

7 DNA AND EVOLUTION

Monkey's Uncle

Nature Alert, 28 June 2006

According to an article titled, "Genetic Evidence for Complex Speciation of Humans and Chimpanzees," by Nick Patterson et al., humans and chimpanzees may have once interbred.

The evolutionary split between humans and chimpanzees is much more recent than was thought, according to a new comparison of the complete genome sequences of the two species. The data show that the split occurred no more than 6.3 million years ago, probably less than 5.4 million years ago.

The speciation process appears to have been rather unusual possibly involving an initial split followed by later hybridization before a final once-and-for-all separation.

June 30, 2006

A'Changing Times

Check Out Heredity's Free Podcast Series

Each month Elli Leadbeater and Steve Le Comber present a free audio show. The podcast features interviews with the people behind the science and a digest of breaking news from *Heredity* editor Richard Nichols at Queen Mary University of London.

Featured in January's episode is H.-J. Bandelt of the University of Hamburg, a leading statistician in the area of population genetics. His

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commentary on mutation rates, "Clock Debate: When Times are A-Changin': Time Dependency of Molecular Rate Estimates, Tempest in a Teacup," appeared in *Heredity*, vol. 100, in February 2008.

According to Bandelt, many current studies on the molecular clock use outmoded data and confused models to arrive at their conclusions regarding human evolution and ancient migrations. Experts do not always distinguish between hot spots in DNA sequences and an average rate of mutation. They may base their suppositions about changes in coding regions (genes) on variation in non-coding regions such as the control loop in mitochondrial DNA. For these reasons, many of our theories about time to coalescence of genetic types may be essentially flawed. Bandelt mentions the model of Amerind migration as an example.

You can subscribe to the service and receive the latest episode in your email or browse the archives.

January 8, 2008

Not in the Genes

A major new multidisciplinary study in the October issue of *Genetics* concludes that human variation and evolution were sped up by learned behavior and culture, and that molecular variation and gene expression—long thought to be the primary driving forces—work in tandem with environment to shape human beings.

The article is titled "Explaining Human Uniqueness: Genome Interactions with Environment, Behaviour and Culture" and is contributed by Ajit Varki, Daniel H. Geschwind and Evan E. Eichler, all at the Center for Academic Research and Training in Anthropogeny (CARTA).

"Rejecting any 'genes versus environment' dichotomy," they write, "we consider genome interactions with environment, behaviour and culture, finally speculating that aspects of human uniqueness arose because of a primate evolutionary trend towards increasing and irreversible dependence on learned behaviours and culture—perhaps relaxing allowable thresholds for large-scale genomic diversity."

The new approach in evolutionary theory overcomes an oft-voiced

criticism that the rate of spontaneous, random mutation is too slow to accommodate the changes in species, especially quantum leaps.

"Anthropogeny" is a newly dubbed field that seeks to explain the origin of humans.

October 2, 2008

Scary Findings

In a report published in the October 30 number of *Science*, Chinese paleoanthropologists claimed that the jawbone and teeth unearthed by them recently in the southern province of Guangxi represent a form of man 100,000 years old. Their interpretation of the fossil challenges the Western theory that claims our ancestors peopled the world in a migration out of Africa late in the last Ice Age, about 50,000 years ago. But there is more. American and European scientists stand to lose even more face if China's insistence is true that this early human is a hybrid with *H. erectus*, a more primitive species also known as Peking Man.

Discoverer Jin Changzhu pointed out that the jawbone curved outward, whereas that of the older species of *H. erectus* had an inward-sloping chin, and modern human chins generally jut out farther than the Guangxi specimen's. Such an intermediate chin, he said, suggested interbreeding with *H. erectus*.

In the West, paleoanthropologists and geneticists for the most part vehemently deny that any interbreeding between species of man could have taken place before our type emerged as the sole and supreme species favored by evolution. Neanderthals, they claim, were replaced by modern humans in Europe and died out without a trace in the genetic record about 30,000-40,000 years ago.

"The initial publication makes shaky claims based on preconceptions," scoffed Tim White, a paleoanthropologist at the University of California, Berkeley.

The title of the report is "Signs of Early *Homo sapiens* in China?" It was written by Richard Stone and published on page 655 of vol. 326, no. 5953, of *Science*.

The confrontation reminds many of the battle over Peking Man dated to about 500,000 years old. At first, the Chinese maintained that East Asian people were descendants of Peking Man (and not of Africans or

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out-of-African humans). Later, they modified their view and held that modern Asians represent a hybridization with Peking Man. Possibly all the "races" or continent-specific forms of modern man are the result of anatomically modern humans interbreeding with more primitive hominids in their part of the world.

We wonder why Western scientists are in such a huff about the conclusions of Chinese paleontologists since there is solid proof of admixture between modern humans and archaic human groups like Neanderthals, *Homo erectus* and *Homo floresiensis* (the fossils of "hobbits" discovered in Indonesia in 2004). One instance among many of publications demonstrating this possibility is: Jeffrey D Wall, "Detecting Ancient Admixture and Estimating Demographic Parameters in Multiple Human Populations," *Molecular Biology and Evolution*, vol. 26, no. 8 (August 2009), pp. 1823-27.

