

**INSTITUTE OF CURRENT WORLD AFFAIRS**

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Cave Men

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Dear Peter,

The scene this autumn at Kebara Cave, a prehistoric site on the coastal plain of Israel near Haifa, could have come from a science fiction film. Suspended beneath the mossy, fissured dome of the cavern was a large aluminum grid frame, tightly strung with wire, dividing the amorphous cave surface into precise one-meter squares. From each corner of the grid network, a plumb line established the vertical dimension, reaching down to the soft, ashy cave floor. Narrow wooden walkways crisscrossed the sharply defined excavation areas. The effect was of artificial order imposed on an irregular natural formation, primeval dankness overlaid by antiseptic high technology.

The coolness of the cave, the glare of the electric lights strung along the stone walls, and the steady whirl of the electric fans in the deepest of the excavation areas set this scene quite apart from the heat, the noise, and the clouds of dust at excavations I've come to identify as typical of Near Eastern archaeology. Different, too, was the pace at which the work was progressing. The dozen or so team members, crouching in their individual digging areas at various depths beneath the surrounding cave surface, slowly scraped the soil away with undersized trowels, stopping to measure and record each artifact uncovered, never digging down more than 5 centimeters (2 inches) at a time.

Painstaking excavation and precise recording were, of course, not ends in themselves. The challenge that faced the Israeli, French, and American members of the Kebara Cave Expedition was, by any standard, difficult. They were not attempting to uncover the extensive remains of an ancient fortress or city whose name is known and whose rise and fall could be fitted into Israel's recorded political, economic, or religious history. They were, instead, trying to detect the far more ephemeral traces of a unique animal species that survived by hunting and foraging in the nearby hills and along the coastal plain approximately 50,000 years ago.

Propped up against the cave wall-- near the high, metal shelves filled with boxes of already excavated flint implements-- was a mounted, life-sized replica of the skeleton that has made Kebara Cave one of the most important prehistoric sites in the world. Found in 1983,

this skeleton has called into question some neat assumptions about the course of human evolution and has raised new doubts about our species' immediate ancestors. The Kebara skeleton is that of a stocky, young man, found lying on his back, with his right hand resting on his chest and his left hand lying on his abdomen. Most of the skull, the right leg, and much of the left leg are missing. But the physical type, at least to the trained eyes of the team's physical anthropologists, is clear.

In 1965, the skeleton of an infant with many of the same physical characteristics was discovered in a parallel layer at Kebara, a first indication of the character of the cave's occupants from about 75,000 to about 30,000 years ago. Throughout that period-- about 20 times longer than all of recorded history-- Kebara Cave was apparently inhabited, at least intermittently, by individuals of the species *Homo sapiens neanderthalensis*, in other words, by Neanderthal men, babies, and presumably Neanderthal women as well.

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Neanderthals have a bad reputation in popular culture; they are usually depicted as dim-witted cave dwellers, whose courtship rituals are seen to involve a heavy club, various animal-like grunts, and the bridegroom's firm grasp of his fiancée's hair. That caricature, of course, is not really justified. It's an inheritance from an early stage of prehistoric research in Europe, from a time when scholars weren't sure just who the Neanderthals were.

Until 1856, in fact, no one even suspected that any different human types had ever existed, so the discovery of a strange skeleton in the Neander Valley in Germany came as a great surprise. The quarry workers who found the bones initially believed them to be of a bear, not a human, but when the bones were examined by a local naturalist, Johann Fuhlrott, and by Professor Hermann Schaafhausen of Bonn University, they were declared to be the remains of a man who had lived in the age before the great biblical flood.

Bitter criticism of Fuhlrott and Schaafhausen's theory was forthcoming almost immediately. In those days before the Origin of Species was published, few scholars were yet ready to contemplate the possibility of the physical evolution of humanity. Some claimed that the stocky skeleton from the Neanderthal was that of an old man with rickets and arthritis; others suggested that they were the remains of a Cossack who had ridden west in 1814 in pursuit of Napoleon's retreating armies. And there were even those who likened the heavy skull to "an idiot's head of the present day."

