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Chapter 1 : Geological Evidences of the Antiquity of Man - Wikisource, the free online library

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Although the dividing line between the Lower and Middle stages is not so clearly defined as that separating the Middle and Upper subdivisions, this system is still used by most workers. Lower Paleolithic On the basis of the very rich materials from the Somme Valley in the north of France and the Thames Valley in the south of England, two main Lower Paleolithic traditions have been recognized in western Europe. These are as follows: The type tools of the Abbevillian formerly Chellean, which takes its name from the town of Abbeville, France, on the metre foot terrace of the Somme Valley, consist of pointed, bifacial implements, or hand axes. Their forms vary, and the flaking is generally irregular; it is probable that they were manufactured either with a stone hammer or on a stone anvil. Associated with these crude types of hand axes, simple flake tools are found, but they lack definite form. The Abbevillian has been reported from deposits of lower Pleistocene First Interglacial age. The Acheulean, which begins in the Second Interglacial and persists to the close of the Third Interglacial, covers by far the longest time span of any of the Paleolithic traditions found in western Europe. The type site is on the metre terrace of the Somme Valley at St. Acheul, near Amiens, in northern France. Acheulean hand axes, which display a marked technological refinement over their Abbevillian precursors, were apparently made by employing a wooden or bone billet rather than the more primitive stone-on-stone technique. But, except at the very end of the Acheulean cycle of development, there is very little typological difference in the types of hand axes found in the various layers. The Micoquian, or Final Upper Acheulean, is characterized by elongated hand axes that exhibit very straight and finely chipped edges, in marked contrast with the Lower Acheulean, in which ovate forms predominate. Flake tools occur in all Acheulean levels, the side scrapers being the predominant type. Many of these tools were made from trimming flakes produced during the process of hand-ax manufacture. In general, flake tools, including points with a triangular cross section, are found in greater quantities in Micoquian deposits than in the older horizons. The evidence from Clacton-on-Sea, Essex, and Swanscombe, Kent, in the Thames Valley of southeastern England clearly shows that the main development of the Clactonian occurred during early Second Interglacial times. The type artifacts are flakes, although core tools—single-edged choppers and chopping tools—do in fact occur. Actual retouching or secondary working of the edge is found in some instances, but for the most part it is crude, and edge chipping resulting from use is far more characteristic. Named after a locality at Levallois, a suburb of Paris, the Levalloisian is primarily a flake tradition, although hand axes are found in certain of the Middle and Upper Levalloisian stages. It is characterized by a new and improved method of producing flakes, which previously had been obtained in a more or less haphazard manner. This involves the careful shaping of the core by the removal of centrally directed flakes, and the preparation of an extremity for the detachment of a symmetrical oval flake. Since unstruck cores of this type exhibit a plano-convex section suggesting the form of a tortoise, they are known as tortoise cores. On the striking platforms of typical levallois flakes, small vertical flake scars, called facets, may be observed, and the scars of the converging core-preparation flakes are present on the upper surface. The use of this technique resulted in the production not only of symmetrical flakes but also of larger ones in proportion to the size of the core. In the Middle and Upper Levalloisian a variation of this same basic technique was developed whereby it was possible to produce either triangular flakes or points or rectangular flakes or flake blades by modifying the method of core preparation. Middle Paleolithic The Middle Paleolithic comprises the Mousterian, a portion of the Levalloisian, and the Tayacian, all of which are complexes based on the production of flakes, although survivals of the old hand-ax tradition are manifest in many instances. Associated with the Tayacian, in which the artifacts consist of very crude flakes, remains of modern humans *Homo sapiens* have been found. The Mousterian industry, on the other hand, is associated with the Neanderthals. By the s no human remains had yet been found associated with the Levalloisian. It is in the Mousterian levels of the caves and rock shelters of central and southern France that

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the earliest evidence of the use of fire and the first definite burials have been discovered in western Europe. The typology of the artifacts is complex; it consists of three distinct increments: The type artifacts from the Mousterian consist of points and side scrapers, in addition to a few hand axes especially heart- or triangular-shaped forms, and the secondary working is coarse. A crude bone industry appears here for the first time. Judging by what is known concerning modern hunting groups, small bands or tribes of people already had developed simple social institutions, even at this early level of development. Early humans made their greatest cultural progress at this time. The hand axes and flake tools of the earlier assemblages were replaced by diversified and specialized tools made on blades struck from specially prepared cores. Many important inventions appeared, such as needles and thread, skin clothing, hafted stone and bone tools, the harpoon, the spear thrower, and special fishing equipment. Bone, ivory, and antler, in addition to flint, were extensively used. The earliest man-made dwellings are found, consisting of semisubterranean pit houses. Of prime importance and interest is the beginning of the basic techniques of drawing, modelling, sculpture, and painting, as well as the earliest manifestations of dancing, music, the use of masks, ceremonies, and the organization of society into patterns that were apparently fairly complex. Indeed, the location of certain settlements suggests a more complex social life, including perhaps collective hunting. There is evidence for fertility magic, private property, and possible social stratification. Furthermore, primitive types of early humans disappeared, and the remains of humans of modern type *Homo sapiens* alone are found in Upper Paleolithic sites. These latter occur, together with gravers or burins, end scrapers, points, etc. The graver itself is a very important tool, for its invention made possible the extensive working of bone and facilitated the development of art. The climate of the Upper Paleolithic varied from cold steppe, or even Arctic tundra, to north temperate taiga, similar to parts of Siberia and Canada of the present day. These first appear, together with other types of blade tools, in horizons immediately overlying Upper Mousterian levels. The tool types include various kinds of steep-ended scrapers, nose scrapers, blades with heavy marginal retouch, strangulated blades, busked gravers or burins, and split-base bone points. Articles of personal adornment, probably worn as necklaces, such as pierced teeth and shells, as well as decorated bits of bone and ivory, appear for the first time in the Aurignacian. In general, Upper Paleolithic art falls into two closely related categories: The former includes finger tracings, paintings, engravings, bas-reliefs, and sculptures on the walls of caves and rock shelters; the latter is characterized by small engravings and sculptures on stone and bone found in the occupation layers. The whole development almost certainly owes its inspiration to the magico-religious idea, especially the custom of hunting magic as practiced today by living primitive peoples. In addition, the usual types of gravers, end scrapers, points, perforators, etc. Examples of Solutrean art are comparatively rare; they consist of sculpture in low relief and incised stone slabs. The fauna indicates that this culture flourished in a relatively cold climate. This final culture of the Upper Paleolithic is noted for the dominance of bone and antler tools over those of flint and stone and for the very remarkable works of art that were produced at this time. The flint and stone tools include a variety of special forms, among which small geometric forms, denticulated blades, scrapers with steeply retouched edges, and the parrot-beak graver are especially distinctive. The six phases of the Magdalenian have been established stratigraphically and are characterized mainly by the contained bone and antler implements. But the heights attained by the people responsible for this culture can best be evaluated on the basis of the art objects they produced. Magdalenian sites have yielded countless fine examples of both mural and portable art. Animals of the period, the usual subject matter, are portrayed in paintings often polychrome, engravings, and sculptures. The fauna from the various Magdalenian horizons demonstrates that cold conditions prevailed in western Europe at the end of Paleolithic times. Cultural adaptations appear to have been made to restricted local areas or niches and to the fluctuations of climate and environment during the changing phases at the end of the Pleistocene range of time. In fact, it could be maintained generally that Upper Paleolithic traditions flowed rather smoothly into the Mesolithic, with no more significant indication of cultural development than further environmental readaptations. A classic example of such traces comes from the Maglemose bog site of Denmark, although there are comparable materials ranging from England to the

