

Archeological analysis of the oldest settlements in the Americas

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ABSTRACT

During the last 20 years, new evidence of pre-Clovis cultures in America has appeared. After we show why putative archaeological finds are so polemic in Pleistocene context, ancient claims mainly Brazilian ones, are revisited (Toca da Esperança, Itaborai, Pedra Furada, Lapa Vermelha, Alice Boër). No archaeological find dated more than 12 or 13,000 BP has been able to convince all scholars. Some have stratigraphic disturbances, others dubious dating, or putative structures and artifacts could have been made by natural processes.

By 12,000 BP, instruments and structures point obviously to an effective presence of Man in both Americas.

For some archaeologists, there is evidence of at least two main technological traditions in America during the Clovis period, that point to the entrance of several groups into the continent. Otherwise, independent cultural evolution in North vs. South America, by 11,500 BP would suggest a long previous adaptation of Man during the pleistocene period.

INTRODUCTION

Until the 1960s it was thought that the oldest populations in the Americas were groups of hunters of large herbivores (nowadays extinct, such as the mastodon, mammoth and a type of bison with big horns) which left few and scarce traces, especially in the United States. These remains are essentially the carcasses of the hunted animals, along with some stone instruments, the most characteristic being arrowheads with an original system of attachment to the shaft (fluted points, see Figure 3) called "Clovis points" (the oldest, around 11500 BP) and "Folsom" (11000/10000 BP). These instruments characterize the stage called "Paleo-indian" in North America.

At the end of the 1960s several archaeologists excavated older sediments where there were indications of an older human presence; as projectile points were never found, a "preClovis horizon" was suggested dating from the Pleistocene (geological period previous to 10 or 11,000 years ago).

Slightly different projectile points (called "El Jobo" and "Fishtail", in the form of a fish tail) appeared between 9000 and 11/13000 BP in South America, while at supposedly older sites there were no arrowheads, reinforcing the idea that there was a "pre-projectile points" occupation in both the Americas.

Throughout the continent, however, the putative pre-projectile points sites (before 12-10,000 BP) are regarded with suspicion by many archaeologists, either because the stratigraphy and the dating are problematic, or because the supposed remains of human activity have a natural origin. Skeletons were dated in the 1970s by amino-acid racemization as over 40,000 years old, but it was found that this method is not reliable and all the bones were re-dated recently by the ^{14}C method as Holocene (post Pleistocene period).

In this paper, which is directed more to biologists than archaeologists, I do not intend to make a critical analysis of all the sites presented as proof of the presence of Man in the Americas in the Pleistocene period, but only to show through the most famous examples, the reasons that make it difficult to arrive at definite conclusions about the beginning of settlement.

Some reasons why research is difficult

Geographic reasons

Besides the inherent difficulties found in all archaeological work (risk of stratigraphic disturbances, for example), researchers studying the origins of settlement in the Americas face specific problems. In general, the archaeological sites are only the rare remains of a lot of places of human activity which have been destroyed. Thus the chances of finding the remains of the first waves of immigrants, who were probably few in number, are a priori very few.

If one accepts the hypothesis (very probable) that the first immigrants came from Asia through the Bering strait, the oldest sites in the continent should be found in North America. Unfortunately the possible passage locations are

either submerged (the sea level rose more than 100 meters after the Pleistocene) or probably almost all destroyed by glaciers and the typical sedimentary movements in a glacier and periglacier environment (solifluctions, etc.). Also, large areas of Alaska and Siberia were strategic zones until very recently to which archaeologists had no access (see Map, Figure 1). Thus the probability of finding intact sites documenting the first entry of Man into the continent is fairly remote and the same can be said about the entry into the southern sub-continent. Finally, it is very probable that the coastal regions, rich in food resources, were populated before the inland zones. These, however, are immersed (except for some points on the coast where there was eustatic or orogenic upheaval, as in Southern Chile). In South America, even where there were no glaciers, there were long periods of erosion which left few quaternary formations in the most studied archaeological regions.