Perhaps the right hand of genetics doesn't know what the left hand of anthropology is doing.

October 30, 2009

We Are All Part Neanderthal

The bombshell arrived with the May 7, 2010, issue of the journal *Science*. Titled "A Draft Sequence of the Neandertal Genome," it presented the years-long attempt of an international team of scientists to derive DNA from ancient female Neanderthal bones and determine if there was any genetic overlap with humans. The news was so sensational that the journal made the original scientific report and all collateral materials free to everyone, along with a podcast, multimedia presentation "The Neandertal Genome" and slew of links and forums for comments.

The original press release from the Max Planck Institute for Evolutionary Anthropology in Leipzig was embargoed for May 6, 2010, 8 p.m.

Discovered in a quarry in Germany in 1856, 40,000-year-old Neanderthal man became the first recognized early human fossil. The debate immediately began whether Neanderthals were a separate species or sub-species of *Homo sapiens*. German language orthographic reforms rendered the spelling of the name Neandertal in the 20th century,

although most people even today prefer to stick with the *th* of the original word. Neanderthals are named after the Neander Valley (German *thal* or *tal*) in which they first came to light.

More and more of them turned up over the years: in Belgium (1886), a nearly complete skeleton in southern France (1908), Israel (then-Palestine, 1930) and Iraq (1953). The first ambitious genetic work was a partial sequencing of their mitochondrial DNA based on highly degraded specimens: Krings et al., *Cell* 90, 19 (1997). A second mtDNA sequence was achieved in 2000. The complete mtDNA sequence came in 2008: Green et al., *Cell* 134, 416 (2008).

In the meantime, Neanderthals were found to have red hair and fair skin, body paint, customs, societies, rituals and art. They used fire, tools and weapons. They hunted bison, horses and other large animals and made bread of acorn meal. With their short arms and weak shoulder sockets, however, they probably could not throw spears. Before they were conquered by their smaller human cousins, they had colonized an area extending from Spain to Western Siberia and the Middle East. They were acclimated to northern Europe's icy temperatures and flourished especially before and during the last Ice Age. Then, suddenly, about 30,000 years ago, the fossil record goes silent. Their last holdout appears to have been in Spain.

Our picture of Neanderthals is likely to change radically now that we know they were among ancestors of ours, not a dead-end, primitive race. Some writers had already speculated, in fact, that Neanderthals were more advanced in many ways than their rivals, Cro-Magnon Man. Certainly, their religion was highly adumbrated. Some carried Venus figures on necklaces. According to the author of *The Neanderthal's Necklace*, Juan Luis Arsuaga (co-director of the World Heritage Site Sierra de Atapuerca in Spain), at one burial in Russia, a 60-year-old adult had 3,000 beads of drilled mammoth ivory sewn onto his clothes. A boy in the same burial wore a belt decorated with 250 arctic fox canines. There were also shells, armbands, head ornaments, bracelets, pendants, assegais, ceremonial staffs and other artifacts made of bone, antler, ivory and stone (p. 294).

The blockbuster draft of the Neanderthal genome just published noted genes linked to cognitive abilities, geo-spatial skills, language and motor coordination as well as strength, reproductive advantages and (what we

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knew already) cold adaptation. Much attention is likely to focus on the Neanderthal's signature occipital bun, noticed in isolated or vestigial populations like the Berbers, Saami, Canary Islands, Native Americans, Australian Aborigines and Melungeons. These populations probably preserved greater proportions of Neanderthal admixture than others.

Because the genetic legacy of Neanderthals (so far) has not been detected in the mitochondrial record, it is believed that gene flow came from males mating with human females. No male Neanderthal lines survive—not surprisingly. Only autosomal DNA reveals the Neanderthal contribution to human populations.

May 12, 2010

Neanderthals Had Language

Michael Balter, "Neandertal Jewelry Shows Their Symbolic Smarts," *Science*, vol. 327, no. 5963 (15 January 2010) 255-256
doi: 10.1126/science.327.5963.255

A handful of marine mollusk shells, possibly used as necklaces and paint cups, shows that Neanderthals expressed themselves symbolically, say the authors of a paper published online this week in the *Proceedings of the National Academy of Sciences*. They argue that the findings suggest that social and demographic factors, rather than cognitive differences, best explain why so-called modern behavior was relatively rare among Neanderthals.

January 14, 2010

100,000-Year-Old Neanderthal Artifacts Found in Britain

Ancient flint meat-cutting tools found in sediment along a highway in Dartford, Kent, prove Neanderthals were present in Britain before the beginning of the last ice age (and possibly before the previous two or three cold periods or interglacials), when the British Isles were joined to mainland Europe due to low sea levels. The find pushes back the earliest known evidence for Neanderthals in England by 40,000 years, according to a June 1 report in the *Daily Mail* headlined "Neanderthal Man Was

Alive in Britain at Start of Ice Age.

