.

This map above is designed to show the major language groups that diversified and evolved into the languages that we speak today. I am certain that the language tree is every bit as complex as our genetic past, and perhaps one day we will have created a more complete picture of it back to our mother language in the west-central portion of Africa.

NOTE: Language Groups are sometimes called different names by researchers making them difficult to identify.

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Ethiopian
Berber
Arabic/Semetic
Iranian
European
Sardinian
Indian
Tamil
Samoyedic
Finnish
Mongol
Tibetian
Korean
Japanese
Ainu
Turkic
Eskimo
Chukchi
Amazonian
Aztecan
Algic
Athabaskan
South Chinese
Mon-Khmer
Thai
Indonesian
Malaysian
Philippine
Polynesian
Micronesian
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New Guinea
Aborigine
Niger-Kordolian
Nilo-Saharan
Khoisan
Afro-Asiatic
Indo-European
Dravidian
Uralic
Altaic
Inuit-Yupik
Chukchi-Kamchatkan
Amerind
Na-Dene
Sino-Tibetian
Austro-Asiatic
Austronesian
Indo-Pacific
Australian
NIGER-CONGO
BANTU
NOSTRADIC
Spoken 15,000 to 12,000 BCE
PROTO-EURASIAN
SINO-CAUCASIAN
AUSTRIC
Our African Beginnings
FIRST HUMAN LANGUAGE "BOREAN"
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Possible Prehistoric Super-Families
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Brain Evolution: Searching for What Makes Us Human

As humans, we do things that no other animal does. We build cities. We write sonnets. We even land rovers on Mars. What is it about the human brain that enables us to do these things? What unique features can account for our cognitive abilities? In many ways, the study of human brain evolution is the search for these features and how they came about.

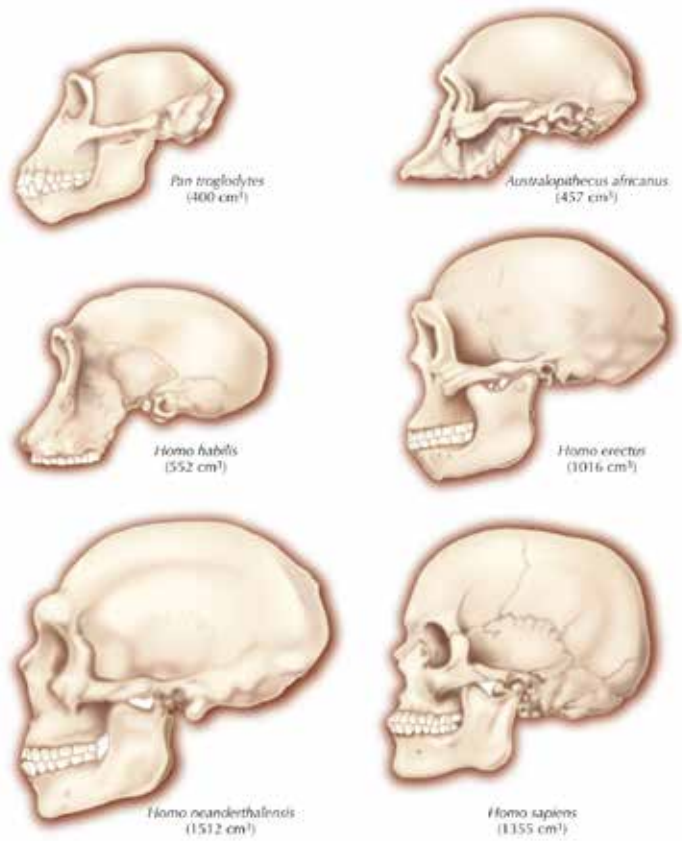
Human brains are three times the size of those of chimpanzees, our closest relative in the animal kingdom. Scientists are now comparing our brains to find out more about this divergence.
Courtesy, with permission: Aida Gómez-Robles and José Manuel De La Cuétara.

BIGGER BRAINS

"Brain size expansion is one of the most extraordinary features of human brain evolution," says Chet Sherwood, an anthropologist at George Washington University who studies primate brain evolution. Modern humans have brains that are three times bigger than those of our closest living relatives, chimpanzees, suggesting that something special occurred in our evolution.