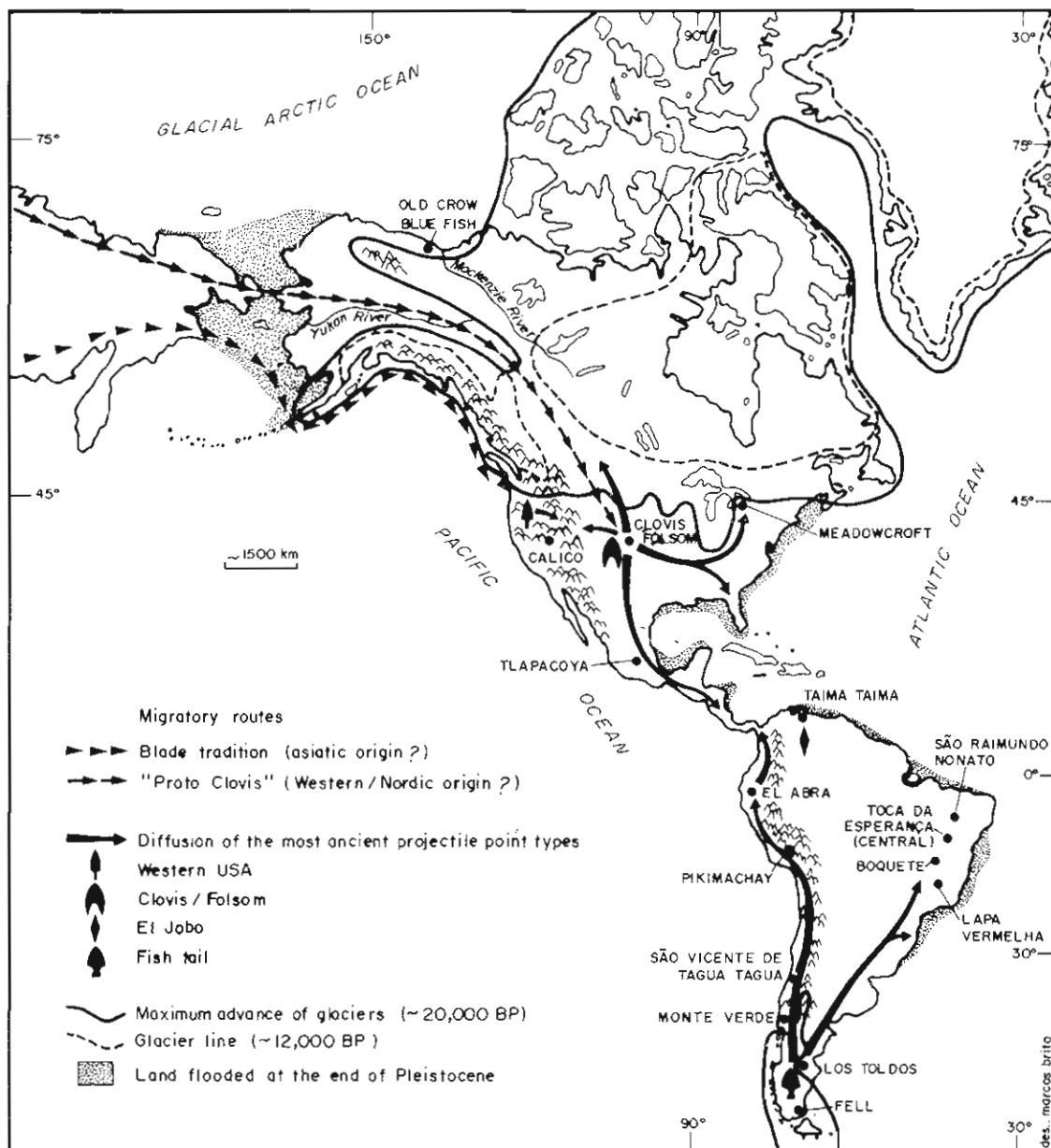


Figure 1 - Prehistoric migration routes in the Americas.

The manufacture of "pseudo-anthropics remains" by nature or the archeologist.

Although the majority of stone instruments (which have a greater chance of survival) made by *Homo sapiens* were usually too sophisticated not to be produced artificially, demonstrating "manufacture methods" which vary from culture to culture, others are fairly crude (but not necessarily less efficient). This is the case of rough stone hammers or choppers made with a few blows on a pebble, shaping a little cutting edge on the original block and removing flakes, which also cut. In places where there are natural accumulations of rock which chip when hit (waterfalls, steep slopes, pebble and gravel pits), accidental shocks occur either among the stones which fall on one another or by the passing of herds of large herbivores, producing identical results (Figure 2A). Artifacts and "ecofacts" can only be differentiated if there is a study of the microremains of their use (which is not always possible nor diagnostic) or a contextual analysis (for example, if the raw material of the object is not available naturally in the very site, or if there is proof of local human activity from other settlements).

Even charcoals, generally considered a proof of prehistoric human activity and used to date sites, may be of natural origin. Spontaneous fires are common in dry environments; there are several vegetable species that flower only after a fire (as in the Cipó range in Minas Gerais, for example) which suggests an ecosystem older than the presence of Man in the Neotropical region.

It must therefore be proved that they were found in a clearly defined artificial structure and not scattered about. Even so, the burning of a tree struck by lightning causes the formation of a concentration of carbon and ashes, sometimes surrounded by burnt earth, as found during our excavation at Lapa Vermelha (Figure 2D).

Even excavated "stone arrangements" may not be of prehistoric origin; tree roots may cause the local uplifting of blocks or pebbles from a deeper layer; the stones become concentrated in the middle of a finer sediment and could be interpreted as anthropic structures by the archeologist (we observed this phenomenon in a bank of the Rio das Velhas, a few kilometers from Lagoa Santa, cf. Figure 2C). Worse, when sediment rich in pebbles is excavated we are always having to choose which blocks to reject and which to collect or, at least, to draw on the plans. This choice is largely a subjective process; we may say that the archaeologist chooses (legitimately) the configurations which seem significant to him according to his perception of the site at that moment. Unfortunately, he may forget other possible configurations, which are rarely mentioned in the literature. This is a constant phenomenon in the sciences, but especially serious in archaeology, as, once the excavation is done, it is not possible to check again, in loco.

We shall see that all the oldest sites only presented remains of the aforementioned type while at the more recent sites, artifacts and more obvious structures are usually found along with the questionable finds.

Psychological reasons

Psychological restrictions should be mentioned: after precipitated statements by pioneers at the end of the nineteenth and beginning of the twentieth centuries, the majority of North American researchers began to systematically disbelieve the supposed "pleistocenic finds". Thus, for a long time few professionals researched Pleistocene layers, which were believed to be sterile from the archeological point of view.

Only at the end of the 1960s new finds reopened the discussion about early settlement. Unfortunately, some rather simplistic interpretations periodically contribute to discredit findings which deserve greater credibility.

The South American Pleistocenic sites

I will deal in more detail with the sites from the southern subcontinent, especially from Brazil, where are the oldest datings put forward at the moment from South American sites. I will present them in three blocks: The very old findings (> 200,000 BP); the moderately old findings (20-50,000) and the latest Pleistocene findings (< 20,000).