Previous notions postulated "pre-Neanderthals" (perhaps *H. heidelbergensis*) sparsely occupying Britain in the Pleistocene Period but vacating it when the climate became prohibitively cold about 200,000 years ago. It was thought that true Neanderthals did not reach Britain until about 60,000 years ago, not far in advance of their cousins, *H. sapiens sapiens*.

Neanderthals were known to be in northern France and Belgium about the same time. Their range must now be extended to Britain, and that country's prehistory recast. As in the rest of Europe, it appears Neanderthals were living in Britain hundreds of thousands of years ago since a date like the Dartford find is only a *terminus ante quem*. If Neanderthals were living 100,000 years ago off the present-day junction of the M25 and A2, they probably had not just arrived. Similarly, they probably did not die off or move out of Britain in the next generation. It was not an excursion or isolated incident. The chances are unlikely that the first, and so far only, evidence of Neanderthals in Britain would be from the exact beginning or precise end of their population's stay.

Current thinking about interglacials is changing, well, like the weather, but there have undoubtedly been many eons-long stretches of time during which Britain was temperate and hospitable to humans. Since the Middle Pleistocene about 600,000 years ago, significant advances of continental ice sheets in Europe have occurred at intervals of approximately 40,000 to 100,000 years. These long glacial periods were separated by more temperate and shorter interglacials. The age of Neanderthal humans is conventionally set at 400,000 years before present but may be revised backward as we learn more and encounter more fossil evidence.

June 30, 2010

Are Neanderthals Out of the Doghouse?

We predicted as much: Anthropologists are beginning to have a more positive attitude toward the role of Neanderthals in human prehistory. According to an article in today's *Washington Post*, "Scientists are broadly rethinking the nature, skills and demise of the Neanderthals of Europe and Asia, steadily finding more ways that they were substantially like us and different from the limited, unchanging and ultimately doomed

inferiors most commonly described in the past."

The article by Marc Kaufman is titled "Anthropologists Adopt a More Favorable View of Neanderthals," and appeared in the October 4, 2010, edition of the newspaper.

Earlier research this year noted that Europeans have, on average, 1 percent to 4 percent Neanderthal genes. That began the wheels of scientific thinking rolling.

"Our picture of Neanderthals is likely to change radically now that we know they were among ancestors of ours, not a dead-end, primitive race," we wrote in the blog post "Most Humans Part Neanderthal" on May 12. DNA Consultants introduced its Neanderthal Index in June.

An important paper that is helping restore Neanderthals' position in prehistory is "A Niche Construction Perspective on the Middle-Upper Paleolithic Transition in Italy," by Julien Riel-Salvatore (*Journal of Archaeological Method and Theory*). Riel-Salvatore also has a blog on prehistoric toolmaking and related subjects. Among his perceptions is that Neanderthal DNA was probably strong at first but got watered down in the course of time. That is confirmation for our targeting archaic populations to measure your Neanderthal Index.

October 5, 2010

Cave of the Mare's Nest

Jewelry from the Grotte du Renne "reindeer cave" at Arcy-sur-Cure in Central France has long been assigned to Neanderthals, helping rehabilitate them in the picture paleontologists paint of early mankind. But these artifacts have now been questioned thanks to a redating of the lowest levels of the cave, where Neanderthals were presumed active, according to the journal *Science* (vol. 330, no. 6003, p. 439) in October 2010.

In the new study, a team led by dating expert Thomas Higham of the University at Oxford in the United Kingdom reports 31 new radiocarbon dates from the Grotte du Renne using novel methods designed to avoid contamination. The dates, obtained on materials such as bone tools and ornaments made of animal teeth, paint a disturbing picture: While upper layers attributed to modern humans clock in at no older than 35,000 years, artifacts from the Châtelperronian levels range from 21,000 years

old, when Neanderthals were long extinct, to 49,000 years old, before the Châtelperronian began. About one-third of the dates were outside the expected range.

What we don't understand is the dichotomy between "modern humans" and Neanderthals to begin with. If the dating was mixed (contaminated) how can paleontologists be sure, since "modern humans" and Neanderthals were mixed themselves according to all proven genetic analyses. These retests seem to be splitting hairs to prove or disprove pet theories that no longer apply.

It is particularly nonsensical to maintain, as the archeologist Randall White of New York University has said, "This key site should be disqualified from the debate over (Neanderthal) symbolism." The debate over Neanderthals' symbolic intellectual and communicative capacities has already been settled to 99 percent of the scientific world's satisfaction. It is a non-issue. Paintings, jewelry and art from over 32 Neanderthal grave sites and camps settled it several years ago, and since the Neanderthal genome was sequenced in draft form earlier this year, it has been demonstrated that they had the same or similar intellectual genes as "modern humans." In fact, their brains were bigger, so if anything they had a greater capacity to conceptualize the world.

We wish archeologists and science writers would work on their own symbolic thinking a bit and let the bones of tired myths and ethnocentric fallacies rest in peace. And please spell the word wrongly right. It's N-e-a-n-d-e-r-t-h-a-l. Neandertal is purist and is not going to become popular. Trust us.