Scientists have learned that a tremendous amount of brain growth took place in the human lineage. By studying the fossilized skulls of human ancestors, scientists have been able to estimate the size of the brains the skulls once housed. The skulls can be filled with a casting material like latex to create a rough model of the brain called an endocast, or, more commonly, scientists use computerized tomography (CT) to scan the skull and create a digital representation of the brain. This work has revealed that, over the last three million years, brain size roughly tripled in the human lineage, from about 450 grams (or about the size of a large orange) in our ancestor Australopithecus afarensis (the same species as the famous Lucy fossil) to between 1,300 and 1,400 grams in modern humans.

All of this happened, Sherwood says, without much of a change in body size. "Brains don't just do that for no reason in evolution. Evolution is frugal and cost-effective, and brain tissue has extraordinary metabolic expense," he says. "There must have been some adaptive value to brain size increase." However, brain size varies among humans. Having a bigger brain doesn't mean that you're better at the aspects of cognition that we consider uniquely human, like language and understanding others' mental states, Sherwood says. "So brain size cannot be the single explanation for what we can do with our neural machinery," he says.



A Series of hominid skulls showing different bran sizes. Notice that Neanderthals had a larger brain than modern humans, but their brain to body size ratio is very close to ours.

CORTICAL EXPANSION

If brains tripled in size, does that mean that all areas of the brain grew three times larger? Or did some areas grow more than others? Endocasts are helpful for determining overall brain size, but they offer little insight about internal brain anatomy and organization. So, to answer these questions, scientists compare the brains of humans to those of other living species, including our closest relatives like chimpanzees (Pan troglodytes). When scientists see that chimp and human brains share a certain trait, they can infer that our common ancestor also had this trait. Any observed differences, however, point to evolutionary changes that occurred after the chimp and human lineages split.

Work in this area has revealed that most of the increase in brain size is due to an expansion of the cerebral cortex — the wrinkled outer layer of the brain that plays a key role in thought, perception, and language — and the underlying nerve fibers. The parts of the cerebral cortex that have grown the most are the association areas. These areas integrate information from other regions and are involved in higher cognitive functions like planning and abstract thinking. On the other hand, areas that are primarily devoted to one function, like the motor cortex or visual cortex, haven't grown as much.

NETWORKING OPPORTUNITY

A bigger cortex means more neurons, and scientists at the Federal University of Rio de Janeiro have counted just how many neurons the human cortex has: 16 billion. They also found that, in primates, the number of neurons increases in direct proportion to brain size, indicating that as brain size tripled over the last three million years, the number of neurons also tripled.

As the brain expanded to reach the size we have now, it never strayed from this proportional relationship. "We never stopped being a primate," says Suzana Herculano-Houzel, who led the study. The human brain doesn't break any of the primate trends, but that doesn't diminish the fact that we a have a huge number

of neurons in the brain and in the cortex in particular, she says. "When you're adding neurons to the cortex, you have the opportunity to create new patterns of connectivity and new functions in the expanded brain areas," she says. This, she adds, is the simplest explanation for the massive increase in cognitive capacity that we have.

