

REEL 1 (~~Side 1~~)

Crabtree: On the other side which is quite different an unusual piece of palm wood which is quite distinct in this array of fossil wood. I can't see on the end of the table very well, and I think Dr. Bordes can see them better and tell a little more about them. This is a little out of my category, so I would like to turn this over to Dr. Bordes.

Bordes: Well, these tools which are just to my right, looks as though they could all pass for a medium grade of Mousterian. Almost all of these there are a kind of crude scrapers, choppers, and better scrapers. Kind of ~~scraper~~<sup>thick</sup> nosed scrapers or something like that, bad cores. And here are chopping tools rather than choppers. Chopping tools worked on two edges, an occasional blade which is retouched on two sides, and that's an end scraper with very flat retouch, very, very flat. That's a bit of a bifacial tool and not very good. Scrapers, scrapers are everywhere. End and side scrapers, big flake. They hit a hard blow on this one. Not much else to say except that they seem to have done a lot of retouch on the flat face of this one too. This one also. Bit of bifacial tools, broken. This doesn't belong to this thing. Well, but scraper. Oh, I should say a flake with a badly faceted striking platform not too well defined on bifacial face by several scars and ~~scars~~<sup>So on</sup>, and then some retouch with step retouch from one side which is perhaps due to the nature of the material rather than the technique of the typology. That's all right but it takes five or six lines. I would call that, you know ascina scraper and I think that they are the same. As for this obsidian debitage, well, I am not too well today, but I think I could do better. It's not a very good job. Well, these poor people, they had no real culture yet.

Irwin Williams: Yes, they probably did.

Bordes: It is hard to explain. That's a peasant culture. Peasants culture, yes. Well, they didn't do much with obsidian. And, for the points, they look not so bad

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considering the material. What's this, petrified wood?

Irwin  
Williams: Yea.

Bordes: Yes, that's hard to work. This is rather fancy but I wonder if it was very effective as a point. They did not know better, probably. What. Yes. Rather strange this one. All right, but that's a later one?

Irwin  
Williams: Yes, this is later. That's a basketmaker.

Bordes: Yea, that's better. Much better. Well if you want to be optimistic. They succeeded up to a point. And here, other end scrapers. Some side scrapers.

Irwin  
Williams: These are late.

Bordes: Ah, that! A kind of bifacially worked flake with longer retouch on one side and shorter on the other. But I would call it a bifacial scraper, which can be a knife, of course, That's something else? That's obsidian?

Irwin  
Williams: Yes, that's a kind of cloudy obsidian.

Bordes: That's nice material - this one. And that's what's that one?

Irwin  
Williams: Just more material from the same late series.

Bordes: Ah, that. What do you think of this? Is it not your state?

Crabtree: No, I don't believe it is. I rather think that this had been in a fire. Accidental or not there is no way of knowing.

Bordes: Same stuff.

Crabtree: Excuse me, Cynthia. This one right here appears to be also - more wood.

Bordes: That's the same stuff, I see. Some obsidian. Ah, ah! This one is backed. No question. Pocket knife, yes, no question. Small, but no question, this is the first one I have seen in all this American material. Yes.

Phil Smith: What is it Prof. Bordes?

Bordes: Pocket knife. A pocket knife.

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Irwin Williams: That is because ~~he~~ a very backward people.

.....

Bordes: You are sure that it didn't drop from your pocket.

Irwin: No, I'm sure sure sure.

Bordes: That's the first example of backing I have ever seen in American stuff. I don't say that they do not exist, but.

Irwin: I mean that's not preparation, that's just actual backing.

Bordes: No, no question. Not backing. <sup>?</sup> All right, ~~that~~ <sup>that</sup> there is no preparation. That is not the side of a core. They took off the little blades and made this from here, you see. A little platform here but a lot from here. Now, that's an interesting tool.

Irwin: Are there many of those?

Irwin Williams: No, that's the only one. I brought it along because I thought it might be interesting.

Bordes: That was ingenious.

Crabtree: Dr. Bordes, I found one that redeems them slightly. This one right here. This one looks like they knew how to take off long blades. There is only one, but the percussion work is very good.

Bordes: Yes, yes, yes.

Irwin Williams: I would imagine that's intrusive.

Bordes: Ah, well, well, well don't fight them. They are your people, after all.