Next thing you know they're going to be talking about Visigots and Ostrogots.

October 21, 2010

Is Evolution Accelerating?

What Happens When 'Pressure of Natural Selection' Ceases?

Maybe I do not understand "classic Darwinism," but I am puzzled by the claims of numerous articles in leading scientific journals that evolutionary change in human beings is "accelerating." Since when?

One such article was published several years ago by the National

Academy of Sciences, "Recent Acceleration of Human Adaptive Evolution." It claims an acceleration in evolution in the last 1,000 years, on an inferred and theoretical, not observed basis, needless to say. Its projections are based on the 4 million SNP database called HapMap, a collection of mostly European and American gene irregularities. Several books and a slew of articles in journals like *Nature* and *Science* have jumped on the scientific bandwagon. But we have a few embarrassing questions.

If the "classic" model of Darwinism was based on primitive man, New Guinea orchids and Galapagos turtles, wouldn't we need to redefine what selection and survival of the fittest and its other tenets really mean for, say, a Harvard or Stanford white male Ph.D. who sits in front of his computer most of the time or the current population of the United States, few of whom qualify as hunter-gatherers or tribal or starved or threatened by predators?

Isn't there rather a disconnect today between surviving and your genetic composition? Pretty much anyone can marry and have children with pretty much anyone they want to, and few people are dying off without issue from bad genes or fatal decisions.

If genes are supposed to mutate and produce more "fit" and eligible marriage partners because of "pressure" from the environment like drought or low-protein diets or too much or too little sunshine, how does evolution operate on a level playing field where the environment is a shopping mall or suburbia?

World population has increased from 200 million in the year 1 to nearly 7 billion. Perhaps the presumed rise in SNPs is an effect of population growth? Evolution was supposed to operate on the basis of selection, not indiscriminate proliferation.

Evolution, it is claimed, has now sublimated beyond the physical realm. It is internal, or mental, or spiritual, or cultural, or social, or political, or even (God help us) scientific. This was the super-clever dodge favored by Teilhard du Chardin, a Catholic missionary to China who wrote *The Phenomenon of Man*. He called it the noosphere. Whatever else, this latest Big Science Fair project requires a new definition. There are no measures possible beyond our present lifetime. We have no way of judging a Neanderthal's consciousness.

I'm sorry but I just don't get it. I wish someone would please explain it

to me so I do not need to feel guilty about not reading all those pat-me-on-the-back and pip-pip-don't-you-know-old-man Victorian recidivist articles that I find, somehow, very self-serving.

I am an avid follower of the Darwin Awards, but the only thing I can see accelerating are modern American and European scientists' delusions of grandeur.

December 14, 2010

Neanderthals and Other Friends

Interbreeding with Neanderthals and Denisovans Conferred Immunity to Diseases, Aided Spread of Humans in Asia, Europe

According to a professor of immunology and microbiology at Stanford University, humans were able to survive, spread and expand their populations once they left Africa because of immunities to disease they acquired from Neanderthals and Denisovans, who had lived in Europe and Asia already for hundreds of thousands of years.

A review of the new research appears in the online science magazine *Discover* under the date of June 20, 2011. The professor's name is Peter Parham.

Crux of the Matter, according to Royal Society Report

- Parham began by taking a close look at a family of genes called human leukocyte antigens (HLAs), which play a central role in our body's immune responses. We are able to react to a wide array of diseases because our HLA genes are highly variable, each containing dozens of alleles (forms of genes).
- Our ancestors in Africa, however, would have had a small number of HLA alleles because they likely traveled in small bands and had little contact with other groups. Moreover, their HLAs would have only protected them against African diseases.
- When Parham compared the HLAs of modern humans with those of Neanderthals and Denisovans, he noticed some overlaps. In particular, he found that HLA-C*0702, an allele common in Europeans and Asians but nonexistent in Africans, was also present in the Neanderthal genome. Similarly, HLA-A*11,

which is found in modern Asians but not in Africans, popped up in Denisovan DNA.

- Overall, about 50 percent of HLA Class I alleles in Europeans seemed to come from Neanderthals, 70 percent to 80 percent in East Asians from Denisovans, and 90 percent to 95 percent in Papuans from Denisovans, Parham said at a recent *Royal Society* meeting.

The latest revelation about the true nature of Neanderthals shows how fast current scientific and popular thinking is moving on the subject. Two years ago, it was still debated whether "humans" could interbreed with Neanderthals, or whether Neanderthals were even a human species. Denisovans were only discovered in the last year.

July 1, 2011

Victorian Caveman

Did you know that Charles Darwin's *On the Origin of Species*, published in 1859, does not contain a single mention of the word "evolution"? I am reading it for the first time and was struck not only by the absence of that term in Darwin's first edition (it does begin to creep in after 20 years in later editions) but many other discrepancies between the historical Darwin and modern Darwinism.