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eastern Baltic lands. These bogs were probably more or less swampy lakes in Mesolithic times. At about bce, when the Maglemosian culture flourished, traces of primitive huts with bark-covered floors have been found. Flint axes for felling trees and adzes for working wood have appeared, as well as a variety of smaller flint tools, including a great number of microlithic scale. These were mounted as points or barbs in arrows and harpoons and were also used in other composite tools. There were adzes and chisels of antler or bone, besides needles and pins, fish-hooks, harpoons, and several-pronged fish spears. Some larger tools, of ground stone e. Wooden implements also have survived because of the unusually favourable preservative qualities of the bogs; bows, arrow shafts, ax handles, paddles, and even a dugout canoe have been discovered. Fishnets were made of bark fibre. There is good evidence that the Maglemosian sites were only seasonally occupied. Deer were successfully hunted, and fish and waterfowl were taken, and it appears possible that several varieties of marsh plants were utilized. At Star Carr, in northern England, there are indications that four or five huts existed in the settlement, with a population of about 25 people. This description of the Maglemosian must suffice to represent a considerable variety of European manifestations of the level of intensified post-Pleistocene food collecting. The catalogs of the Azilian and Tardenoisian industries of western Europe, of the Ahrensburgian of northern Germany, of the Asturian of Spain, etc. The Nachikufan As a further and far-distant example, the Nachikufan culture of southern Zimbabwe might be cited. Here again, microlithic flint bladelet tools, with certain types mounted as projectile points or in composite tools, existed. Ground-stone axes and adzes, bored stones digging-stick weights? Grindstones of various types indicate a degree of dependence on collected vegetable foods, and the animal bones suggest specialization in the hunting of zebras, wildebeests, hartebeests, and wild pigs. These Nachikufan materials date back to at least bce. Again, an intensified level of food collecting is implied. The general picture Though there are vast gaps in our knowledge of the Holocene Period in many parts of the Old World, enough is known to see the general cultural level of this range of time. Outside of the regions where food production was establishing itself, the period was one of a gradual settling-in and of an increasingly intensive utilization of all the resources of restricted regional niches. But, as time went on, certain climaxes within the matrix of an intensified level of food collection did occur. An often-cited example might be the complex art and social organization of the cultures of the northwest coast of British Columbia. Neolithic The origins and history of European Neolithic culture are closely connected with the postglacial climate and forest development. The increasing temperature after the late Dryas period during the Pre-Boreal and the Boreal c. Thus, the Mediterranean zone became the centre of the first cultural modifications leading from the last hunters and food gatherers to the earliest farmers. This was established by some important excavations in the mid-th century in the Middle East , which unearthed the first stages of early agriculture and stock breeding 7th and 6th millennia bce with wheat, barley, dogs, sheep, and goats. Early prepottery Neolithic finds probably 6th millennium bce have been made in the Argissa Magula near Larissa Thessaly, Greece , while excavations in Lepenski Vir Balkan Peninsula have brought to light some sculptures of the same period. The independent origin of European Neolithic was established, and it was thought highly probable that the cradle of farming in the Middle East had not been the only one: Each zone itself is subdivided into natural regions by physiographic boundaries and peculiarities of climate or soil. Only the three major divisions of the temperate zone are not obvious from every map. The substantial Neolithic communities that arose by bce must have been largely recruited from indigenous Mesolithic hunters and fishers, attested to so abundantly in western and northern Europe by various remains. Some communities indeed seem to be composed entirely of such Mesolithic stocks, though they had adopted a Neolithic equipment from immigrant farmers; such are sometimes termed Secondary Neolithic.

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Chapter 2 : Thomas Belt | Open Library