The acceptance of the possibility of evolution, however, established a new scholarly consensus. The British geologist Charles Lyell and the British anatomist Thomas Huxley included a description of the skeleton from the Neanderthal in Lyell's epoch-making book, Geological Evidences for the Antiquity of Man (1863). And not only did they conclude that this unusual physical type was a part of human evolution,

they acknowledged its closeness to modern mankind by giving it the scientific appellation, *Homo sapiens neanderthalensis*.

But what was its specific role in human evolution? Was Neanderthal Man the direct ancestor of all of us, or was he merely an evolutionary dead end? The physical type was certainly distinctive; the pronounced brow ridges, receding forehead, heavy jaw, and squat, heavily muscled body superficially evoked images of crudeness and limited intelligence.

A distinctive class of chipped flint tools was eventually associated with the Neanderthals, taking its name from the site of Le Moustier in France where this class of tools was first recognized. Despite the doubts about Neanderthal intelligence, the Mousterian industry included dozens of tool types-- specialized scrapers, borers, and spearheads-- that were manufactured by skillfully striking flakes from a solid flint core. And there were other aspects of Neanderthal culture that merited attention; there seemed among Neanderthals to be intentional burial rituals, and presumably some sort of religious consciousness as well.

The problem was that despite their admirable proficiency with flint and concern for their dear departed, the Neanderthals were still quite primitive when compared with modern mankind. It seemed almost as if the Neanderthals were physically incapable of progress and it therefore took a new human type-- entering Europe from the outside-- to push human history along.

That type was us: *Homo sapiens sapiens* ("twice wise," to emphasize our intellectual superiority). The earliest known skeletons of *Homo sapiens sapiens* in Europe, dating from around 25,000 years ago, were associated with flint industries-- slender blades in place of the irregular flakes of the Mousterian-- that apparently represented a significant advance in manual dexterity. Add to that the sudden appearance of elaborate wall paintings and fertility figurines also associated with *Homo sapiens sapiens*, and it's fairly easy to see why many early 20th century scholars assumed that intelligent *Homo sapiens sapiens* and the less gifted Neanderthals belonged to two quite distinct evolutionary lines.

And that comparative IQ assessment led, in turn, to an explanation for the disappearance of the Neanderthals at more or less the time when modern men first appeared in Europe. European prehistorians initially suspected a genocidal conflict. They assumed that the first of the *Homo sapiens sapiens*, arriving from somewhere in Central Asia-- that vague and often-suggested homeland for mysterious ancient peoples-- skillfully hunted down and exterminated the dumber and clumsier Neanderthals who stood in the way of their complete possession of the land.

In retrospect, that early-20th-century archaeological theory can be seen as symptomatic of the era's dominant philosophical approach to the mechanics of culture change. At a time when the sun never set on the British Empire and almost never on those of the French and the Ger-

mans, history was seen as a continuing succession of the triumphs of more talented races over their inferiors. Hadn't it happened with the sweeping conquests of the Aryans, the Greeks, the Romans, and, in modern times, with the Europeans themselves? Why should the dawn of human history have been any different?

As it turned out, however, the answer is not so simple. Subsequent discoveries of both Neanderthal and Homo sapiens sapiens fossils have complicated that neat archaeological reconstruction. And the nature of the relationship between the two human types has today become the object of considerable controversy.

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Israel is today the scene of some of the world's most intense debates about the transformation from Neanderthals to Homo sapiens sapiens, a situation that's hardly surprising in view of the country's extraordinary wealth of fossil remains. But that particular source of wealth long went unnoticed. Throughout the 19th century, European archaeologists working in Palestine were almost entirely preoccupied with biblical relics and biblical history.

It was only in the late 1920's that scholars began to recognize that Palestine, lying on the natural route of overland animal migration from Africa to Asia and Europe, might provide the missing link in the fossil record of the relationship between Homo sapiens sapiens and Neanderthals. The site of the first great discovery was a group of natural caves about 12 miles south of Haifa, at the outlet of one of the ravines running down toward the sea through the hills of the Carmel range. There, a joint expedition of the British School of Archaeology in Jerusalem and the American School of Prehistoric Research, directed by Dorothy Garrod, discovered an unprecedented diversity of human types in three adjoining caves.