Phil Smith: What type is this?

Irwin Williams: Well, this is not necessarily that.

Tixier: What type is this does it go with these?

Well, this does, but ~~not~~ necessarily that. I have never seen another quite as finely made as that one.

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- Tixier: Like upper Paleolithic.
- Irwin Williams: And I would guess - a progression and degeneration. But we get this kind of thing.
- Crabtree: Yes, it appears to be.
- Tixier: But on the other hand, you see.
- Crabtree: Little preparation. It's a shame they waste obsidian like this.
- Irwin Williams: Well, they didn't know what they were doing. It can be seen by the points that they turned out, or at least the tools. Well, these people's main interest was in grinding up either <sup>wild</sup> ~~wild~~ or agricultural materials. They have dozens and dozens of grinding stones for every projectile point. And hunting is apparently a very secondary kind of pursuit. With one interesting thing. You mentioned that you thought that perhaps these had been made because they needed a sturdy heavy kind of point. Well, certainly the kind of game that these people were hunting doesn't necessitate this kind of thing. Primarily deer, and rabbits and this sort of thing.
- Bordes: Rabbits, ah yea.
- Irwin Williams: Rabbits.
- Bordes: Rabbit's hide is hard. And if you know, if you shoot a rabbit, you shoot downward, and so if you miss it, your point is gone except if it is very strong.
- Irwin Williams: In other words these people were also bad aims.
- Bordes: <sup>Oh, no!</sup> Try to shoot a rabbit with a bow and arrow. That's not so easy as it seems.
- Irwin Williams: Well, this was probably with dart points, spear.
- Bordes: Spears are even worst.
- Irwin Williams: Well, I would assume that most of the, not all, but most of this has been done apparently by percussion.

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- Crabtree: It appears to be.
- Bordes: All of that anyway.
- Crabtree: With the exception of the little serrations on this side here, and some of this work here, but this is very simple to do with a tiny pebble. Or with extra piece of sharp flint you can do this. ~~They are even abraded,~~ <sup>The</sup> ~~notches~~ <sup>notches are even abraded</sup> ~~notched.~~
- Bordes: That's percussion here. Perhaps a little pressure, but they are not much farther on pressure flaking that I am, rather less.
- Irwin  
Williams: Rather less.
- Tixier: And their arrowheads are more beautiful in quartzite than obsidian.
- Bordes: Ya. But you know, that it is easier to work quartzite than obsidian, except when you know. Oh, yes. Oh, yes. I would rather work this than obsidian.
- Epstein: We agree, we agree.
- Crabtree: It depend on the different techniques.
- Bordes: On the technique you use and quality of the quartzite of course. No, no, no.
- Crabtree: It looks almost like a blade whether it is accidental or not - there is not enough there to tell.
- Irwin  
Williams: I wonder if you thought that might have been heated.
- Crabtree: Yes, I'm sure it has. I'm sure it has.
- Bordes: That's an important thing, you know.
- Irwin  
Williams: Well, all right, we'll make it a little later.
- Tixier: Scars on obsidian - an end scraper.
- Irwin  
Williams: The ancient mariner. Yes, it looks like it.
- Irwin: Even that is characteristic.
- Irwin  
Williams: Well, does anybody have any more comments or shall we move to another group of materials.

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Bordes: All right, let's move.

Epstein: The material on the table now consists of material from two sites in Mexico. The heavily patinated, tan patinated material comes from San Isidro site which is an open site about <sup>forty</sup> 40 miles east of Monterey in Northeastern Mex. In the lowland section of that area. It's a very hot, dry region. And this site was discovered in 1960 and excavated in 1962 with very little results of excavation. The site seems to have been uncovered rather recently, but how many times this last recent exposure represents in the history of the site, I do not know. But there are a whole series of fire hearths that seem to be in almost perfect condition, that is, there are circles of concentrations of rocks maybe <sup>three</sup> 3 feet in diameter and in and around the hearths are these heavy artifacts. Most of the artifacts are heavy percussion bifaces of this general kind. Some twice, sometimes three times, as large as the ones on the table, and they vary in size. Second in number are these pebble choppers which are unifaces on unifacial and bifacial and some of these weigh as much as four and five pounds. Going along with that, are such things as what we call in Texas, bifacial clear fork gouges of which this is representative. And throughout are whole series of what I think of as very heavy percussion flakes. Some of them have relatively straight platforms and some have rather faceted platforms. These flakes that I am bringing here are the smaller flakes. Some of the flakes are enormous, being of this kind. In terms of the faceted flakes, most of the flakes that are faceted are struck at the high point of the platform. Also, in this area, in this region of Mexico projectile points are the most common single artifact one can find. And yet at the San Isidro site Projectile points were very uncommon. We found a few, once, to lump these things together and called them something or other. We found <sup>fourteen</sup> 14 of these. And they were all within essentially a very small area of the site. We found <sup>five</sup> 5 of these, or things identical to this. Actually this is almost identical to