The oldest findings

Itaboraí (Rio de Janeiro, Brazil)

M. Beltrão excavated in Itaboraí a Pleistocene gravel layer with extinct fauna and hundreds of chipped quartz pebbles. She reported (at a meeting of archeologists in São Paulo in April 1995) that the alterations in the pieces of quartz implied an age greater than 2,500,000 BP. I will not discuss the dating method here. But when I saw the artifacts some 10 years ago, I thought that none of them were unquestionably human in origin, an opinion confirmed later by J. Tixier. An ex-collaborator of M. Beltrão studied the Itaboraí material in France, and the conclusion also shows only that some pieces *might* be of anthropic origin (Gomes, 1987). Therefore there is no reason to discuss this site any further.

Toca da Esperança (Bahia, Brazil)

Maria Beltrão excavated in this limestone cave with H. and M.A. de Lumley. She found remains of megafauna and possibly stones artifacts (Figure 3A) in layers dated at 200,000 and 300,000 by the $^{230}\text{Th}/^{234}\text{U}$ method (Lumley, 1987). Let me say in passing that dating by the uranium/thorium method is not totally reliable and has already caused disagreements among archaeologists at the Mexican site of Valsequilla, also initially dated as middle Pleistocene and later rejuvenated by ^{14}C . Above all, the artifacts (some flakes and three chipped pebbles, see Figure 3A), although of non-local rock (quartzite), do not convince me. The quartzite comes from the old covering that fossilized the limestone and was dismantled in the Pleistocene, and could thus have been

carried by water; flakes would have been removed by accidental impacts, forming edges similar to those of choppers. An attempt at traceologic analysis did not give diagnostic results (they were carried out with MEB and not with a metallographic microscope, which would have been the best method in this case). M. Beltrão also argues that the gigant anteaters found could not have got into the cave,

which has difficult access; the presence of their bones could only be explained by human intervention. As we do not know the topography of the period and as the action of saber toothed tigers cannot be discounted, (there is a tooth from this feline in the cave), the Toca da Esperança cannot convince any critical person unless new data appears (Lavallée, 1989).

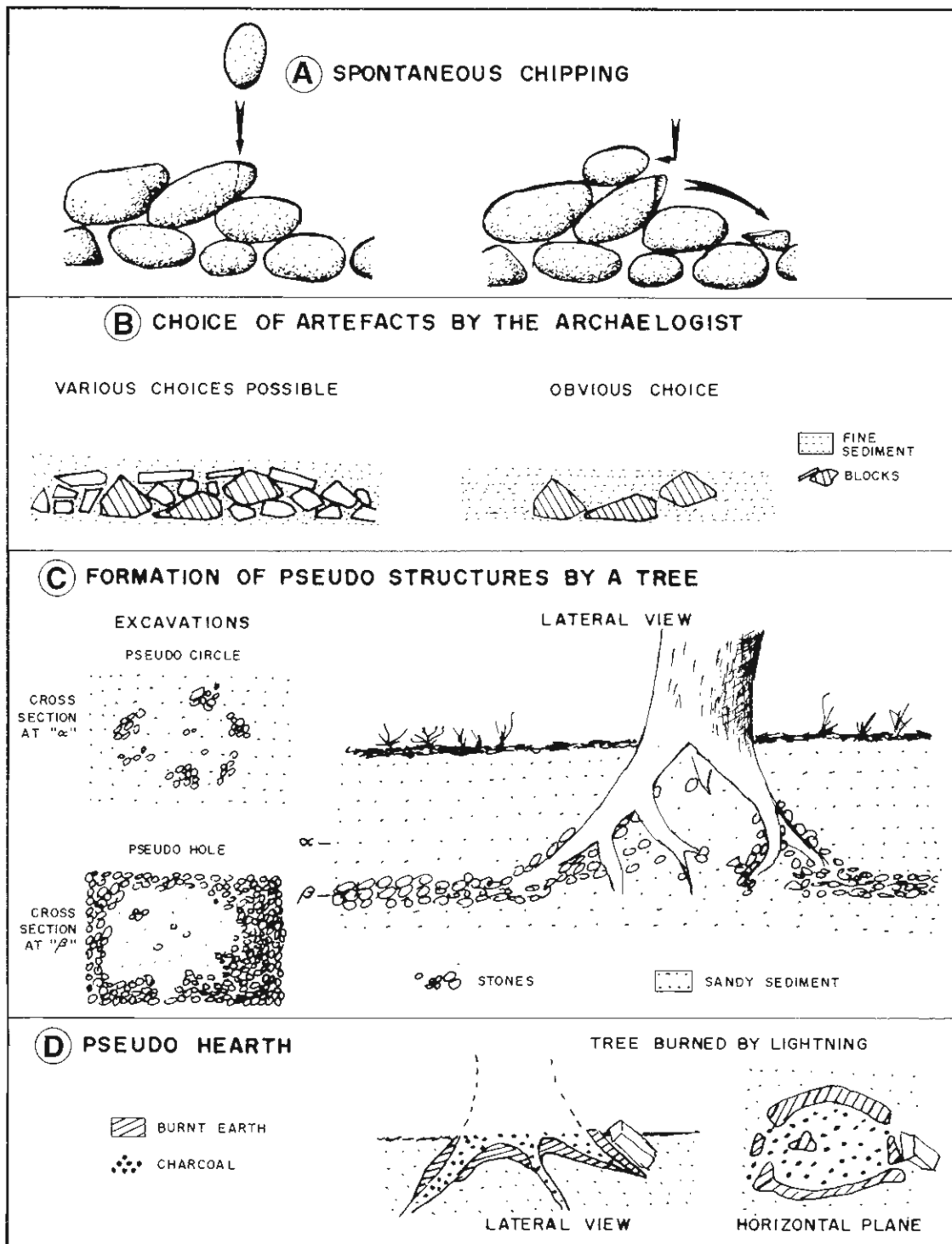


Figure 2 - Natural origin of artifacts.