In comparison with the finds in Europe (where Neanderthal and Homo sapiens sapiens fossils were scattered and never found together), the archaeological picture in the Carmel Caves was a puzzling one. In the easternmost of the caves, al-Wad, there were fully modern humans. Only a few yards away, in the Tabun Cave, were "classic" Neanderthals. And most surprising of all, in the third of the caves, as-Skhul, there were skeletal remains of a type that seemed to be half-way between Neanderthals and modern humans, a unique hybrid type that became popularly known as "Carmel Man."

These discoveries obviously called for a revision of the earlier theories of invasion and genocide, for the existence of an intermediate type suggested that all the human variants were part of a single evolutionary continuum. The Carmel Cave finds therefore marked a turning point in prehistoric research, and it might not be too much of an exaggeration to say that the modern understanding of human genetic inheritance hung in the balance. Was it conceivable that those supposedly dimwitted Neanderthal cave dwellers were our own direct ancestors? Could there be a few Neanderthals hanging from the lower branches of all of our family trees?

The question could not be answered definitively on the basis of the earlier excavations, so from 1967 to 1972, Arthur Jelinek of the University of Arizona returned to Tabun Cave in an effort to determine whether a clear evolutionary sequence could be discerned. In the decades since Garrod's pioneering discoveries, the techniques of prehistoric excavation had become far more precise. And where Garrod had distinguished 10 successive levels in the cave accumulations, Jelinek and his team distinguished no fewer than 85. And even more important, they collected and studied more than 44,000 flint artifacts that provided a new insight on the development of the various tool types.

Most scholars had long believed that the earlier flakes (associated with Neanderthals) and the later blades (associated with Homo sapiens sapiens) reflected those two human types' differing manual dexterity. But Jelinek observed what he believed to be a gradual transformation in the form of the earlier flakes that seemed to foreshadow the technology of the blades. In fact, he came to the conclusion that the technical ability of the Neanderthals was not static, but had clearly improved.

By measuring the width and thickness of the flint flakes associated with the distinct human types in the Carmel Caves and at other prehistoric sites in Israel, Jelinek recognized what he believed to be a recognizable pattern of change. A progressive thinning of the flakes apparently began with the "classic" Neanderthals of Tabun Cave; the flakes associated with the transitional human types in nearby as-Skhul Cave were thinner; and the flakes found with the fully modern humans of Qafzeh Cave near Nazareth were the thinnest of all.

So by the late 1970's, a new version of Genesis was written, based on the finds in the Holy Land. Jelinek maintained that the Neanderthals of Israel (and presumably elsewhere) were an evolutionary bridge, not a dead end. According to his version, the disappearance of the Neanderthals was not due to an invasion and prehistoric genocidal conflict, but to an evolutionary transformation. The evidence, as he noted in Science magazine in 1982, suggested "an orderly and continuous progression of [flint] industries in the southern Levant, paralleled by a morphological progression from Neanderthal to modern man."

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It would have been nice if Jelinek's theory had been the last word on the matter, for his theory fits the tenor of our times so well. The replacement of colonial conquest by steady technological improvement-- with all peoples potential contributors to world progress-- is in neat accord with the policy papers of many First World governments and international development agencies. Unfortunately, the facts may not support the theory, and here we come back to the ongoing excavations at Kebara Cave. Professor Ofer Bar-Yosef of Hebrew University, one of the directors of the expedition, is convinced that that neat Neanderthal-to-modern-man theory is no more than a chronological and ideological mirage.

Bar-Yosef has come to that conclusion partly as the result of his own recent excavations at Qafzeh Cave near Nazareth, which seem to undermine Jelinek's basic evolutionary timetable. At Qafzeh, the fully modern human fossils-- associated with the thinnest of the flint tools-- are apparently more ancient than the Tabun Neanderthals. The latest analysis of the various animal species found on the Homo sapiens sapiens level has revealed the presence of two archaic rodents (Mastomys batei and Arvicanthis ectos, to be specific) that were found only in the lowest, pre-Neanderthal levels at Tabun.

This would mean that Homo sapiens sapiens existed in Israel long before the appearance of the first Neanderthals, and the evolutionary transition between the two types would therefore be impossible. And the ongoing excavations at Kebara-- only about 7 miles south of the Carmel Caves-- have provided even more surprises. Bar-Yosef believes that the finds there necessitate a revision of even the most time-honored ideas of the comparative intelligence and manual dexterity of Homo sapiens sapiens and Neanderthals.