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a specimen that MacNeish found from Tamaulipas called Lerma. Almost identical in terms of the photograph of his stuff and going along with something like this. These are some of the projectile points found. There is also some very recent projectile points found at the site. The material itself is a highly silicified limestone. Where is that clear fork gauge? And it consists of essentially black material, which is patinated, as you can see. There was no context in which this could be surely dated except that the material that we found in the survey was not like this. And recently, as a matter of fact, I am working on the site now, we stopped digging just to come up here. There is a site near Lenores on a second terrace, it is a two terrace arrangement and this is the high terrace, the cave up in the high terrace is about ~~75~~<sup>seventy five</sup> to ~~80~~<sup>eighty</sup> feet above the ground. There was a ~~5~~<sup>five</sup> foot cultural deposit lying on top of gravels in it and then because I had been to Combe Grinelle and seen Bordes excavations, I decided to go through the gravel and there was about ~~2~~<sup>five</sup> to ~~5~~<sup>five</sup> feet of gravel in the section of the cave that I dug through and this was lying under the gravel. And, so far, the kind of material found with that are the large flakes of this kind but, so far, none of the thinning flakes that one would find in making a biface such as this or something like this. We have abundant carbon ~~14~~<sup>fourteen</sup> sample on this material, but we won't have that run until about a week from now.

Bordes:

That's a pity. *I would like it though.*

Epstein:

In terms of typology one thing that comes up at this site which does not come up here are these. The pebble tools, unifacial we have, but these things, which are pebbles largely that have been miserly unifacially worked, with just a little bit of bifacial working, do come up at this site, but do not show up at San Isidro. This material is known as Oue Vedal a Zona, because it is very close to a zone of rock fall in that area. That's all.

Bordes:

This material is very strange. And it seems from what Epstein says that they

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are always small flakes. The biggest flakes not being there. Well, of course, there were flakes which were struck rather hard but most of them not by stone but by, rather, <sup>by</sup> a soft hammer. This is more the characteristic of wood on the first flake. This one perhaps, no I don't speak of this one. This one perhaps, but <sup>soft</sup> hammer anyway, not a very hard rock. This could be stone struck. It is difficult because patination is so heavy, but on the other hand this one does not seem stone struck. Seem <sup>they</sup> used it as some kind of stone hammer. This belongs to same.

Epstein: It's the same open site. That's all I can tell you.

Bordes: But you have not found it here. And these projectile points are rather surprising and I wonder if these two are not intrusive I wonder. I don't know <sup>the material</sup> the site, and so on.

Epstein: I wonder too.

Bordes: This one could be a burin. They seem rather much fresher, than the other as far as patination goes. Perhaps it is not the same material I don't know if this is the same material as that. Looks like.

Epstein: On the patination, it is very difficult to tell. There is definitely a <sup>re-use</sup> reuse of tools evident at this site. In other words, some tools will have been used, some bifaces have been used and then the new flakes on it, the patination is much less. Of course, patination can vary with the amount of exposure and it is difficult to tell looking at this open site which side has been exposed.

Bordes: Ye, yea, of course, but it seems rather strange that the four projectile points, <sup>four</sup> all ~~of~~ of them, seem to be of the same material ~~but~~ much less heavily patinated that the others. This <sup>one</sup> is a little bit. Not the same kind of patina, you know. This is, you know, I would say, let's say it is worse in France on the plateau. I would say that this is Paleolithic and this is Neolithic. Of course the patina can be but I think that if you have enough material, as statistical as this of the different elements following patination could, perhaps, give you

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something interesting. It works here, and on the plateaus. Of course, you will find on every patina some that are not too bad and something like that which is not very patinated. I would be rather surprised if there was the same ~~preparation~~ <sup>patination</sup> in the two kinds. This looks very good, it doesn't mean much. Could be a peasant culture, you know. And this you say comes from below the gravels in the cave?