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Neanderthal extinction hypotheses and Archaic human admixture with modern humans The expansion of modern human population is thought to have begun 45,000 years ago, and may have taken 15,000 years for Europe to be colonized. Because it took so long for Europe to be occupied, it appears that humans and Neanderthals may have been constantly competing for territory. The Neanderthals had larger brains, and were larger overall, with a more robust or heavily built frame, which suggests that they were physically stronger than modern Homo sapiens. Having lived in Europe for 40,000 years, they would have been better adapted to the cold weather. The anatomically modern humans known as the Cro-Magnons, with widespread trade networks, superior technology and bodies likely better suited to running, would eventually completely displace the Neanderthals, whose last refuge was in the Iberian peninsula. After about 25,000 years ago the fossil record of the Neanderthals ends, indicating that they had become extinct. The last known population lived around a cave system on the remote south-facing coast of Gibraltar from 30,000 to 24,000 years ago. From the extent of linkage disequilibrium, it was estimated that the last Neanderthal gene flow into early ancestors of Europeans occurred 47,000–65,000 years BP. In conjunction with archaeological and fossil evidence, the gene flow is thought likely to have occurred somewhere in Western Eurasia, possibly the Middle East. Consequently, the presence of this B haplotype on the northern and northeastern perimeter of Sub-Saharan Africa is attributed to gene flow from a non-African point of origin. A study of the ancient DNA of Tianyuan Man found that the individual is closely related to modern East Asian populations, but not a direct ancestor. The introgressive haplotypes were positively selected in only East Asian populations, rising steadily from 45,000 years ago until a sudden increase of growth rate around 5,000 to 3,000 years ago. They occur at very high frequencies among East Asian populations in contrast to other Eurasian populations e. European and South Asian populations. The findings also suggest that this Neanderthal introgression occurred within the ancestral population shared by East Asians and Native Americans. The Ainu were found to represent a more basal branch than the modern farming populations of East Asia, suggesting an ancient pre-Neolithic connection with northeast Siberians. Last Glacial Maximum[edit] Further information: Solutrean and Magdalenian Around 20,000 years ago, approximately 5,000 years after the Neanderthal extinction, the Last Glacial Maximum forced northern hemisphere inhabitants to migrate to several shelters known as refugia until the end of this period. The resulting populations are then presumed to have resided in such refuges during the LGM to ultimately reoccupy Europe where archaic historical populations are considered their descendants. The composition of European populations was later altered by further migrations, notably the Neolithic expansion from the Middle East, and still later the Chalcolithic population movements associated with Indo-European expansion. This site shows that people adapted to this harsh, high-latitude, Late Pleistocene environment much earlier than previously thought. Settlement of the Americas and Genetic history of indigenous peoples of the Americas Schematic illustration of the Beringia migration based on matrilineal genetics: Arrival of Central Asian populations to the Beringian Mammoth steppe c. Paleo-Indians originated from Central Asia, crossing the Beringia land bridge between eastern Siberia and present-day Alaska. The traditional theory is that these early migrants moved when sea levels were significantly lowered due to the Quaternary glaciation, [86] [89] following herds of now-extinct pleistocene megafauna along ice-free corridors that stretched between the Laurentide and Cordilleran ice sheets. Pre-modern human migration, Mesolithic, and Urheimat The Holocene is taken to begin 12,000 years ago, after the end of the Last Glacial Maximum. During the Holocene climatic optimum, beginning about 9,000 years ago, human populations which had been geographically confined to refugia began to migrate. By this time, most parts of the globe had been settled by H. This period sees the transition from the Mesolithic to the Neolithic

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stage throughout the temperate zone. The Neolithic subsequently gives way to the Bronze Age in Old World cultures and the gradual emergence of the historical record in the Near East and China beginning around 4,000 years ago. The speculative Nostratic theory postulates the derivation of the major language families of Eurasia excluding Sino-Tibetan from a single proto-language spoken at the beginning of the Holocene period. Neolithic Revolution, Indo-European expansion, and Proto-Uralic homeland hypotheses Evidence published in from genome analysis of ancient human remains suggests that the modern native populations of Europe largely descend from three distinct lineages: The development of the Proto-Nilotes as a group may have been connected with their domestication of livestock. The Eastern Sudanic unity must have been considerably earlier still, perhaps around the 5th millennium BC while the proposed Nilo-Saharan unity would date to the Upper Paleolithic about 15kya. The original locus of the early Nilotic speakers was presumably east of the Nile in what is now South Sudan. The Proto-Nilotes of the 3rd millennium BC were pastoralists, while their neighbors, the Proto-Central Sudanic peoples, were mostly agriculturalists. Its expansion may have been associated with the expansion of Sahel agriculture in the African Neolithic period, following the desiccation of the Sahara in c. Beginning about 3,000 years ago, it reached South Africa about 1,000 years ago. The Lapita people, who got their name from the archaeological site in Lapita, New Caledonia, where their characteristic pottery was first discovered, were an Austronesian-speaking people who settled in Near Oceania notably the Bismarck Archipelago in Papua New Guinea, and the Solomon Islands around BCE, where some intermingling with the existing Papuan population took place. All evidence suggests that later migrants from BC and onwards originated from South America, via the Orinoco region. Circumpolar peoples The last region to be permanently settled by human migrations is the Arctic.

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Chapter 3 : Browse subject: Plate tectonics -- North America | The Online Books Page

Discovery of stone implements in glacial drift in North America *Discovery of stone implements in glacial drift in North America.* by Belt, Thomas,

The Discovery of Global Ice Ages by Louis Agassiz Overview Today, the concept of thick ice sheets covering large portions of the globe is a familiar one. We now know that ice sheets advance and retreat, altering landscape and climate as they do so. This knowledge, however, is relatively recent, the result of a great deal of geological deduction on the part of the Swiss scientists Johann von Charpentier and Jean Louis Agassiz. Charpentier first advanced a reasonable scientific explanation of a recent ice age to explain many of the phenomena found in the Alps, while Agassiz fought to have the idea win acceptance in both the scientific and popular arenas. Acceptance of this theory has changed the way we view Earth and its climate, including recent debates on global warming. Background For centuries it had been noticed by scientists and local residents that many areas of northern Europe and North America possessed unusual jumbles of sand, gravel, mud, and silt that showed no consistent layering. Many of these jumbles contained large rocks that were obviously brought from some other location and left, presumably deposited by some outside agent. Initial explanations ranged widely and included some ideas that now seem silly. The most widespread explanations referred to the biblical flood and assumed that these deposits were simply left behind when the flood waters receded from the face of the Earth. A variant on this theory held that many glacial phenomena resulted from icebergs afloat in the post-flood waters, gouging rocks as they floated in shallow waters and depositing rocks and other sediments frozen into their undersides. In fact, the term "glacial drift" as a synonym for what is now known as "till" is a carry-over from such theories. Other explanations included suggestions that glacial erratics the large rocks apparently brought from some distance were launched by underground pressure, as though shot from a cannon; that water had suddenly issued forth from now-lost caverns; or that large amounts of water had recently condensed out of the atmosphere and left these deposits. Finally, in the s, several Swiss men began to formulate some other ideas. The first of these was a chamois hunter named Jean-Pierre Perraudin, who convinced engineer Ignace Venetz that glacial marks in Alpine valleys were, indeed, left by previous larger glaciers. Venetz expanded on this idea over the next several years, albeit without much success, but was able to convince Charpentier of its essential accuracy. In , Charpentier took Agassiz on a trip through the Alps, which proved utterly convincing. Unlike Charpentier, Agassiz was an active and ultimately convincing advocate of the glacial theory, although it took many years for the scientific community to fully accept the idea of nearly two miles 3. Since that time, geologists have also come to realize that Earth has undergone many ice ages, going back more than two billion years. Impact The theory of ice ages has impacted both the science community and the public in a number of ways. For scientists, understanding ice ages has provided useful tools for better understanding geology, climate, and our current world. The public has shown a great interest in the concept of ice ages and has gained a better appreciation for the variations in climate that the Earth undergoes, even without human intervention. This, in turn, has led to an increased awareness of the possible impacts of humanity on the environment. Understanding that Earth had undergone one relatively recent ice age helped to explain many problematic geologic deposits found in the Alps, northern Europe, and North America. It did not explain many other, similar deposits found elsewhere. Accepting a single ice age, however, made it easier to accept multiple ice ages, and this has become the standard explanation for the great many glacier-related deposits found on Earth. In fact, it is now assumed that at least four major glaciations have occurred in the northern hemisphere over the past million years or so. In addition, ancient glacial deposits and other evidence suggest strongly that ice ages are not limited to the current era but have, instead, occurred periodically throughout the history of the Earth. This, in turn, causes scientists to wonder why. Questioning the origins of ice ages has been a fruitful endeavor. Geologistsâ€™ once the theory of plate tectonics was acceptedâ€™ suggested that large continents periodically congregate near one of the poles, causing the land to