For those inclined to believe conspiracy theories—for instance, that it was not Darwin, but Darwinists or even anti-Darwinists who invented the theory of evolution—here are some items to consider:

- Darwin was a mediocre student at Cambridge, where he learned little science or mathematics and preferred theology. "He passed the final examination in January 1831 at an undistinguished position, 10th in the list of candidates who did not seek honours" (Richard Keynes, in the introduction to the first edition of Darwin's *On the Origin of Species*, published by the Folio Society, 2006).
- Darwin's disordered notebooks and papers, in which he supposedly developed the theory of evolution, only to keep it "secret" for 20 years, were not transcribed and published until 2000.
- The modern reconstruction of Darwin's theory of evolution evolved

itself. It began to take iconic form only after the 1960s, when historians of science began to "read between the lines" of Darwin's work. His career was divided into an initial period of 10 years when he was a biologist on the Beagle, then a "secret period" of 20 years until he and Alfred Russel Wallace "simultaneously" broke the theory in 1858, and finally another 20-year period until "evolution" began to appear in his writings by name shortly before his death.

- Darwin's interests were erratic, not to say eccentric. He spent eight years studying the sex life of a Peruvian barnacle. He published four extensive monographs on the subject between 1851 and 1854. During this period he wrote nothing on "transmutation of species," the early term for "evolution." His young son asked a playmate, "Where does your father do his barnacles?" (Keynes, xxi.)
- After barnacles, Darwin turned his attention to fancy show pigeons. He joined the Philoperisteronic Society and added an aviary to his house.
- The scientific establishment at the time did not exactly acclaim Darwin's *On the Origin of Species*. The geologist Adam Sedgwick wrote Darwin a scalding letter. "Many of your wide conclusions are based upon assumptions which can neither be proved nor disproved," Sedgwick said, accusing Darwin of "deserting the true method of induction." (xxiv). The astronomer Sir John Herschel called Darwin's work "the law of hiddeldy-pigglety."

Finally, no matter what you might decide about the "evolution of evolution," both Darwin and Darwinists reject the idea that Neanderthals might have been, in the words of the subtitle of *On the Origin of Species*, anything like a "Favoured Race." They died out, right? This being so, it is interesting to me that a portrait of Charles Darwin exhibits most, if not all, the characteristics of a Neanderthal: sloping forehead, powerful jaws, craggy brow, occipital protuberance and large nose. We don't know quite what to make of it but wish Darwin had willed his skull as well as his thoughts to science.

September 30, 2011

Were Neanderthals the First Artists?

Were Neanderthals capable of creating art? The idea seems shocking to us. After all, we learned in school that these were brutish savages without higher thinking and symbolic thought or expression. The picture of a Neanderthal making hand prints in Spanish caves or making shell necklaces is odd indeed because art is largely "considered evidence of sophisticated symbolic thinking, (and) has traditionally been attributed to modern humans, who reached Europe some 40,000 years ago" according to the recent *Wired Science* article, "First Painters May Have Been Neanderthal Not Human."

In the article, a stunning panel of hands is displayed in the El Castillo Cave, Spain, dated to 37,300 years old. Perhaps, an ancient Neanderthal kindergarten. In fact, they remind me of my daughter's kindergarten painting of her hands dipped in red and blue finger paint and pressed onto manila paper.

Where did they get artistic expression? And was it genetic? Or was it learned from humans? We are not yet clear whether there were Neanderthal-human babies. The initial publication in the May 7, 2010, article in *Science*, "A Draft Sequence of the Neandertal Genome" suggested that many of us have "1-4% Neanderthal DNA." Clearly, Neanderthal and human hanky-panky must have been going on.

But now some scientists are doubting it, positing we only share a common ancestor.

A recent article in *Discovery* discusses this in "Humans, Neanderthals Did Not Have Babies," as does a *Smithsonian* article, "Hot for Hominids Did Humans Mate with Neanderthals or Not?" The latter takes the middle ground, quoting science writer Ed Yong as saying that it was probably a "rare" occurrence and every population has that "weird" person in the group which is not indicative of the actions of a community. If this theory is correct, perhaps, it wasn't the popular thing to do. Sort of like dating an artistic Bigfoot.

But whether your ancestor went to bed with Neanderthal Jane or not, many now think Neanderthals, not humans, may have been the earliest artists.

A recent *Daily News and Analysis* article, "Neanderthals Learned to Make Jewelry and Tools from Modern Humans," says an international

team from the Max Planck Institute in Germany suggests there was a "cultural exchange" between the two species, and there is evidence that Neanderthals "learned how to make jewelry and sophisticated tools" from the early ancestors of humans. The reasoning behind this is based on the fact that artistic relics were found near Neanderthal remains, but the artwork was "clearly" indicative of human hands. So, the conjecture is that it must have been learned. Perhaps that Neanderthal kindergarten had a human art teacher?

Whether this is true or not, Neanderthals were creative. According to Kate Wong, in her *Scientific American* article, "Oldest Cave Paintings May Be Creations of Neanderthals, Not Modern Humans," according to archeological evidence, Neanderthals not only wore feathers but "painted their skin" and "made jewelry from teeth and shells."