Epstein: Pardon me. Just one thing. This has a slight sheen to it because point one: when these were found they were heavily encrusted with limestone and when the finish of the limestone after it was through with acid was so ~~different~~ <sup>difficult</sup> that I decided, I just touched it up with oil. So there is a sheen to it because of an oil finish on it.

Bordes: Yes, yea, yea, It doesn't matter.

It also photographs better with oil.

*the Salutrea condo*

Bordes: We have seen this. Yea. After all, not only ~~the work in~~ thinning but also the people with the chopper chopping tools. That looks very much like the old culture of Font Robert I don't say it is. I don't say it is, but if you find a little like well, why not. Who can tell. That's really quite different. Even this one.

Epstein: Try fluting on that or thinning and I was wondering whether Mr. Crabtree would think of that as fluting or thinning or what?

Crabtree: It's reminiscent of some of the very rudimentary Clovis sort of thinning with the step fractures. He pressed and then stopped, or attempted to stop without the flake going on through. He got a step fracture here. He was letting it go as far as the pressure would allow before he let it come outward. But this material appears to be comparatively soft and your observation of their utilizing a ridge for the impact, is quite important. To concentrate the force of the blow up on this projection so that they can carry their cone on through-

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~~He got a step fracturing here. He was letting it go as far as the pressure would allow before he let it come outward. But this material appears to be comparatively soft and your observation of their utilizing a ridge for the impact, is quite important. To concentrate the force of the blow up on this projection so that they can carry their cone on through. But, because of the softness of the material, these seem to be going inwards from the leading edge. Shows almost a shattering before that one. It demonstrates considerable toughness of material yet they have the ability to come up with a point such as that. It's quite amazing if this is all the same material.~~

Bordes: This is what I call in France a <sup>dihedral</sup> diagonal striking platform and it is very, very common one, but very peculiarly the point of impact is not just on the ridge, but just beside.

Epstein: What kind of a platform is it?

Bordes: Dihedral striking platform.

Epstein: ~~Dialog?~~

Irwin  
Williams:

Dihedral.

Bordes: Dihedral.

Epstein: Now what is the <sup>H</sup>chapeau de <sup>H</sup>gendarme.?

Bordes: Chapeau de <sup>G</sup>gendarme, ah, something quite different. It would be. Have you a pencil somebody and a bit of paper? Here is a pencil and a bit of paper and the <sup>H</sup>chapeau de <sup>H</sup>gendarme would be. Oh, God damn this tool! <sup>it would be</sup> A striking platform like that with small faceting, you know, with this shape. What you have here is a <sup>dihedral</sup> diagonal striking platform. And, generally, <sup>the</sup> point of <sup>impact is</sup> percussion, not just here, but here just beside. Because just try to strike exactly on the edge and you catch a ridge and, pop!

Tixier: I think that you have to make one. You have to make one.

Bordes: Yea, yea. It's not difficult. And here I would say is a striking point. Here

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was a ridge and a striking point is just here, just beside. Why they use this kind I don't know, but perhaps this is just a flake taken off of one of these chopping tools or no bigger.

Epstein: I think.

Bordes: Well, here is indicative of a convex striking platform. This material. Yea, yea, yea. That's a good one.

Tixier: That's a good one.

Bordes: It is not bad from what I have seen here.

Epstein: Interestingly enough, in the area where I am working there are apparently no burins.

Tixier: What kind of raw material?

.....

Phil Smith: There's one almost as good.

Bordes: *That's* Almost not quite except for the true Chapeau de Gendarme it should be a little like that. That's a convex striking platform. In the value of Chapeau de Gendarme it is like that. No, no, no, they did not quite get to the Chapeau de Gendarme. That's a convex striking platform. The Chapeau de Gendarme is a variative of the convex striking platform which looks like the old hat in the French Gendarmare. Yea, and this kind of tool, how you call it?

Epstein: We call it a clear fork geuge in Texas.

Bordes: Clear four?

Epstein: Clear fork, a gouge.

Bordes: A gouge - oh, yes.