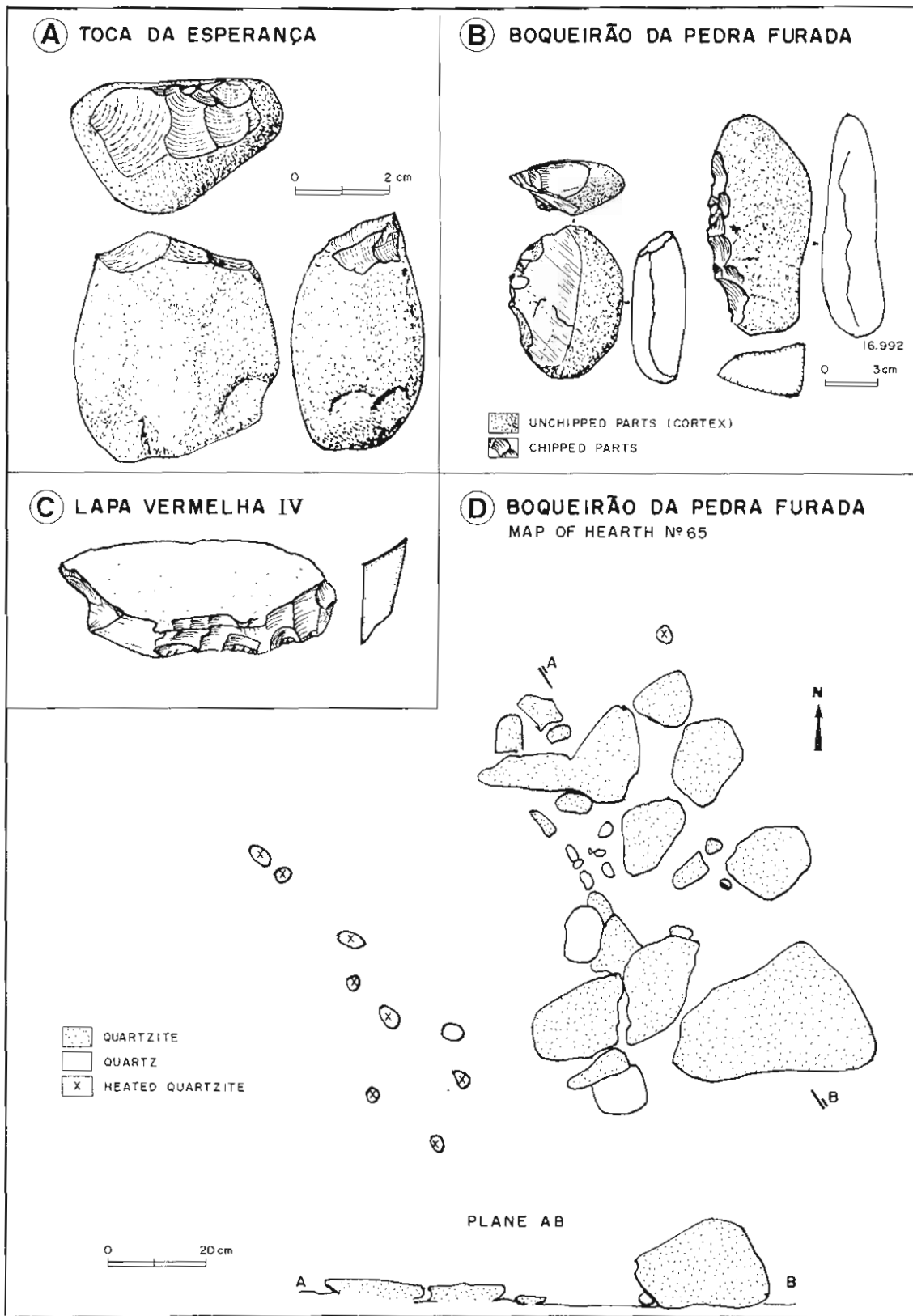


Figure 3- Artifacts at various sites.

It is worth remembering that a doctoral student of H. de Lumley reported in a session of the Academy of Sciences in Paris, that the stratigraphy of the cave had been obviously disturbed; since then there has been total silence about the case in France.

The moderately old findings:

Boqueirão da Pedra Furada and the sites in São Raimundo Nonato (Piauí, Brazil)

Pedra Furada was excavated by N. Guidon in the 1970s and by F. Parenti in the 1980s (see Guidon and Arnaud, 1991). They obtained a long series of ^{14}C datings which go from the middle Holocene to almost 50,000 years BP. These datings came from charcoals which might be fireplaces with blocks of burnt stone (some dated by thermoluminescence), associated with rough chipped artifacts. The numerous datings, generally coherent, are entirely credible. From about 10,000 years ago, the traces of occupation become more dense, typical and unquestionable, while the Pleistocene traces are doubtful. I will now enumerate some of the major problems:

Reality of the "industry": All the supposed Pleistocene instruments are of local rock, pebbles from a layer covering the roof of the shelter and which fall naturally at two points from a height of 80m. F. Parenti (op. cit. 1993) tried to differentiate what Nature was or was not capable of producing by analyzing the pebbles which had fallen recently from the roof. He demonstrated that forms previously presented by Guidon and Delibrias (op. cit. 1986) as proof of human action are still being formed today. But he also states that pebbles with more than three flaking or removal scars on more than one striking platform would be unquestionably artifacts. His arguments, however, are not totally convincing because they are based on the analysis of fallen pebbles under the present climatic conditions, but do not take into consideration that in the past water action may have been more violent, easing the rolling of blocks and allowing two surface chipping. A hypothesis of a more humid climate in the Pleistocene is sustained by the author in other parts of the text. Further, Meltzer and his collaborators (Meltzer *et al.*, 1995) question the statistical validity of Parenti's tests. Parenti himself admits, in his thesis, that "the retouched pieces are more the result of a summary improvement (*aménagement*) of the flakes than the intentional result of a work method", that is, they do not show the logical and systematic characteristics which usually accompany retouching by human hand.