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cool and spurring glacial advances. Others feel that long-term variations in weather may follow changes in solar activity, the passage of the solar system through interstellar dust clouds, or other extraterrestrial events. All of these suggestions have resulted in research that, even if inconclusive with respect to ice ages, has led to a better understanding of our climate and factors that may influence it. Research efforts at the present time are aimed at determining reasons for sudden climatic shifts, because of fears of global warming caused by human activities. The reasoning is that, if we can understand what caused temperatures to change, we can better understand whether we can cause global warming. However, with all of these studies, it must first be acknowledged that the typical temperature of Earth is much warmer than present global temperatures. In fact, we are currently in what is known as an interglacial period, meaning that the glaciers have temporarily retreated, but there is no reason to assume that they will not again advance in the future. On the other hand, it is also entirely possible that the most recent ice age has, in fact, ended, in which case we would expect global temperatures to begin rising, ice caps to begin melting, and glaciers to be retreating. While scientists have not agreed on the time, magnitude, or direction of these changes i. There is a growing realization that the climate changes and that human actions may be responsible. This, in turn, is likely to encourage further policies, such as low-emissions vehicles, substitute fuels, and so forth, that are designed to reduce the likelihood and magnitude of future global warming. Whether the glaciers will melt or advance a fifth time is still not known with any degree of certainty. Similarly, whether human activities will hasten an advance, prevent it, or have no impact remains unknown. What is known is that ice once covered large parts of the Earth and is now gone, leaving irrefutable proof of its existence and power. Edward Arnold Press, Oxford Science Publications, Cambridge University Press, Cite this article Pick a style below, and copy the text for your bibliography. Understanding the Social Significance of Scientific Discovery. Retrieved November 10, from Encyclopedia. Then, copy and paste the text into your bibliography or works cited list. Because each style has its own formatting nuances that evolve over time and not all information is available for every reference entry or article, Encyclopedia.

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Chapter 4 : Glaciation of North America - Museum of Archaeology & Ethnology - Simon Fraser University

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Africa Paleolithic The Paleolithic of Africa is characterized by a variety of stone-tool assemblages, some of which represent purely local developments while others are practically identical with materials from corresponding horizons in Europe. Geological investigations of the Late Cenozoic deposits of this continent indicate that, as the result of fluctuations in rainfall, the Pleistocene Epoch throughout most of Africa can be subdivided on the basis of a succession of pluvial and interpluvial stages. The pluvials, known as Kageran, Kamasian, Kanjeran, and Gamblian, are believed to represent the tropical and subtropical equivalents of the four major glacial stages of the Northern Hemisphere, but this has not yet been proved. The archaeological succession is well established in certain areas, although not in the continent as a whole.

North Africa In this area, very crudely worked pebble tools have been reported from one site in Algeria in direct association with a Lower Pleistocene Villafranchian mammalian assemblage. Throughout Tunisia, Algeria, Morocco, and the Sahara region, Lower Paleolithic hand axes of both Abbevillian and Acheulean type, together with flake tools, have been found in great numbers. The geological evidence shows that the Sahara region was far less arid during Pleistocene times than it is at present. A specialized Middle Paleolithic development, known as the Aterian, occurred there; it is characterized by tanged points made on flakes and flake blades. This was succeeded by two distinctive blade-tool complexes—the Capsian and Oranian—which are more or less contemporary. Their main development took place during the time span of the European Mesolithic. The Capsian sites are all inland, whereas the Oranian has a coastal distribution. Both are microlithic tool complexes that persisted after the introduction of Neolithic traits into the area. The metre terrace contains typical Abbevillian and early Acheulean hand axes, including a special form with a triangular section known as the Chalossian type. These are associated with primitive flake implements. In the metre terrace, developed Acheulean has been recorded, while the nine-metre terrace yields large flakes and cores of Levalloisian type. In the low terrace, which occurs at a height of three metres above river level, developed Levalloisian originally called Mousterian has been reported. Overlying the low terrace, a local development known as the Sebilian is found. It contains very highly evolved flake implements of Levallois type and, in its later phases, a definite microlithic industry. In the latter area, where the specialized Levalloisian development is called the Khargan, an Egyptian version of the Aterian has been discovered.

East Africa In Kenya, the oldest known tools—consisting of primitive hammers, anvils, and cutting tools—date to the Middle Pliocene Epoch and predate the emergence of the oldest confirmed specimens of *Homo* by almost one million years. Also in Kenya, Tanzania, and Uganda, very simple types of pebble tools, roughly chipped to an edge on one side only, occur in deposits of Lower Pleistocene age. This development, known as the Kafuan, apparently evolved into an industry characterized by implements made on pebbles chipped to an edge on both sides, called the Oldowan. Overlying the latter are beds containing true Lower Paleolithic hand axes of Abbevillian and Acheulean type, together with flake tools. Associated with the Middle and Late Acheulean are cleavers made on flakes, as well as evidence of the use of the prepared striking-platform—tortoise-core Levallois technique in the production of flakes. In the next-younger horizon, two distinct toolmaking traditions are found: Carefully shaped round stone balls, believed to have been used as bola weights in hunting, constitute part of the Fauresmith assemblage. In the post-Gamblian dry phase, microlithic tools appear for the first time in an assemblage known as the Magosian. This was followed by the introduction into the area of a true blade technique, called the Kenya Capsian, together with the art of pottery making. More or less contemporary with the localities where the earliest pottery is found in East Africa, a series of sites has been discovered yielding typical microlithic assemblages and referable to the Kenya Wilton, also found in South Africa, Zimbabwe,