Tixier: But, we call it in Egypt, an adz.

Bordes: Is this known in other cultures in America?

Epstein: Yes, it has a very wide distribution in the American Plains, ~~large~~ I think, the well stratified evidence in Texas indicates that this is associated with Plainview, so called Plainview points and ~~hierma~~ *terma* when the evidence is well documented.

*largely but outside of the plains, I don't know.*

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- Bordes: Could be. Could well be that those belong to the same thing but it is rather surprising but anyway, nothing is impossible. That is very rough work, huh? I would not call that a projectile point. That's rather rough. This, this, I don't know what it is. Here a kind of bad scraper. Chopping tool. Their best tools are chopping tools, by far. Oh, well. Have you seen anything like that in Siberia, Marie?
- Wormington: Some of these big things and even larger than this are the sort of things that they call skreblo that you get at Afontoba Gora. That's part of the tradition which is quite different from Malta and <sup>Guilera</sup> ~~guieriere (cl. s. p.)~~ and there is now a radio carbon date in somewhere in excess of 11,000 years for the lowest level of the Afontoba Gora where you do get this general type of thing.
- Bordes: Yea, that's a small ax.
- Epstein: These large triangular things which is here about <sup>two and a half</sup> ~~2 1/2~~ inches wide and maybe <sup>five</sup> ~~3~~ inches long. These have been found in Texas in dry caves hafted to a branch, in other words a branch about this large, which has been split in half and then tied at both ends.
- Answer*
- Bordes: Yea, yea, I am not at all surprised.
- Tixier: Hafted like this or like this?
- Bordes: No, like that.
- Epstein: This is the branch here. Yea, like this.
- Tixier: An ax.
- Bordes: Looks like. Rather a nice thing. Yea, strange. These Americans are crazy!  
No more comment?
- Epstein: Do you have any more comment on this, Mr. Crabtree?
- Crabtree: I haven't any at all. It is strange material.
- Epstein: Well, here may I ask you one question? I think that I have seen points called

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Palasaides points in, who's the author of "The Old Cordilleran Culture"  
Butler? I think he illustrates a point like that that he calls Palasaides.

Irwin  
Williams: Cascade.

Epstein: Cascade, I'm sorry. And it has a certain amount of serration in it and I  
was wondering if it is at all related.

Crabtree: This is unique. In getting away from this sort of pressure, which is very  
rare. I mean, I thought I had seen many many points in the Northwest but we  
never see this type of diagonal flaking. Either they hold down the artifact  
and push away from the body or they are left handed men doing it this way.  
The Solutrean are straight in, straight in like this, but to turn it like this  
is strange. There are well defined bulbs ~~in~~ of pressure flaking moving  
ahead instead of following the ridge and staggering their flakes exactly right,  
without the help of the ridges. A slight step fracture there on that side, but  
not a great deal, of regularity. However, the direction of the flakes certainly  
indicates ~~being~~<sup>pressing</sup> towards the tip rather than towards the base of the point.  
I'm not familiar with the Cascade points.

Bordes: Nothing more.

Crabtree: No, I wouldn't like to say anything about them.

Bordes: <sup>any</sup> ~~no~~ question.?

Irwin  
Williams: Well, no except that I think the Cascade points generally have considerably  
more bipointed effect.

Wormington: } You have same there.

..... I think ~~that~~ Dick has a Cascade point that you can use to compare it <sup>with</sup>

Irwin  
Williams: Oh, good - a cascade.

Daugherty: This is coming closer to what we are talking about.

Irwin  
Williams: See the point of balance is considerable farther up, <sup>T</sup> the widest point is

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considerably farther up the point than the Cascade stuff. Here it is essentially at the base.

Bordes: Finished?

Irwin Williams: Well, the only other comment that I have is that I think that both Gerry's and to a somewhat lesser ~~stuff~~ extent - my stuff from the Southwest, indicates at least the possibility, and in my case the probability, of the association of relatively well made points and these extraordinarily crude things. And, I think, it is interesting to think about the problem, anyway, of the many comments that have been made on our early cultures, the cultures that have no context, surface materials, etc., which are sometimes considered to be very early just on the basis of pure typology. The point is that it is perfectly possible for people to make stuff like this or like the Cochise, San Jose choppers and scrapers, planes, etc. and at the same time be producing perfectly ~~strictly~~ functional bifacial projectile points for spears or whatever.