In spite of these cautions, I realize that some rare pieces from the Pedra Furada II phase (such as the quartz pebble no. 16998, Figure 3B) show more complex and apparently "organized" chipping which would be difficult to come from natural accidents; even so, their spontaneous production cannot be totally discarded; my opinion is the same on this point as that of J. Pelegrin (personal communication). I also have not received from Parenti totally satisfactory answers to my questions about taxonomic and

topographic problems in relation to the dispersion of the "artifacts". After all, it is curious that Pleistocene man would have ignored good quality materials readily available a few hundred meters from the shelter and widely used by his successors.

Reality of the "structures": In an environment where there may be natural fires, the claimed fireplaces, identified mainly from stone arrangements in gravel sediments, are not totally convincing because the plans presented by Parenti in his thesis allow several interpretations. What Parenti considers most demonstrative (from no. 65, dated at $42,400 \pm 2,600$ BP, see Figure 3D) does not contain charcoal; dating was obtained from charcoal found *outside* the stone arrangement, but considered associated, which is the case of many of these putative combustion structures. The small burnt pebbles of the structure (heat exposure was shown from the thermoluminescent analyses) were also found outside the arrangement of the blocks which would have defined the fireplace. Parenti explains this by the fact that prehistoric man would have removed them to clean the fireplace. This is an acceptable explanation, but there is another alternative: there was no fireplace. However, I was impressed by a well defined accumulation of stones "dated about 20,000 BP" (presented as slides by Parenti), in the middle of an apparently fine granular sediment; even so, the context and the nature of this possible structure were not properly shown or discussed, at least to my knowledge. There are more detailed critiques in my article published in *Ciência Hoje* (1993) and in Meltzer *et al.* (1994).

Dating of rock art: In spite of what has been published, it has not been possible to show that the red pigments found on rock fragments fallen from the cliff are of human origin (Lage, 1990). As for the panel of "200 buried figures" supposedly dated at about 10,000 years in the shelter of Baixão do Perna, a careful reading of the only detailed publication (Guidon, 1989) reveals that few figures were really buried and moreover were stratigraphically above the level dated at 9,700 BP. The author assessed this ancient age by considering that the artists would not have painted from the floor base of the period; consequently she considers the dating of the floor located about one meter below the paintings. This premise obviously is unfounded and there are examples of rock paintings which reach the base of cliffs in places where the floor is formed by uncovered bedrock (Prous, in press).

The dating at about 15,000 years by AMS of the organic traces contained in a block of pigment found in a shelter is also problematic because the sample was not associated with human occupation and its age does not tally with the sedimentary history of the site (Schaffee *et al.*, 1993).

The enthusiasm of the researchers: Although F. Parenti has carried out a serious analytical study, a series of facts connected with the documentation are a cause of embarrassment, such as the repeatedly premature statements by those responsible for the excavations carried out at this locale and in the region of São Raimundo Nonato. It is natural that researchers should become enthusiastic

about the site they are working on and that they defend their point of view, but there have been pronouncements that could be qualified as extremely imprudent, as can be seen by the information we presented here.

Monte Verde I (Central Chile)

Dillehay (1987, 1994) have found charcoal concentrations and remains of fireplaces and stones used and broken by man at a layer dated 33,000 BP. Above all, a nucleus and two flakes were of clearly human origin. The definitive report has not been published yet and Dillehay has been very prudent about his conclusions in recent publications. However, a stone blade, immunologically analyzed (ELISA test and Western blots) for meat protein showed a positive result, in contrast with the samples of the surrounding soil; consequently the authors suggest that it may have been used by man to cut meat (Tuross and Dillehay, 1995).

Lapa Vermelha IV (Lagoa Santa, Brazil)

This shelter was excavated by A. Laming-Empeaire and A. Prous from 1971 to 1976 (Laming-Empeaire 1979; Prous 1991). The Pleistocene layers are found in a narrow crack where material eroded at the end of the Pleistocene fell from the upper platform. Only a scraper in local stone and a quartz fragment were found at the levels dated between 14,500 and 22,000 BP, along with doubtful pieces of limestone. It is difficult to interpret these findings due to their scarcity and topographical context. Traces consistent with human and extinct megafauna presence only appear between 11,000 and 12,000 BP and the oldest charcoals may be due to natural fires (there are datings over 25,000 BP). We have personally checked the findings of pseudo fireplaces resulting from burnt trees in Holocene layers.

The findings from the end of the Pleistocene

Pikimachay (Ayacucho, Peru)

This site, excavated by McNeish from 1969 to 1972, shows pleistocenic traces grouped in three phases: The Pacaicasa phase shows a few rough artifacts, almost all of local volcanic rock, along with the extinct megafauna. The datings are from 20,200 and 14,700 BP. However, only four of the volcanic rock artifacts are unquestionably human in origin, and there are reasons to believe that they may have intruded from an upper layer. The Ayacucho phase, dated from 14,150 BP is less controversial, although its reality is debated by Lynch; it is characterized by 212 chipped instruments (including rough two surfaced) and some possibly carved bones, along with the megafauna (Edentate, camels, horse and deer). The other phase presents only non-characteristic material.