ROOM FOR GROWTH

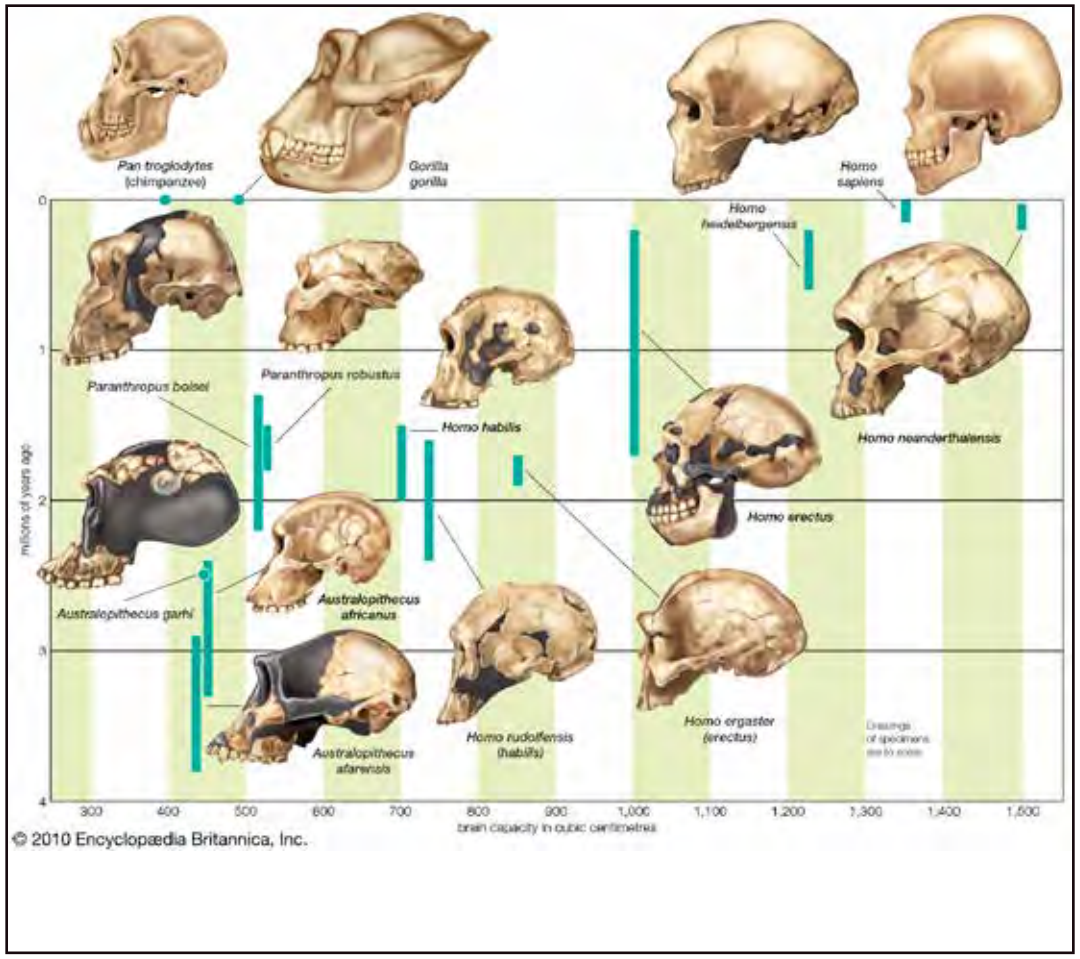
The human brain has a lot of growing to do before it reaches its extraordinary size, Sherwood says, and another key feature of human brain evolution is that a larger fraction of this growth occurs outside of the womb. At birth, the human brain is only 27 percent of its adult size. Compare that to a newborn chimp whose brain is 36 percent of its adult size, or a macaque monkey whose brain is already 70 percent developed at birth. How does the human brain get to be so big?

In 2004, researchers at the University of Illinois sought to answer that question. They charted the patterns of brain growth for humans, chimpanzees, and five other primate species and found that both humans and chimpanzees reached adult brain size around age five or six. But they differed drastically when it came to the rate of brain growth: at birth, the human brain was growing six times as fast as the chimp brain.

Despite declining after birth, the rapid growth rate of the human brain continues for the first year of life. "It's as though our newborns and infants still have fetal brains growing in the outside world," Sherwood says.

A LONGER WINDOW OF DEVELOPMENT

While humans reach adult brain size in childhood, brain development continues for decades. For instance, during development, nerve fibers become covered with myelin, a fatty substance that insulates the fibers and speeds up the transmission of electrical signals. This process is vital for neurons forming connections during development, and Sherwood's research has demonstrated that it occurs more slowly in humans compared to other primates. When comparing human brains to chimpanzee brains, ranging in age from infancy to adulthood, they found that, at birth, the human brain had less than 2 percent of adult levels of myelin, while the chimp brain had 20 percent of adult myelin levels at birth. And the disparity persisted, with chimp brains becoming fully myelinated around puberty and human brains continuing to add myelin until about age 30.



The results suggest that humans evolved a prolonged schedule of brain development. This is important because myelination is guided by stimulation and learning: when neurons are more active, more myelin is added to the fibers between them, which strengthens the connections. Humans have a longer window of time to strengthen these connections, meaning that there are more opportunities for our brains to be shaped by culture, socialization, and environment.

And, compared to other primates, humans are more dependent on culture, interaction, and group identity. Many scientists think that this increased social complexity could be one of the driving forces behind the changes that occurred in human brain evolution. "The idea is that the more that human ancestors were dependent on culture and the processes of social learning, the more that success and fitness required having the kind of brain machinery that could sustain ever more complex culture," Sherwood says.