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and Zambia. Southern Africa The sequence in Southern Africa is well established on the basis of the terrace stratigraphy of the Vaal Valley. Just as in North and East Africa, the succession begins in the basal Pleistocene with the occurrence of simple pebble tools of Kafuan type. These develop into what is called the pre-Stellenbosch, which is found in the oldest gravels of the Vaal and which includes artifacts made on pebbles that recall both the Kafuan and the Oldowan. The true Stellenbosch complex occurs in the next-younger series of deposits; it is simply a Southern African version of the Abbevillian and Acheulean of other parts of Africa and Europe. Typical are hand axes, cleavers, flakes struck from Victoria West cores, and in its later phases various sorts of flakes produced by the prepared striking-platform "tortoise-core" technique. The Stellenbosch was followed by the Fauresmith, which is characterized by evolved hand axes and Levallois-type flakes. It is characterized by a series of more or less contemporary flake-tool assemblages, each of which displays local features. The characteristic tools are made on flakes produced by a developed Levalloisian technique, including slender unifacial and bifacial lances or spear points for stabbing or throwing. These are closely related and, in their later stages, reveal varying degrees of influence as the result of contact with the culture introduced by the Bantu-speaking peoples. Both were extant at the time the first Europeans arrived in Southern Africa, and there is little doubt that the Wilton, which is a typical microlithic assemblage, is to be associated with the modern San Bushman. There are many paintings in the rock shelters and engravings on stones in the open-air sites of Southern Africa, the oldest of which belong to the Later Stone Age. The naturalistic style of art revealed at these sites persisted until well into historic times. At the beginning of Middle Stone Age times, however, a special development took place known as the Sangoan formerly Tumbian. This is characterized by picks and adzes made on bifacially flaked cores, the tranchet type of ax, hand axes of developed Acheulean form, massive side scrapers, and many elongated, bifacially flaked points that probably served as lances or spearheads. The Sangoan seems to represent a response to the environmental conditions of this tropical rain-forest region. Its main development took place during Upper Pleistocene times, but it persisted after the introduction of Neolithic traits into the area. Movius

Mesolithic "Neolithic The Paleolithic was everywhere followed by the Mesolithic, a period when man continued to use stone tools, mostly microlithic, and, while still in the hunting-and-gathering stage, depended less for his food supply on large mammals than on fish and mollusks. In Africa the evidence for the Mesolithic is still scanty. At the latitude of Khartoum, for a considerable distance to each side of the Nile, have been found sites of a Mesolithic culture in which large, well-fired, unburnished pots decorated with designs impressed with a fish spine to make them resemble baskets were made and barbed bone harpoons were used for fishing. Arrows were mostly armed with stone lunates, and in general the microlithic industry shows relations with the Capsian of northwestern Africa and the Wilton of east central Africa. The fauna indicates a climate much wetter than the present. Its pottery also copies basketwork. And while it is impossible to say where pottery was invented, the discovery of a prepottery Neolithic in Asia, with the existence of modern mud-lined baskets among the Nilotes, the accidental burning of which could have led to the invention of pottery, suggests that pottery was possibly an African discovery. The Neolithic inventions that led to the rise of man above the conditions of the Old Stone Age were made gradually in different places and probably over a long period. Some, such as the domestication of animals, took place more than once. In a famine, a wild animal will sell itself into slavery to man for the food that will preserve its life. Thus, cattle and goats, while certainly domesticated in Asia, may have been independently domesticated in Africa, too. African jackals may have provided one breed of domestic dog, while the donkey and the cat are African. The polishing of stone implements was probably a by-product of the grinding of red ochre, in wide demand for its magic properties since the Paleolithic and extensively used in Africa in the Mesolithic and later. One result of the grinding of ochre was to polish the grindstone, and another, when the upper grindstone was used at an angle, was to develop a sharp edge that, produced accidentally, may have led to the idea of grinding the cutting edge of celts or other tools. Repeated pecking of the flat surfaces of the grindstones that became too smooth to grind ochre efficiently led to perforation of the stone and thus to the development of the disk macehead of the Nile Valley.

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Archaeology must establish where and when celts were first ground; but the partly polished celts of the Fayum and Khartoum are probably the earliest forms of that tool known. The cultivation of wheat, barley, and flax probably were Asiatic developments that first entered Africa through the Nile Delta. The cultivation of one form of wheat may have originated in Ethiopia, however. In Egypt, civilization first reached its full development c. In some localities, an intermediate state, when Neolithic forms were used, occurred e. The Americas The prehistoric sequence in the New World shares many essential developmental features with the Old World and provides a test for generalizations about cultural development based upon Old World materials. In the New World there is evidence for an early horizon of primitive food collectors, followed by an increasing specialization of food collecting based primarily upon differences in localized resources. These specialized collectors were followed by a tradition of food production independent of the Old World. With food production came gradual increases in centres of population; villages were succeeded by towns and finally by centres of urban civilizations, which at the time of European contact were comparable to the ancient civilizations of the Middle East. The absence of a suitable fossil record and of cultural remains from Early and Middle Pleistocene deposits in the New World have led prehistorians to look to the Old World as the ultimate source of the diverse populations of American Indians found in the Western Hemisphere by the early European explorers. Present knowledge of Pleistocene glaciations and of accompanying alterations in sea level indicates that the most probable route of entry for man from the Old World was via a land bridge between Alaska and Siberia, crossing what is now the Bering Strait. It appears that a dry-land crossing of this area was possible during periods of continental glaciation, until about 10,000 years ago. The subsequent flooding of this region has hidden whatever traces these early migrants may have left of their arrival on the threshold of the American continents, and it is necessary to look to the interior of North America for evidence of their presence. Although these early horizons of American prehistory are little known, a few sites in central Mexico have cultural remains or other possible evidences of man in a context suggesting occupation as early as 20,000 years ago. At no site in this early context are there any types of implements distinctive enough to be recognized in a context of crudely chipped stone tools from later horizons. Early cultures The earliest well-defined cultures in the New World have been placed by radiocarbon dating at about 10,000 bc. At this period, two distinct traditions in North America are known: Paleo-Indian tradition The oldest remains of the Paleo-Indian tradition are found on sites where large Pleistocene mammals were killed and butchered. The most distinctive artifact type of this horizon is the Clovis Fluted projectile point, a lanceolate point of chipped stone that has had one or more longitudinal flakes struck from the base of each flat face. These points are accompanied by side scrapers and, in one instance, by long cylindrical shafts of ivory. They are most frequently associated with mammoth, although associations with extinct species of bison, horse, and camel have also been reported. A second Paleo-Indian horizon, which seems in part to be contemporary with the Clovis material and partially to postdate it, is the Folsom phase of the central high plains. It is characterized by lanceolate points of more careful manufacture including broader fluted surfaces than Clovis, associated with the remains of extinct *Bison antiquus*. The Lindenmeier site, a Folsom campsite in northeastern Colorado, has yielded a wide variety of end and side scrapers, graters, and miscellaneous bone artifacts. Clovis sites have been dated at about 10,000 bc by radiocarbon, and Folsom sites at about 10,000 to 11,000 years later. Fluted points similar to western Clovis specimens have been found over most of the eastern United States south of the limits of the last major glacial advance. A single series of radiocarbon dates from the Debert site in Nova Scotia places the age of points of similar type at about 10,000 to 11,000 bc in that area. The distribution of this artifact type with respect to glacial events, however, suggests an appearance as early as 11,000 bc and a terminal date about 3,000 years later. In the east, several specialized varieties of fluted points may replace Clovis-type points toward the end of the Paleo-Indian occupation. While there is no instance of the discovery of eastern fluted points in association with an extinct fauna, the similarity of the accompanying assemblages of scrapers and graters to those of the western industries suggests a similar carnivorous economic orientation in the east. Outside of the United States, fluted points have been reported at scattered sites from Alaska to Ecuador, but no certain temporal