Monte Verde II (Llanquihué, Chile)

This is a peat site, which preserved the organic remains exceptionally well. The no. II site is dated between 13,000 and 12,000 BP (Dillehay, 1994). There seems to have been a dozen dwellings with wooden and gravel foundation; remains of animal skins were still stuck to the branches that formed the walls. The food remains include seeds, tubers (including wild potatoes) and bones from several mastodons. The majority of the instruments are rough (pebbles of local stone, either chipped or used without modifications, but bifaced projectile points were recently identified. The intrusion from a later occupation of 32 objects (including some obviously chipped) of halogenous rock is a possibility discounted with convincing arguments by the authors. There are clearly recognizable fireplaces, with holes lined with clays and several thermic chips; there is also a human footprint. The large quantity and variety of evidence seen and the critical spirit of the authors impressed the reader, in spite of Lynch's arguments (1990). See also Dillehay and Collins' replies (1991).

Alice Boer (São Paulo, Brazil)

Excavated by M. Beltrão in 1964 and O. Heredia in 1980 (Beltrão, 1974). This water terrace contains archaeological material in a secondary deposit. The base of layer III was dated 14,200 ± 1,150 BP by radiocarbon and contains bifacial projectile points. However, the large margin of error in dating and its discrepancy in relation to the rhythm of the deposit of the rest of Layer III dated ± 6,000 BP makes it doubtful, in spite of attempts to confirm a certain antiquity (± 10,970 BP) by thermoluminescence done in the 1980s. The origin of the charcoals (rolled) makes them possibly not contemporary with the period of deposition, and much less, with the "associated" material.

In Layer V, deeper and not dated (it is a gravel bed containing rolled flint) some instruments of human origin have been found. The conditions of sedimentation and the lack of a detailed publication and critique prevent the formation of a definitive opinion about the site, but suggest spontaneous flaking processes. The unpublished work by Cunha (1987) reinforces this hypothesis, already expressed verbally by J. Tixier at the beginning of the 1980s.

Other sites with findings dated between 16,000 and 11,000 BP

In Tagua-Tagua (central Chile), Montané's excavation showed between 11,380 and 11,000 BP bones of hip-pidions and mastodons piled up and with marks of butchering by man. The industry includes some flakes and nuclei, along with a two surfaced knife of obsidian (volcanic rock).

A workshop with large flakes retouched on one surface, along with a horse and an extinct camel, were found by Cardich (1978) in Argentina at the lower level of Los Toldos. The two datings (8,750 and 12,600 BP) are different and do not permit confirmation of a Pleistocene age. In

northern Argentina, Lynch (1990) mentions fishtail arrowheads, together with giant anteater bones at the Cerro La China, dated 10,720 BP.

In central Brazil, in several shelters in Peruaçu (especially the Boquete) thousands of flint flakes were found together with numerous flat-convex instruments and one bifacial point along with food and combustion structures dated between 12,000 and 11,000 BP (Figure 4B). In Santana do Riacho, a set of coals dated at 18,000 BP probably corresponds to a natural fire; another dating, 11,960 BP, corresponds to a very thick layer of ashes and coals, unfortunately laterally eroded. Two small quartz flakes and grains of prepared red pigment were found in the middle. The very few traces do not allow its characterization as a settlement. In spite of the care with which the excavation was undertaken and the presence of several sterile centimeters above the finds, the diminutive size of the artifacts does not allow complete dismissal of the possibility that both flakes and pigments may have filtered down from the more recent burials situated above.

In the Brazilian northeast, the Toca do Meio has a reported occupation layer dated between 12,200 and 14,300 BP. The findings have not been published in detail, but they seem to be subject to the same kind of criticism as those of Pedra Furada.

We will mention the find in Minas Gerais (Lagoa Santa) and in the State of Bahia (Brejões) of *Eremotherium* and mastodon bones cleared carved by man (Prous, 1986). However, the so-called "Pleistocene fauna" seem to have survived until at least 10,000 BP in central and western Brazil (Lapa Vermelha and Santa Elina; see Vialou and Vialou, 1994) and maybe until very much later in the State of Bahia as unpublished datings (obtained independently by M. Beltrão and myself) suggest. So, the association between the megafauna and man, even when obvious, does not confirm a Pleistocene age in Brazil. The same has been known a long time for Argentina.

In Venezuela, I will mention Muaco (16,374-14,300 BP) where there was an association of Pleistocene megafauna with clubs and projectile points of the El Jobo type. The site at Taima Taima, excavated by A. Bryan and Casamiquela, showed the presence of an arrowhead of the "El Jobo" type in the abdominal cavity of a young mastodon (13,000 BP); in both cases, according to Lynch (1990) there are clear indications of stratigraphic perturbations.

In Colombia, two datings of 11,121 and 13,000 BP correspond to some chert flakes in one of the El Abra shelters.

In Peru, besides Pikimachy, some chipped stone instruments dated between 12,500 and 9,140 BP were found at Guitarrero.