Studying human brain evolution is a way of understanding these kinds of connections between our biology and what we can do. In short, Sherwood says, it's a way of understanding ourselves.

DON'T BE ALARMED, BUT OUR BRAINS ARE SHRINKING

A study published earlier this year confirmed what scientists have long believed to be the case – the human brain is shrinking. For more than 7 million years the hominid brain has grown increasingly bigger, almost tripling in size. But for the last 10,000 years, the human brain has been shrinking at an alarming rate and no one really knows why. New research has attempted to answer this question by examining size changes in specific regions of the brain.

The study published in the American Journal of Physical Anthropology was carried out by a team of Chinese researchers who looked at over 500 endocasts from the past 7,000 years. Endocasts are molds of brains created from the imprints on the inside of the skull. They are an invaluable resource when studying human evolution, allowing us to track how our brain has evolved over the past few million years. The results confirmed what has long been suspected – our brains are getting smaller.

It was in 2010 when researching a skull that belonged to a Cro-Magnon(Homo-sapiens-archanus) man that scientists first discovered the brain of our ancient ancestor was significantly larger than humans today. This has been replicated time and again and it can now be said that the human brain has decreased from 1,500 cubic centimeters (cc) to 1,350cc, irrespective of gender and race.

Does a smaller brain mean less intelligence?

Scientists have been debating for many years about whether a smaller brain means less intelligence, and no agreement has been reached. To clarify, it is not simply the size of the brain that is relevant here, but the size of the brain in relation to body size, referred to as the Encephalization Quotient (EQ). Research has found a close relationship between intelligence and EQ. Over millions of years, the hominid body has been shrinking but the worrying fact is that our brains are shrinking faster than our bodies. Does this mean human beings are getting dumber, or are smaller brains not necessarily bad?

Many scientists have argued that bigger doesn't always mean better. Duke University anthropologist Brian Hare says "the decrease in brain size is actually an evolutionary advantage" because it could indicate we're evolving into a less aggressive animal. For example, the common chimpanzees have bigger brains than bonobos, but they are less likely to resolve issues through teamwork because they're more aggressive. Other proponents of the 'bigger isn't better' hypothesis have argued that our ancestors had a larger visual cortex because good vision was necessary for survival. But as social support increased, vision became less important. Those with smaller visual cortexes had more resources available for social regions of the brain, thus increasing chances of survival.

Population density did track closely with brain size; when population numbers were low, as they were for most of our evolution, the cranium kept getting bigger. As population density climbed, cranial size declined with a sharp 3 to 4 percent drop in EQ starting about 15,000 years ago. This trend occurred everywhere...Europe, China, Africa, Malaysia, etc. As complex societies developed, the brain became smaller because people did not have to be as "smart" to stay alive.

However, the findings of the new study conducted in China are not consistent with these theories because the results indicated that it was not one particular area of the brain that was shrinking – the whole brain has been getting smaller. If the hypothesis about the visual cortex was correct, we should see shrinkage only in that region of the brain.

The one exception is the frontal lobe, which actually seems to be increasing in size. The frontal lobe is the region of the brain responsible for speaking, comprehending the speech of others, reading and writing. It is possible that we are doing a lot more of that now – at least the reading and writing part – compared to our ancient past.

While plenty of hypotheses have been put forward to justify the shrinking of the human brain, there remain many who are less optimistic. The authors of a study published in 2012 maintained that humans lost the evolutionary pressure to be smart once they formed agricultural settlements. This seems to have historical merit as brain size started to decrease at this time. One should not underestimate how the changing food diet could have contributed to this as more sugars were consumed and less meat and organ fat was eaten in human settlements as well. While the agricultural revolution launched our ability to survive in larger and larger population centers, the decrease in high-quality, fresh meats and fats are a contributing factor in the bodies ability to grow properly, especially to develop large brain size. With the advent of agriculture, we initially had poorer nutrition, as the first farmers were not very successful so there was a deficiency in protein and vitamins—critical for growth of body and brain. However, the agricultural revolution did not arrive in Australia or southern Africa until much later, but brain size declined in those places, too. Another important factor, but not the only one.