So that human art teacher had Neanderthal kindergarteners that resembled some early American Indians?

But was their artistic expression learned? There are those that do not think so. According to Eric Wayner, in a recent *Smithsonian* article, "Do Feathers Reveal Neanderthal Brain Power?", Neanderthals wore feathers as personal adornments that showed them to be "capable of symbolic expression." And Wong says, there are Spanish and French caves thousands of years old with cave paintings long thought to be the artwork of early humans that are now thought to be the work of Neanderthals.

Why? She says because of recently refined techniques of radiocarbon dating that these paintings are "significantly older" than once thought. In fact, some may be older than the date when the first humans arrived in Europe around 41,500 years ago. When there were thought to be only Neanderthals.

"A large red disk" on one of the Spanish caves, El Castillo, is "at a minimum 40,800 years old, making it some 4,000 years older than the Chauvet paintings which were previously thought to be the oldest in the world." This and a "stretch of limestone wall with dozens of hands" in the same cave are both thought to possibly be the handiwork of Neanderthal painters because the "estimates" are considered to be at best a conservative "minimum." According to Ker Than, in the recent *National Geographic Daily News* article, "The new dates raise the possibility that some of the paintings could have been made by Neanderthals who are thought to have lived in Europe some 30,000 or

40,000 years ago."

If Neanderthals were painters where did they get their creative expression if not from humans? Wong says that both "modern humans and Neanderthals might have inherited their capacity for symbolic thinking from their common ancestor." And she says, if that is the case, "the roots of our symbolic culture go back half a million years."

Either way, artistic impression has been in our DNA for a very long time.

December 4, 2012

Neanderthals in America

Yes, Virginia, there is a Neanderthal fossil record in America. And apparently a Neanderthal hybrid record.

No genetics publication has put all the evidence together: the genetics establishment is still in denial about most things Neanderthal. The evidence is scattered and mostly unrecognized, but, in our opinion, conclusive and compulsive. Consider the following article:

Frank L'Engle Williams and Gail E. Krovitz, "Ontogenetic Migration of the Mental Foramen in Neanderthals and Modern Humans," *Journal of Human Evolution* 47/4 (October 2004) 190-219.

The mental foramen (literally "mind's little hole") is an anatomical trait very pronounced in Neanderthals, a small dimple in the lower jaw of the skull beneath the teeth, or mandible. It is found sporadically in humans, where it is classified as archaic. Among the places where it has been identified are Oleniy Island in Northern Russia and the Baltic region, where Cro-Magnon like Europoid and Mongoloid types have been found, along with "large and massive" torus occipitalis or Anatolian bumps (Alexander Mongait, 1959; Marija Gimbutas, 1956). Neanderthal bones were also reported in Bakhehisarai in the Crimea (Alexander Mongait, 1959), in the Joman or Ainu of Japan (Carleton Stevens Coon, 1962) and the "race of giants" continually being unearthed in West Coast, Ohio Valley and New England archeological sites, caves and mounds.

Archaic giant skeletons with mental foramina, occipital bumps, double

rows of teeth and other Neanderthal features are reported, in fact, all over the Americas. Fritz Zimmerman has gathered a lot of the evidence in a new book titled *Nephilim Chronicles*, of which a small excerpt was published in *Ancient American* magazine, issue 91, pp. 24-27. Here is one of the newspaper reports he cites:

Evening News (Ada, Oklahoma), November 8, 1912.
PRIMITIVE MEN OF GIGANTIC STATURE.

Eleven skeletons of primitive men, with foreheads sloping directly back from the eyes and two rows of teeth in the front of the upper jaw, have been uncovered at Craigshill at Ellensburg, Washington. They were found about twenty feet below the surface, twenty feet back from the face of the slope, in a cement rock formation over which was a layer of shale. The rock was perfectly dry. The jawbones, which easily break, are so large that they will go around the face of a man today. The other bones are also much larger than those of the ordinary man. The femur is twenty inches long, indicating a man of eighty inches tall (6'8"). The teeth in front are worn almost down to the jawbones, due, it is believed, to eating uncooked foods and crushing substances with the teeth. The sloping skull shows an extreme low order of intelligence.

We note that the female mummy clutching a child known as The Thing on display at a roadside attraction on Interstate 10 north of Tombstone, Arizona, has a double row of teeth. It supposedly was one of three skeletons sold to the operator of the original site for \$50 by a Chinese gentleman passing through. The Thing is discussed in several works by David Hatcher Childress. My son and I paid our two bucks and saw it last Christmas on a road trip.

October 18, 2011

Kathryn Halliday commented on 19-Oct-2011

Very interesting article. What caught my eye is the article from Ada, Oklahoma—where I was born and now live in my old age. It is the center, after the removal, of the Chickasaw Nation.