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context has been established for any of these finds, and faunal associations are not clear. Another variety of Paleo-Indian culture, which appears to be contemporary with the Clovis and Folsom phases, is characterized in its early horizons by rather crudely flaked lanceolate points that have been found associated with the bones of mammoth at two sites near Ixtapan in the Valley of Mexico and between the Clovis and Folsom horizons in a gravel pit near Portales, New Mexico. It appears that by about bc the fluted-point industries were replaced by a succession of lanceolate-point-using phases, which continued the Paleo-Indian hunting tradition, concentrating primarily on large, now-extinct species of bison until the onset of the Altithermal dry period about bc. The eastern limit of these cultures is in the vicinity of the western Great Lakes, while the most intensive occupation was on the western plains. Desert tradition The Desert-culture tradition, an adaptation of food-collecting peoples to the impoverished habitats of the basinâ€”range area of western North America, seems to have been established by about bc. The most extensive knowledge of this way of life comes from cave or rock-shelter sites, such as Danger Cave in western Utah, in which the desiccated remains of vegetal and animal materials have been discovered along with stone tools. The Desert peoples made intensive use of virtually all aspects of their habitat, specializing in the use of vegetable fibres for a wide variety of implements, including twine, nets, baskets, sandals, and snares. Projectile points appear to have been mostly leaf- or lozenge-shaped or lanceolate in earlier phases, with a greater use of notching for hafting in later phases. An essential feature of Desert assemblages is the milling stone, for use in grinding wild seeds.

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Chapter 5 : Discovery of Stone Implements in Glacial Drift in North America: Thomas Belt: calendrierdelascience.com

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Additional Information In lieu of an abstract, here is a brief excerpt of the content: A Note on Archival Sources Unpublished archival materials are cited in this volume using the following abbreviations. On the discovery of supposed Paleolithic implements from the glacial drift in the Valley of the Delaware River, near Trenton, New Jersey. Peabody Museum Annual Report Evidences of the antiquity of man in eastern North America. Proceedings American Association for the Advancement of Science Recent archaeological explorations in the Valley of the Delaware. The North American monsoon. Bulletin of the American Meteorological Society 78, " Monte Verde and the antiquity of humankind in the Americas. The amateur involvement in the discovery of the Folsom type site. Implications for rapid climate changes during the last deglaciation. Projectile point form and function at Rodgers Shelter, Missouri. Missouri Archaeological Society Research Series no. Use-phase classification and manufacturing technology in Plains Village arrowpoints. In Piecing together the past: BAR International Series Folsom point design and adaptation. Journal of Archaeological Science Implications from a particular technofunctional explanation. In Folsom technology and lifeways, ed. Department of Anthropology, Univ. Fluting the Lindenmeier Folsom: Paleotopography and bison traps. Plains Anthropologist Memoir Geological Society of America Special Paper Late Quaternary loess in northeastern Colorado, II-Pb isotopic evidence for the variability of loess sources. Geological Society of America Bulletin Evidence from western North You are not currently authenticated. View freely available titles:

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DOWNLOAD DISCOVERY OF STONE IMPLEMENTS IN GLACIAL DRIFT IN NORTH AMERICA *discovery of stone implements pdf* A stone tool is, in the most general sense, any tool made either partially or entirely out of *calendrierdelascience.comgh*.