"A hunter-gatherer who did not correctly conceive a solution to providing food or shelter probably died, along with his/her progeny, whereas a modern Wall Street executive that made a similar conceptual mistake, and only focused on his job, might receive a substantial bonus and be a more attractive mate. Clearly, extreme selection is a thing of the past," the researchers wrote in the journal article published in the journal Trends in Genetics.

More than 4,000 years ago, great civilizations existed around the world and the ancient inhabitants built incredible buildings and cities with great precision and beauty, often with astronomical alignments that we are only just beginning to realize. Nowadays, technology has taken over, rendering our need to apply skill, creativity, and memory virtually redundant. Instead of memorizing navigational routes we switch on our GPS maps, and rather than storing phone numbers and addresses in our memory banks, we have them on our smart-phones. All we have to do is say a name.

Our technology is evolving rapidly, but sadly it seems that we are not able to biologically keep pace with the breakthroughs that make our lives easier. In fact, according to evolutionary logic, it seems natural that our brain and biology might shrink and atrophy as there is no selective pressure on our survival in the extremes of environments that we had to live within. Nature is always efficient and concise with her resources, and when its not, it usually ends badly for the top predators.

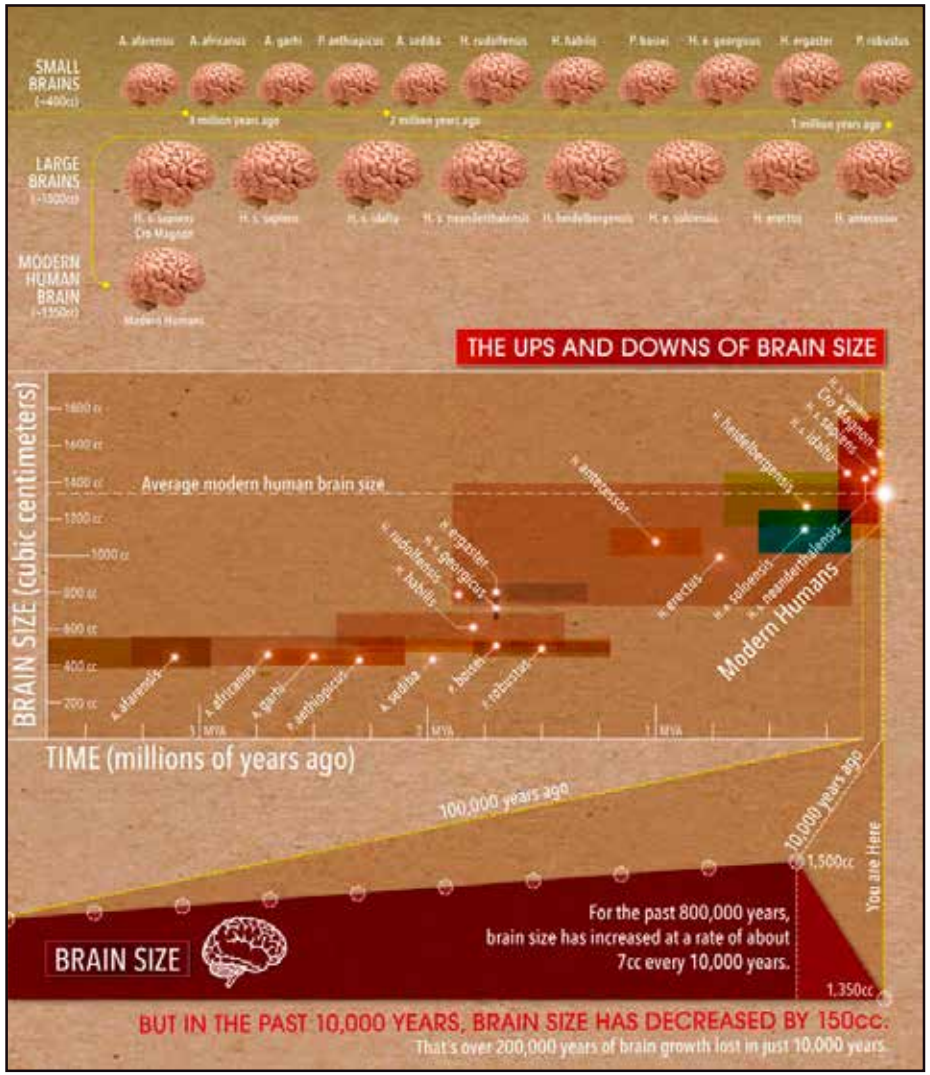
Chris Stringer, a paleoanthropologist at the

Natural History Museum in London evaluates this shrinkage by looking at the ratio of brain volume to body mass, the encephalization quotient, or EQ. The EQ was the same for Cro-Magnons, the Homo sapiens with the biggest brains, who lived 20,000 to 30,000 years ago in Europe, who had barrel chests and huge, jutting jaws with enormous teeth.