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Fritz Zimmerman commented on 01-Feb-2012

There are many cases of "archaic" type skulls that are associated with the Maritime Archaic who migrated to North America (by boat) from 7000 to 2000 BC. They eventually migrated into the Great Lakes region. These are a few of headlines of giant skeletons with Neanderthal like skulls in the Great Lakes: <http://gianthumanskeletons.blogspot.com/2012/01/giant-human-skeletons-with-archaic.html> This link will take you to headlines from the coastal regions, where more of these Neanderthal-looking skulls were uncovered. <http://gianthumanskeletons.blogspot.com/2012/01/giant-human-skeletons-headlines.html>.

Anonymus commented on 02-May-2012

Yes, there is overwhelming evidence to support this. I'm one of the rare people who have in my possession a skull showing brow ridge, teeth, leg bones, and hundreds of tools.

Chris L Lesley commented on 24-Nov-2013

Anonymous, I sure would like to get a replica of that skull preserved and displayed in the GAWM Museum.—Chris L. Lesley

What Lurks in Our Family Tree?

Some of our earliest grandmothers may well have known or even dated other kinds of humans at the original café of rocks.

Charles Choi, a Huffington Post Live Science contributor, in the article, "Denisovan Genome Sequenced, Reveals Brown-Eyed Girl of Extinct Human Species," says that "...our planet was once home to a variety of other human species." It sounds like something out of *The Lord of the Rings*.

Though we have tossed some out as invalid, there are others according to a recent *Smithsonian* blog, "Four Species You've Never Heard of," like "some hominid fossils in China that are hard to fit into any of the known species." Who knows what mysteries are in those boxes waiting to be discovered and elsewhere?

Recently, with high DNA sequencing, we have discovered a lot from the bones of archaic hominids like the Denisovans and Neanderthals.

Another Huffington Post Science article quotes Svante Pääbo, a

Swedish biologist who specializes in evolutionary genetics, as saying, "... there is ... no difference in what we can learn genetically about a person that lived 50,000 years ago, and from a person today, provided that we have well-enough preserved bones."

And those bones tell stories. We just can't agree yet on the entire story. Pääbo, in the article "Denisovan Genome Sequenced," says that "Denisovans diverged from modern humans in terms of DNA sequences about 800,000 years ago." We can now say some archaic humans are in some way related to us. But how?

Some think we are the Neanderthals. The *Smithsonian* article, "Virus Fossils Reveal Neanderthal's Kin," says that humans and Neanderthals are "so close, in fact, that some researchers argue the two hominids might actually be the members of the same species."

But the consensus appears to be that "Humans and Neanderthals are cousins" ("Virus Fossils"). That article also quotes researchers from *Current Biology* as saying, "Denisovans seem to be more closely related to Neanderthals than we are." At any rate, meet your new cousins. Not quite what one expected. Imagine those relatives over for the holidays.

Whether we were kissing cousins or remote relatives with Denisovans or Neanderthals continues to be debated. A *Smithsonian* article, "Top 10 Hominid Discoveries of 2011," concurs that the finding that "Denisovans bred with several lineages of modern humans—people native to SE Asia, Australia, Melanesia, Polynesia, and elsewhere in Oceania" was one of the most astounding discoveries of 2011. Katherine Harmon, in her article in *Nature*, "New DNA Shows Ancient Humans Interbred with Denisovans," further bolsters this position when she claims the latest evidence from high-sequencing DNA analysis shows that Denisovans and humans interbred.

However, the author of another article in the *Smithsonian* "Denisovan Genome Sequenced" is unconvinced and says that these Denisovan "genetic variants" probably reflect interbreeding with our closest relatives, the Neanderthals, not the Denisovans.

So, the question remains. How are we related? How different are we? Are we all the same happy human family?

We don't have the answer to all of these questions, but it seems that we have a common mystery ancestor. Why? "Researchers discovered that most of the ancient viruses found in Denisovans and Neanderthals

are also present in humans, implying that all three inherited the same genetic material from a common ancestor" ("Virus Fossils").

If that is true, that means we have the same original grandmother. A bit shocking. Not quite what one expected or the picture one might want to put over the dining room table. Sort of reminds one of Worf on Star Trek with a slightly feminine touch. According to the *Smithsonian* article, "Top 10 Hominid Discoveries of 2011," "Australopithecus, 1.97 million years old," is our possible direct ancestor.

So how do we differ? For one thing, we have a much greater genetic diversity. We have traveled and been around for quite a while. According to the author of the article, "Humans Have Been Evolving Like Crazy Over the Past Few Thousand Years," a recent *Smithsonian* blog quotes *Nature* as saying, "Over the past 5 to 10 thousand years ... the genetic diversity in the human population has exploded."

In contrast, the Denisovan DNA that was sequenced exhibits a very low genetic diversity, probably showing it was initially small but grew quickly—too quickly for much genetic diversity ("Denisovan Genome Sequenced"). The article says that if the Neanderthal genome shows the same information that this likely means one population from Africa gave rise to both the Denisovan and the Neanderthal populations.

And some researchers conclude that what makes us unique is our brain power—though not all. Pääbo, in the article, "Denisovan Genome Sequenced," says it was our "brain function and development" that helped us increase and dominates as a species and made all of "human history possible."