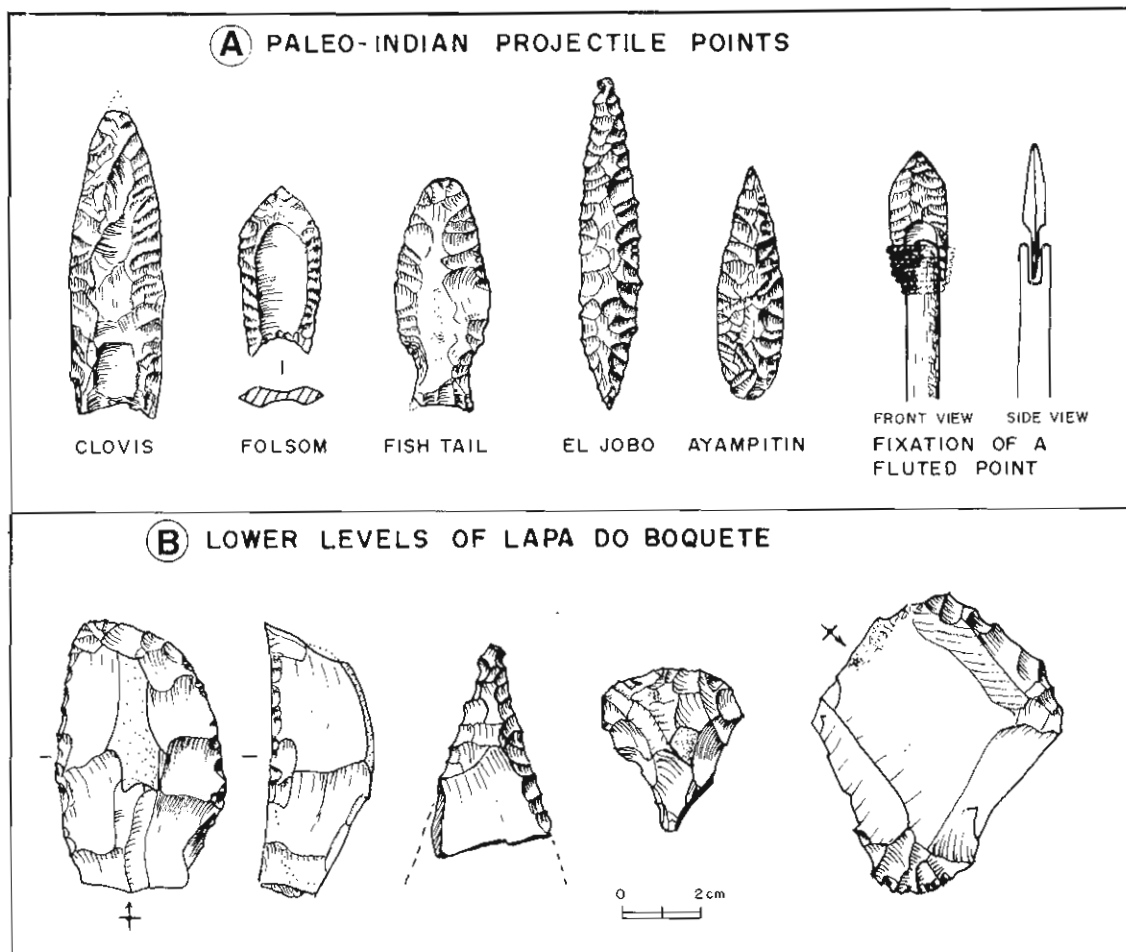


Figure 4 Projectile points and other cutting/hacking tools.

North and Central America

The possible sites in the extreme north (Yukon-Alaska) do not provide stone instruments, but bones supposedly broken and transformed by man. The best known is *Old Crow*, where some of the most convincing instruments were unfortunately related recently as Holocene. At Blue Fish, flaked stones buried along with mammoth bones are dated at 18,000 BP. In western Canada, pupils of A. Bryan are now excavating at a site more than 20,000 years old (A. Bryan, personal communication).

In northeastern USA, the most convincing site is Meadowcroft, excavated by A. O'Keefe, and which supplied many flakes, besides 13 retouched instruments (one bifacially worked) dated between 19,600 and 15,000 BP, in a well controlled stratigraphic context. Unfortunately the paleoclimatic indexes (fauna, pollens) show a temperate environment which does not tally with the proximity of the ice sheets at the time; there should have been vegetation similar to tundra at this time; so, there will be doubts about the real age of the instruments until an explanation for this discrepancy is found.

In California, Calico showed numerous supposed stone artifacts and "stone structures", some of which, marked with fire, were interpreted as fireplaces. Geologically the formation is dated at more than 70,000 BP and a carbon sample proved to be older than 45,000 BP. This site, which benefited from the great international repercussion of having been excavated by L. Leakey, is rarely taken into consideration today and the general opinion is that the chipped stones of the old levels are "geofacts".

I will single out El Cedral (Potosi, Mexico) in Central America, a possible hunting place of megafauna (mammoth, mastodon, horse, cameloid) who searched for the scarce water holes in the region. A fireplace constructed with *Proboscidae* bones was dated at 31,850 ± 1,800 BP. At the same site, some rare chipped artifacts dated between 15,000 and 33,000 BP along with supposedly carved bones (21,960 BP) were found.

Near the Pleistocene lake of Tlapacoya, a fireplace surrounded by stones along with two obsidian flakes and chips of local stone were dated at 24,000 ± 4,000 BP. A site recently excavated by A. McNeish has also supplied old datings, but nothing has been published yet about it.

Finally, Gruhn and Espinoza found in El Bosque (Nicaragua) possible stone and bone instruments associated with *Erethotherium* and *Amerhippus* (32,000 to 22,000 BP).

CONCLUSION

In spite of the growing evidence of settlement prior to 13-12,000 BP, and the certainty that man was unquestionably present on the southern sub-continent in this period and necessarily before then in Northern America, all the oldest sites are the object of strong criticism. Perhaps it is useful to remember that many descriptions of holocene sites also have disputable statements, but no doubt of the

presence of man in this period can be raised. The "unfortunate" excavators of Pleistocene sites are however subject to more of contestations and arguments by their colleagues, than is usual.