"As a general rule," Stringer says, "the more meat on your bones, the more brain you need to control massive muscle blocks." An elephant's brain can weigh four times as much as a human's. However, EQ is not enough, as recent studies show that the brain shrank faster than the body in near-modern times.

Some scientists point to warming in the earth's climate that also began 20,000 years ago. Since bulky bodies are better at conserving heat, larger frames fared better in the earlier, colder climate. As the planet warmed, selection would favor "slighter" people, and the brain got smaller.

While this may be a factor, comparable warming periods occurred many times over the previous 2 million years, yet body and brain size still increased, so it's not the only factor.



Aggression Selection

Other researchers believe selection against aggression is another important factor, i.e., we evolutionarily domesticated ourselves. The leading proponent of this view is Richard Wrangham, a primatologist at Harvard.

As Wrangham points out, some 30 animals have been domesticated, and in the process all lost brain volume—typically 10 to 15 percent, and the builds become more slender. Natural selection reduces aggressiveness by favoring those who have "a more juvenile brain, which tends to be less aggressive than that of an adult".

This was demonstrated in the famous "domesticated silver fox" experiments of Dmitri Belyaev. Breeding only foxes that were the slowest to snarl when a human approached their cage, after 15 generations they were like domesticated dogs...smaller skeletons, floppy ears, and lower levels of aggression.

Perhaps our increasingly hierarchical socialized structures evolutionarily sorted for "domestication" through laws, social pressures, different tasks, hierarchical promotions, different mates, etc. As Wrangham says, "The story written in our bones is that we look more and more peaceful over the last 50,000 years."

Our domestication has also transformed our cognitive style. Graduate student Brian Hare, now at Duke University, compares domestic animals with their wild relatives. He found that "...wild types and domesticates think differently."

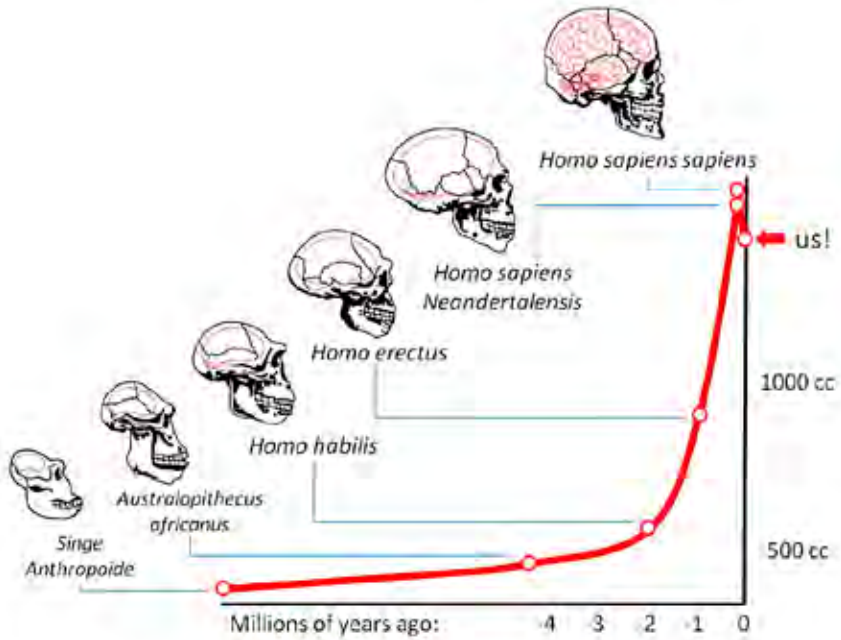
In comparing the cognitive abilities of wolves and dogs, Hare found that wolves, with larger brains, have more flashes of insight, and solve problems on their own. Dogs, with smaller brains, get humans to help them. "Wolves persevere when dogs readily give up." However, dogs leave wolves in the dust when it comes to tracking the gaze and gestures of their masters. As Hare puts it, "They are very good at using humans as tools to solve problems for them."