However, John Hawks, a biological anthropologist at the University of Wisconsin, in the *Nature* article, "New DNA Analysis Shows Ancient Humans Interbred with Denisovans" counters this idea and says it is "too early to begin drawing conclusions about human brain evolution from genetic comparisons with archaic relatives" and "decoding the genetic map of the brain and cognition from a genome is a long way off."

The latest science sounds like a tale from "The Munsters." We have a few not-quite-human cousins to put on our family tree. And it looks like we have the same brown-eyed Jane as a grandmother who ran around the rocks with some real characters.

October 22, 2013

Hominin Trysts

Our most ancient cousin has been found through genetic testing. Personally, I have never wanted to find any more cousins and have done my best to run from the ones I have. Nevertheless, a lot of people have looked for cousins through DNA testing. Now, science has found our most ancient cousin who lived some 400,000 years ago in northern Spain. They found what was left of him in a place that sounds reminiscent of the zombie movie, *World War Z*: Pit of Bones ('Sima de los Huesos'). But the finding has raised more questions than it has given us answers (Ewen Callaway, *Nature*, "Hominin DNA Baffles Experts").

Why? Though they did not find zombies, they still did not find what they expected to find. The team, led by Svante Pääbo, a molecular geneticist, thought they would attribute the ancient bones to early Neanderthals as had long been supposed; however, DNA testing results did not show this to be the case to the scientists' surprise (Callaway).

Instead, they discovered Denisovan DNA, another ancient human-like species that was curious because the "only remnants of Denisovans come from Siberia—a long way from Spain" (Elizabeth Landau, *CNN*, "Oldest Human DNA Found in Spain"). Denisovans were not our direct ancestors but cousin-related (Landau). But how did Denisovan DNA arrive in Spain? No one seems to be asking that looming question.

That is not all. When they examined the femur bone, they did so with mitochondrial DNA testing (which shows only the female line of ancestry). However, since the mitochondrial line only reflects one parent's line of ancestry, it is not the entire story. The team hopes to be able to do nuclear DNA testing, also the basis of autosomal DNA testing, within a year (Callaway). Nuclear DNA provides a clearer picture of both sides of one's ancestry and could also provide a clearer picture to how it is connected to other human or human-like species (Landau). Right now, it is not clear at all.

Pääbo believes the femur bone, which was found in the '90s and just recently tested, may reflect a common ancestor to both Denisovans and Neanderthals. However, Chris Stringer, anthropologist at the Natural History Museum in London, believes the femur may reflect a mystery hominin. Why? Not far from the caves, they found more hominin bones that are even older—some 800,000 years. Stringer believes that this was

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a founding group to both the Denisovans and the group belonging to the mystery femur that may account for the mystery species Denisovans had some hot dates with at the original Hardrock Café.

Our ancient ancestry just gets stranger.

August 31, 2012

Ancient Bones

It isn't as easy to do DNA testing on ancient bones as "CSI" and other television shows might make it appear. Most people probably have the idea that an Indiana Jones type just snaps everyone into shape in the lab, and the results are whipped up magically. Why would anyone think that? Genetic testing has become so advanced and so routine in our everyday lives. However, genetic testing of ancient bones is a much more difficult process.

What is the difference? Contamination is more likely. When genetic testing is done by a professional, certified ISO lab, chances of contamination are next to impossible as proper procedures are followed. No matter the type of genetic testing one has, very careful steps are part of the process to ensure contamination does not happen for most modern-day medical and genetic testing. If proper standards are followed, that is not a problem. Your DNA is sitting in a container, nice and secure, before it is analyzed. The DNA of an ancient human is sitting in dirt and has been for many thousands of years. This means the DNA has often largely been broken down and degraded in warm soil where bacteria have made a cozy home (Jocelyn Kaiser, *Science*, "Cleaning up Ancient Human DNA").

Of course, there are exceptions, but the conditions are exceptional. The difference is found in cold conditions versus warm ones. There have been cases of "human DNA samples taken from human bone, tooth, hair, or other tissue typically preserved in frozen soil, ice, or a chilly cave" like "Ötzi the 5300-year-old iceman and even Neanderthals."

However, that isn't the norm, and we cannot change the conditions the DNA that we find has undergone because we want the best DNA testing results. How do we fix the problem of genetic testing of bones and other usually an expensive process, but scientists are thinking of ways they can filter away the "non-human DNA." Then the bones can tell us more

stories. For instance, using this method a team determined a "500-year-old Peruvian mummy did not have European ancestry as claimed" (Kaiser).

Cleaning ancient bones using this method will mean better DNA testing results despite bad conditions. And it just might mean that we can use whole genome sequencing on samples that we did not think possible before (Meredith L. Carpenter et al, *American Journal of Human Genetics*, "Pulling out the 1%- Whole Genome Capture").

What does this mean? If we are able to get better results from Neanderthals, from Denisovans, from the little ancient hobbit-like people of Indonesia called the *Homo floresiensis*, we might have a better picture of our origins as well as other hominins and how we connect to those different hominins. We would have a clearer story.

November 12, 2013