Since 1982, Kebara Cave has been the scene of yearly excavations undertaken by an international team of specialists whose professional prominence is evidence of the importance of the site. In addition to Bar-Yosef, the team includes geologist Paul Goldberg and zoologist Eitan Tchernov of the Hebrew University and physical anthropologist Baruch Arensburg of Tel Aviv University, who have previously cooperated in the excavation of some of Israel's most significant prehistoric remains. And the French contingent, including Bernard Vandermeersch and Henri Laville of the University of Bordeaux, A.M. Tillier of the University of Paris, and Louis Meignen of the Centre de Recherches Archéologiques of Valbonne, are among the most well known scholars of the problem of the European Neanderthals.

The results have already justified their efforts. The superimposed levels of Kebara are rich in the remains of human activity: ash layers, hearths, and such a large quantity of worked flints and flint chips that the team has concluded that the cave served as a workshop for thousands of years. And the flint tools themselves provide an unexpected pattern. Those in the upper levels are predominantly flakes, while those in the lower, and therefore earlier levels contain a large number of the supposedly advanced blades.

What's more, even the human fossil evidence from Kebara has contradicted the neat Neanderthal to modern man progression. That stocky, young Neanderthal-- of supposed limited dexterity-- who lived and died there about 50,000 years ago, was buried on a level that contained the thin flint blades. Neanderthals, it now seems, were as capable of producing those delicate stone tools as the Homo sapiens sapiens. And since there is no apparent difference in the technical ability of Neanderthals and modern humans, Bar-Yosef has returned to the earlier ideas of prehistoric migrations to explain Israel's surprising Stone Age human diversity.

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"Sometimes the early archaeologists were right-- but for the wrong reasons," Bar-Yosef points out, emphasizing the fact that the physical differences between Neanderthals and modern humans are a factor that is difficult to ignore. But the earlier scholarly tendency to make evolutionary value judgements about the differences fails, he believes, to recognize the developments that took place almost simultaneously in different regions of the world.

The real story of evolution, Bar-Yosef contends, is of the gradual spread of humanity in its earlier form, *Homo erectus*, from its African homeland all over the world. Facing new environmental conditions and new challenges, mankind blossomed into a wide spectrum of forms. As many scholars have noted, the main concentration of Neanderthals is in Europe, and their physical type may be merely a regional adaptation to the conditions they encountered there for tens of thousands of years. Their characteristic stockiness, to take just one example, may have enabled them to maintain their body heat more efficiently in Europe's periglacial environment.

*Homo sapiens sapiens* itself may be just another regional adaptation; the finds at Qafzeh and at recently excavated sites in North Africa suggest that this human form was common throughout the Middle East as early as 150,000 years ago. But with the changing climate of the last ice age (beginning around 75,000 years ago), the previously distinct types may have begun to mingle. Bar-Yosef believes that as conditions grew colder and more difficult in Europe, scattered groups of Neanderthals began migrations southeastward, some of them arriving in the area of modern Syria, Lebanon, and Israel and settling among a pre-existing population of *Homo sapiens sapiens*.

The nature of their social relations is uncertain, as are the circumstances for the final disappearance of these Neanderthal "colonies." But Bar-Yosef contends that the extinction of the Neanderthals in the Middle East and, later, in Europe, was probably not a reflection of their intelligence relative to *Homo sapiens sapiens*. It was, perhaps, because their bodies had grown too specialized in Europe to survive a long period of dramatic climatic fluctuations. Or was it because the course of history just didn't flow in their favor, as it didn't flow for countless cultural groups in later history?

The work continues this fall at Kebara, with the excavation team slowly scraping away the accumulated silt and ash, searching for the conclusive answer to the Neanderthal mystery. The debate is far from settled, for Jelinek and his supporters are still holding fast to their evolutionary theories. But whether the Neanderthals ultimately prove to be our own ancestors, or whether they prove to be a specialized species doomed by forces beyond their control, their modern archaeological image is in the midst of a dramatic transformation.

Think of that the next time you see a caveman cartoon.

Best Regards,

Neil

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