Hare is now studying other primates, notably bonobos. "Bonobos look and behave like juvenile chimps," he continues. "They are gracile. They never show lethal aggression and do not kill each other. They also have brains that are 20 percent smaller than those of chimps." Hare thinks bonobos became domesticated by occupying an ecological niche that favored selection for less aggressive tendencies. That niche offered more abundant sources of nutrition, so fighting over meals became less important to survival. From that lineage came these highly cooperative primates known for their peaceful ways.

Conclusions

The Cro-Magnons were likely "smarter" in terms of raw innate abilities. Geary believes they were as "bright as today's brightest" and might even have surpassed us. However, he adds "our ancestors were not our intellectual or creative equals because they lacked the (social network) cultural support...our very brightest people can focus their efforts in the sciences, the arts, and other fields... Our ancient ancestors took all their efforts just to get through life."

However, perhaps human brain size is rising again. Anthropologist Richard Jantz of the University of Tennessee measured the craniums of Americans of



Our Ancestral Brain Development Growth Chart

European and African descent from colonial times up to the late 20th century and found that brain volume was again moving upward.

As this happened so rapidly, the explanation is "mostly nutrition." Jantz thinks the trend has "an evolutionary component because the forces of natural selection changed so radically in the last 200 years." With the unprecedented abundance of food in recent times, selective forces have relaxed, reducing the evolutionary cost of a large brain.

A recent study carried out by Chinese researchers looked at 500 endocasts from the past 7,000 years. They also confirmed that our brains are getting smaller. However, they found that while the whole brain has been getting smaller, the frontal lobe, the region of the brain responsible for speaking, comprehending others' speech, reading and writing is actually increasing in size as we do more of that now compared to our ancient past.

Interestingly, across the world the average IQ has increased over the last 100 years, a phenomenon known as the Flynn Effect. Most of that jump probably resulted from better prenatal care, better nutrition and reduced exposure to brain-stunting chemicals such as lead. Also, the access to education has generally increased for us and we know that IQ tests favor those who have been well educated, over those of equal intelligence who have had poor education. Another are of Intelligence in modern countries is access to the amount of information that can be accessed easily from anywhere, and this can lead to an increase in IQ as well.

"Natural selection is different from artificial selection in that it acts on every trait at once," Stringer says. "It's perfectly plausible our modern brain is smarter in some ways, dumber in others, and more docile overall."

SO NOW WHAT?

This is supposed to be a book about mankind and how religion and culture have driven us to become the most successful story on the planet so far. What does all this back story have to do with religion and the names of the gods? It has to do with perspective...you can't know where your going unless you know where you started from. It is literally that simple. As I spent time design and putting this book together, researching all the cultures and histories of the world, it became imperative to me that I had to have a chapter on our evolution as a species, how we know (with reasonable certainty) where we came from and how we spread over the globe. It became very hard to talk about the next chapter: Man's Earliest Religion, without talking about what came before that. And, as we have read, genetically, we are very close to understanding most of our story, and linguistically, the data is largely backed up. I still have many points of confusion on how much Neanderthals, Home erectus and others of our species played a role in our development as the species we are today, and science is still discovering this, but the story is pretty complete.

I believe, in my heart, that Homo erectus and our later cousins spoke and taught each other. I believe that we learned some religious concepts from our cousins who were living in the placed we moved into after them, and I think that there were many instances of hybridization between our ancestors that eventually led to our current species. I doubt that we will ever know with certainty about the foundations of our language, exactly where it originated and why, but there is still so much work to do and so much to learn in Africa. Sites like Gobekli Tepe show us this. I am very sure that there are other, amazing discoveries still to come that will challenge our concepts of our past.

In the next chapters you will learn how the great goddess Kore in her many forms was worshiped and how she was a profound symbol of our relationship to the earth and our survival. She came out of Africa, but the story of her past has been lost, largely because of the modern inventions of war and iron and the ability of one sex to dominate another.

In this chapter we have explored how we evolved, when we evolved and where we spread across the globe. Now we have perspective to look at the time frames of the cultures over the next chapters to see how our ideas of religion changed and how it impacted our culture, our relationships to each other, to the earth and ultimately to the universe we live in.