Such an old habitation predates the widespread toolmaking tradition known as Clovis, which spread across the continent some 12, to 13, years ago and was once thought to mark the first wave of settlers in the Americas. The area where the tools were found, northwest of Austin, must have been an appealing campsite for millennia, because it bears a record of nearly continuous occupation from 15, years ago. The discovery is detailed in a new study , published online March 24 in Science. The prevalence of Clovis style tools – epitomized by fine, fluted grooved stone points – across the continent had suggested to many archaeologists for decades that the groups who made these tools must have comprised the first wave of settlement in the Americas. This arrival would have placed the initial migration from northeastern Asia over the Bering Land Bridge and through the Arctic corridor that opened between ice sheets at some 15, years ago. This latest tool evidence, however, suggests that people were already making and discarding stone tools about 15, years ago, which would mean that the migration likely occurred even earlier. Waters argues that their find of 15, artifacts made from chert, a flint-like rock , which span the 2, years before the accepted emergence of Clovis technology 13, years ago, is the nail in coffin of the theory that Clovis toolmakers were the first inhabitants of the New World, the so-called Clovis-first model. Uprooting the Clovis-first model Extracting and describing these thousands of small stone tools has been slow going. The research team has been working in the pre-Clovis layers of the site since , uncovering the artifacts, which were scattered in a layer of clay just 20 centimeters thick. Douglas Bamforth , a professor of anthropology at the University of Colorado at Boulder who was not involved in the new research, calls the work "beautiful excavation and beautiful analysis. Several sites, including two in Wisconsin as well as one in Pennsylvania and one in Oregon, had already offered up a handful of stone tools that predated Clovis. These have offered up many fewer artifacts, and the dating of some pieces has drawn scrutiny over the years. The striking discovery of 14, to 14,year-old stone tools at a site in Monte Verde, Chile , raised questions about just how quickly the new settlers could have arrived so far south so quickly. Researchers have also yet to find strong technological links between Clovis technology and same-period stone tools in northeastern Asia. But, as Waters pointed out, known tools from that period in Siberia and northeastern Asia are relatively scant. Likewise, Bamforth was not surprised by the discovery of the new evidence. The presence of a settlement in the middle of North America by 15, years ago gives "ample time for Clovis to develop" and plenty of time for people to reach the South American sites in Monte Verde, Waters said. But such an early, glacial-period arrival poses some problems for the overland route through the Laurentide and Cordilleran ice sheets, the corridor between which would have been closed until about 15, years ago. Diligent dating Surrounding any ancient artifact is a slurry of questions and doubts as to whether the place they are found reflects when and where they were originally discarded. And when biological material is scant or absent, making radiocarbon dating impossible, scientists can face greater challenges in establishing just how old objects really are – even though, as Bamforth says, it is becoming increasingly obvious that "people have to have been here way longer than radiocarbon dating could suggest. But, he noted, the researchers behind the new work "have shown in great detail that the site is intact," adding that he was impressed with "how carefully they were able to document the age. Because the researchers did not find enough biological material in the nearby dirt to perform radiocarbon dating, they used optically stimulated luminescence OLS , which measures the amount of radiation trapped in sediment grains when they were last exposed to sunlight. The technique is "not as precise as radiocarbon by a long shot," Bamforth says. And although early studies arrived at some pretty errant dates, the technology has been refined and now, Bamforth notes, "it really works. So if no biological material was available for handy radiocarbon dating, researchers

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would have had no way to gauge exactly when an assemblage of tools was made. A new old Clovis? Many of the rough, chipped chert chunks at Buttermilk Creek might look crude, especially when compared with a refined prototypical fluted Clovis spear point. But, as Waters pointed out, most Clovis sites are littered with "utilitarian chips like we found at Buttermilk Creek. The rest, whether textiles or other more delicate artifacts, would have been destroyed by time had it not been for protective permafrost. So, Waters noted, "we have to be careful about how we interpret the evidence that we have. As Waters and his colleagues described in their study, the people who made these tools were already using some similar, if less exacting, techniques as the later Clovis patterns, such as bifacial points. The rough similarities between some of these earlier tools with later, more sophisticated Clovis technologies has Bamforth pondering whether distinguishing this assemblage as "pre-Clovis" is necessary. Shea notes that it can get tricky when trying to ask these big human questions of chips of cold stone. Rather, as Waters noted, these earlier groups would likely have eventually developed into the groups that produced the Clovis tools. Firmer answers should emerge as other sites are discovered" and as more genetic data is gathered from ancient remains. But it is always going to be more challenging to affix firm start and end dates to the earliest settlement groups, because the older the site, the more likely it is to have been wrecked in the intervening epochs. And populations were so few and far between that they were not likely producing the sheer quantity of stone tools that were later made in the Clovis style. Given the new Texas find and the other accumulating evidence, Bamforth says, it looks like "the data are hanging together pretty well" to support an earlier occupation of North America than traditional models had suggested. But as tempting as it might be to string sites and theories together neatly, "each site has to stand on its own and by its own merits," Waters noted. But, he adds, the Buttermilk Creek site "takes us a long way down the trail" to understanding the first inhabitants of the Americas.

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Chapter 7 : People Were Chipping Stone Tools in Texas More Than 15, Years Ago - Scientific American

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Visit Website About 14, years ago, Earth entered a warming period. Many of the large Ice Age animals went extinct. In the Fertile Crescent , a boomerang-shaped region bounded on the west by the Mediterranean Sea and on the east by the Persian Gulf, wild wheat and barley became plentiful as it got warmer. Some humans started to build permanent houses in the region. They gave up the nomadic lifestyle of their Ice Age ancestors to begin farming. Human artifacts in the Americas begin showing up from around this time, too. Hammerstones are some of the earliest and simplest stone tools. Prehistoric humans used hammerstones to chip other stones into sharp-edged flakes. They also used hammerstones to break apart nuts, seeds and bones and to grind clay into pigment. Archaeologists refer to these earliest stone tools as the Oldowan toolkit. Oldowan stone tools dating back nearly 2. Most of the makers of Oldowan tools were right-handed, leading experts to believe that handedness evolved very early in human history. As technology progressed, humans created increasingly more sophisticated stone tools. These included hand axes, spear points for hunting large game, scrapers which could be used to prepare animal hides and awls for shredding plant fibers and making clothing. Not all Stone Age tools were made of stone. Groups of humans experimented with other raw materials including bone, ivory and antler, especially later on in the Stone Age. Later Stone Age tools are more diverse. Different groups sought different ways of making tools. Some examples of late Stone Age tools include harpoon points, bone and ivory needles, bone flutes for playing music and chisel-like stone flakes used for carving wood, antler or bone. Stone Age Food People during the Stone Age first started using clay pots to cook food and store things. The oldest pottery known was found at an archaeological site in Japan. Fragments of clay containers used in food preparation at the site may be up to 16, years old. Stone Age food varied over time and from region to region, but included the foods typical of hunter gatherers: Most researchers think the population density in most areas was low enough to avoid violent conflict between groups. Stone Age wars may have started later when humans began settling and established economic currency in the form of agricultural goods. The earliest known depiction of a human in Stone Age art is a small ivory sculpture of a female figure with exaggerated breasts and genitalia. The figurine is named the Venus of Hohle Fels, after the cave in Germany in which it was discovered. Humans started carving symbols and signs onto the walls of caves during the Stone Age using hammerstones and stone chisels. These early murals, called petroglyphs, depict scenes of animals. Some may have been used as early maps, showing trails, rivers, landmarks, astronomical markers and symbols communicating time and distance traveled. Shamans, too, may have created cave art while under the influence of natural hallucinogens. The earliest petroglyphs were created around 40, years ago. Archaeologists have discovered petroglyphs on every continent besides Antarctica.