If the evidence of some of the Pleistocene findings so far mentioned is accepted, it is obvious that the first American settlers had little interest in making sophisticated stone instruments, as if they had lost the technical memory of *Homo sapiens*, to use the expression of D. Lavallée. Although this may have happened in environments where no stones were available, it is hard to explain in the arctic regions where the raw lithic material was always abundant. It is true however that the oldest traditions of eastern Asia did not concern themselves with the quality of the stone work. Anyway, this rough character of the supposed Pleistocene instruments fits with the idea that there existed a "pre projectile point" stage, from a cultural stock completely different from the "paleoindians" (owners of fluted points), whose industry was quite similar to those of the upper European and Siberian populations during the Paleolithic period. For A. Bryan, these "proto Clovis" populations would have entered America through an ice-free corridor between the glaciers, and would have begun to manufacture their fluted points only when they arrived at the great plains of the United States. In the meanwhile, other groups, with different stone blade manufacture technology (of Asian tradition), would have moved along the Canadian coast and began to make unfluted points about 12,000 BP in the western United States.

If this hypothesis is accepted, there could have been two genetically distinct population one (west of the Rockies) with proto-Asian characteristics and another (to the East) more related to western populations of the old Continent. On the other hand, according to A. Bryan, the South American projectile points may have been invented independently of those in North America; some show individual features such as the Patagonian "fish tail" base (dated about 11,000 BP), while others, such as those of El Jobo, would be older than the North Americans. The arrowheads of both families are found in Panama; their almost simultaneous appearance at the extreme north and south of the Americas would, therefore, result from an adaptive convergence rather than from an accelerated migration of the arrowhead producing populations. For such diversity to occur at the end of the Pleistocene, a delayed maturing and, therefore, a long Pleistocene occupation must be supposed.

Most authors (especially North Americans) traditionally consider that the first immigrants were specialized hunters of megafauna in the same way as their United States Holocene successors, owners of bifacial projectile points. This idea came from the fact that the discoveries of archeological sites are often the result of studies of paleontological sites where the remains of giant mammals are sometimes found together with worked stones. It is, therefore, likely that the first "Americans" had quickly developed varied strategies. This has already been proven for the Clovis and Folsom type carriers (eastern USA) that do not have their sites associated with giant mammals (Bryan, 1991;

Meltzer 1993). Bryan uses this point to explain the differences between the sites left by the owners of bifacial projectile points, making unquestionable artifacts, hunters of large animals (in regions with little food choice) and sites left by generalized hunter-gatherers (in regions with more numerous and varied resources) which did not need such elaborate artifacts and may have produced only rough flaked artifacts which the skeptics do not recognize as instruments. We must, however, consider that the hunter-gatherers may sporadically hunt big game and that most of the populations that used stone in the last few hundreds of thousands of years, produced unifacially flaked instruments (Figure 4B) that are as diagnostic of human work as the Paleo-indian bifacial points are. We cannot therefore, explain beyond doubt the rough aspect of the artifacts under discussion based on the type of economy.

Today, not only skeptics (such as T. Lynch) and believers (such as A. Bryan, 1978, 1986) of a remote human presence, but also supporters of a long chronology themselves keep continuously criticizing each other (cf. Meltzer, Adovasio and Dillehay X Guidon, Nuñez and Santoro X Dillehay, etc.).

Thus, faced with numerous rough instruments, doubtful structures and complex stratigraphy, not to mention human error in the excavations and analyses, the impartial scientist has no choice but to remain a skeptic in regard to the sites and collections he knows only through the literature. Even visiting an already excavated site does not solve the problems linked to the excavation procedures or the reality of supposed structures. Re-excavation of the intact parts of the sites under discussion raises problems of availability (all the archaeologists are already involved in their own research), operational and psychological difficulties. Most frequently the opinion remains dependent on the internal criticism of the data already published in the bibliography, which is frequently unclear or limited to previous insufficient notes (when these are not contradictory). Archeology cannot, in 1995, be a substitute for the limitations of other disciplines such as paleo-linguistics or paleo-biology. We are all at the beginning of the path, and fortunately have a lot of work ahead.

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RESUMO

Nos últimos vinte anos, multiplicaram-se os indícios da presença humana nas Américas antes da cultura Clovis nos Estados Unidos. Depois de expor as razões que dificultam as pesquisas e a identificação de eventuais achados arqueológicos de idade pleistocênica, passamos em revista os principais sítios que proporcionaram datas de mais de 11.000 anos nas Américas. Analisamos particularmente os sítios brasileiros (Toca da Esperança, Itaborai, Pedra Furada, Lapa Vermelha, Alice Boêr).

Finalmente, parece que nenhum componente supostamente arqueológico com mais de 13 ou 12.000 anos satisfaça a maioria dos pesquisadores: há dúvidas seja em relação às datações e à estratigrafia, seja quanto a origem antrópica dos artefatos e das supostas estruturas. É quase certo que o Homem tenha penetrado no continente americano bem antes do final do Pleistoceno. No entanto, ou os vestígios deles ainda não foram encontrados, ou, então, deixaram instrumentos tão toscos e estruturas tão atípicas que poderiam ser creditados a processos naturais.

Por volta de 12.000 BP, instrumentos e estruturas evidenciam uma presença humana consolidada. A análise dos artefatos mais típicos (como pontas de projétil) sugere a certos autores a existência de pelo menos duas tradições culturais (relacionadas às ondas migratórias distintas?) na América do Norte. Discute-se ainda se o surgimento aparente simultâneo de certos traços culturais na América do Sul e na América do Norte seria conseqüência de uma difusão ocorrida numa velocidade extrema, ou seria o resultado de uma convergência. A existência de duas tecnologias independentes cerca de 15.000 anos atrás nas duas Américas significaria uma longa evolução prévia durante o Pleistoceno.

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