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Chapter 8 : Project MUSE - Folsom

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Global temperatures were significantly colder than they are today, with northern oceans an average of 4 to 8 degrees colder than modern temperatures. Huge stretches of ice covered most of northern Europe and all but the southern tip of the British Isles. Sea levels were also dramatically different during the LGM due to the twin pressures of eustasy and isostasy. During the Late Wisconsinan glacial stage, most of Canada and parts of the northern United States were covered by two massive ice sheets, the Cordilleran, which lay to the west of the Rocky Mountains, and the Laurentide to the east. These ice sheets are estimated to have had a maximum thickness of 2 to 4 km. Studies of glacial deposits suggest that a large part of the two ice sheets were joined together above central Alberta, near Edmonton, until long after the glacial maximum. Several factors related to glaciation can influence sea levels on either a global or a local scale including eustatic and isostatic changes as well as tectonic factors. Over time, this precipitation makes its way back to the oceans. During glacial periods, ice accumulates over a given area and its weight pushes down on the crust, causing the lowering of the land relative to sea level. Due to the mechanics of plate tectonics, stress builds along convergent or transverse plate margins until it is released through the slippage of one crust relative to the other along a fault line. This can result in either raised shorelines or drowned beaches. Large stretches of coastal land emerged from the ocean floor off the coast of the Pacific Northwest. As the glaciers melted and sea levels rose, the ancient coastline was drowned, along with any archaeological evidence that early people may have left behind. In order for archaeologists to find this evidence, they must first look for the ancient coastline. The identification of ancient coastlines is a complicated process. Although sea levels were generally lower during the Ice Age, in some areas of the Pacific northwest coast they were actually higher than today. This is due to isostatic depression, which occurs when the weight of glacial ice pushes the land downward, causing relative sea levels to rise. When the ice melts, the land rebounds upward. While many ancient coastal sites may be drowned beneath metres of ocean water today, others may be stranded far inland in dense coastal rainforest. In order to overcome these difficulties, geologists have created detailed localized sea level charts for many areas of the coast, and this data is used to reconstruct the ancient shorelines. Remote sensing of the sea floor off Haida Gwaii has led to the identification of ancient riverbeds and forest floors, providing more clues as to the possible location of archaeological sites. Investigating these ancient coastlines can be incredibly difficult - reconstructions place the depth of some of the river drainages and ancient terraces to 50 m below the modern ocean and the cold water can make underwater excavation extremely challenging. However, archaeologists have developed special tools called "grabbers" to pull up material from the ocean floor. In some places, they have found ancient tree stumps, proving that the land was once above the sea. Prior to when this website was created, a tantalizing glimpse of what may lay just below the ancient riverbeds was also uncovered. When the bucket was retrieved, the team meticulously screened sifted or searched through the collected soil sediment from the ocean bed, uncovering a single, unmistakable artifact - a slate blade. Though this was a test, the retrieval of a slate blade from 50 m below the surface demonstrates that humans were occupying these ancient exposed coastlines. In southern Alberta, along the eastern side of the Rocky Mountains, thousands of erratics form a train over km long! When geologists examined them, they discovered that they were all made of the same material, which was sourced to an area around Mount Edith Cavell in Jasper Park. Thousands of years ago, these large boulders fell onto the surface of the Cordilleran ice sheet and were slowly carried outward onto the Plains. When the ice melted, the long train of boulders was left behind. They contain clues that have helped scientists to understand the movements of the ice sheets that covered Canada during the Late Wisconsinan glacial stage. The path of the erratics takes

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a sharp right-angle turn out on the Plains, changing from an easterly to a southerly direction. Scientists believe that the western Cordilleran ice sheet, which was carrying the erratics, met the eastern Laurentide ice sheet and was deflected south. Eskers Eskers are long, curved ridges that develop beneath an ice sheet and are formed from gravel, sand and other sediments that have been deposited by glacial meltwater. Eskers range in height from a few metres to tens of metres and in length from a few metres to hundreds of kilometres. They are very common in northern Canada and were also important dry transportation routes for animals and people in the early post-glacial period. Kame Terraces Kame terraces are narrow, raised ridges of land found along the sides of glacial valleys. These features are formed by the deposition buildup of sand, gravel and other sediments between a melting glacier and an adjacent valley wall. Today, kame terraces are an important economic resource because the gravel they contain can be extracted for use in road building and concrete. However, in the past, they were prime sites for human habitation due to their elevation above the surrounding landscape. The McCallum archaeological site in the Fraser Valley British Columbia is situated on a kame terrace, which formed between the melting ice and the valley wall. As the sediment, gravel and sand built up, the ice melted away, leaving a flat surface that is elevated above the lower ground where the glacier formerly sat. However, ancient plant and animal remains found on several offshore islands off the Pacific coast from Alaska to southern British Columbia provide evidence that some areas of land on the outer coast remained unglaciated and habitable during the Ice Age. These ice-free areas are called refugia. Cape Ball Research at a sea cliff at Cape Ball, on eastern Graham Island off the Pacific coast of British Columbia, has provided evidence that this coastal region remained ice-free throughout the Late Wisconsinan glaciation. Graham Island is part of the Queen Charlotte Island group now called Haida Gwaii , and for many years researchers believed that the islands were completely buried under glacial ice during the Late Wisconsinan. However, the discovery of ancient plant fossils at Cape Ball confirmed that the environment was in fact habitable, and supported a diverse array of plant life. Comparison of the DNA of modern bears with that of the fossilized remains has led researchers to conclude that brown bears have been inhabiting the islands continuously for 40, years, indicating that habitable refugia must have existed in this region throughout the last glaciation. Isotope analysis of the human bone indicated a marine-based diet. The stone tools were made of obsidian that was traced to a source on Mount Edziza in British Columbia. This evidence indicates that people were living on the island by 9, years BP, had established trade networks for obsidian, relied on marine resources for food and were almost certainly using some form of watercraft for travel between the islands of the archipelago and the mainland. Archaeological evidence from sediments in K-1 Cave indicate that bears were present there by about 14, years BP, and salmon were present there by 12, years BP. The plant and animal remains, including mountain goats, marmots and voles as well as several species of birds and fish, preserved in the cave have provided scientists with a unique window into the climate and environment of this coastal region between 16, and 18, years ago. The cave was formed at a time when relative sea levels were higher than present, and wave action eroded the cliff face and created the cave. When sea levels dropped, the cave became a dry inland shelter for animals living in the area. Sometime after 16, years ago, glacial ice covered the mouth of the cave and fine-grained glacial sediments were deposited in the cave by melt water. These sediments buried the organic remains located on the cave floor. While there is no evidence for human use of this cave no stone tools or material culture were found here , it demonstrates that this coastal region was habitable up until at least 16, years ago and capable of supporting a variety of life.

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