That's all. *(break in tape)*

Daugherty: However, that was without heat treatment and I'm sure it is older than that. Geological studies have suggested that it is probably a couple of thousands years older than that. But we have, I didn't bring the whole assemblage, there are a lot of bone tools with this, long bone shafts like you find with Clovis, serrated bone point, a variety of scrapers. They are flake scrapers as well as these heavy steep angle scrapers. Projectile points you'll notice are of considerable variety, different materials involved. There is one of these crescents, actually two were found. These have a very wide spread distribution throughout the intermountain west and down into Mexico I think that I'll stop at that point and let you look at those.

Bordes: What's the date did you say? What date?

Daugherty: The radiocarbon was 8500 B.P. and 9500 B.P.

Bordes: What?

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- Daugherty: Nine thousand five hundred.
- Bordes: Yea, yea, yea.
- Daugherty: And I think that it would be more likely between 10,000 and 11,000.
- Bordes: O.K. Well that's certainly fine work on this one.
- Crabtree: Very fine.
- Bordes: Good material but fine work too. And that is a projectile point. This is a kind of bad carinate scraper, thick scraper. This is a thick scraper not much <sup>cutting edge</sup> ~~cut in it~~, and that is a projectile point. This crescent is amusing. Looks a little less well made big like Egyptian or Danish stuff. That's smaller and not so well made.
- Daugherty: There were larger points in the assemblage. We didn't find any larger complete points, but we found the stems on the order of this point but maybe <sup>three</sup> ~~3~~ times as large as that.
- Bordes: Don.
- Crabtree: This one here is a little unique between these two points with apparently the same sort pressure technique. These two appear to be the same and this one no doubt, is the base of another point. They have basal grinding on them. Some of the flakes carry over the surface while this point shows a different technique used with the short flakes ending ~~in~~ on the ridge giving a different contour than this unique point. This one appears to be of untreated material. This one appears to be treated material, which is a little unique. These flakes are spaced with the sides straight and <sup>are almost</sup> ~~almost appears to be~~ parallel. Well-controlled flakes. But they are of the very broad style with almost no indentation for the placement of the tool. This poses the question - how were these wide flakes detached without having a bulb of pressure. Normally, the tool would be set back away from the edge to produce this type of flake. So far, I haven't been able to replicate this technique. I'm working on it,

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but I don't understand it yet.

Bordes: I wonder if this is not part of a much bigger flake.

Crabtree: Yes, I think so.

Bordes: Yes, it could be. It's a rather big one.

Crabtree: Let's see this bunch here.

Daugherty: There is a large form of bison found with these. The identification was just a large form they didn't find anything that was diagnostic to suggest that it was a non-existent type, <sup>But</sup>, on the other hand, it was extremely large for modern bison. This next group comes from Marmos Rockshelter, a site that we have just finished excavating. We worked three years on this. There is a large collection of material, <sup>R</sup> radiocarbon dates received so far run from 10,750 and right on up to modern times. This 10,750 date was not at the bottom of the deposits, <sup>T</sup> there was <sup>three</sup> feet of material below that. So we have no idea yet how far it goes back beyond that but I would guess not too much earlier. The earliest points, interesting enough, are the stemmed points very markedly edged ground and quite a variety of these. Then you come up to certain <sup>lancelot</sup> lot forms like this with the distinctive basal notch. Then the so called Cascade type come in about 8,000 years ago and this happens all over the plateau. It's not nearly as early as Butler originally suggested. About 5500 to 6000 years ago you get these large basalt side notched right in the midst of the altithermal when it is hot and dry and economic conditions apparently rather grim. The fine material changes almost exclusively to basalt and this form develops. After that when things improve you get this is a example of large corner notched points giving way to smaller corner notched points and finally I didn't bring any, some very tiny side notched points, which are just about the beginning of the historic period. These large blades, five of them were found with a infant burial about 7,000 years old. All right I'll stop.

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- Crabtree: These appear to be very well done. This basalt has extreme toughness and appears to be made by percussion. It's hard to say whether blade or core techniques was used with these particular ones. Apparently the flakes were removed <sup>from a big blade</sup> from showing -- nice meeting and thinning of the collateral flakes -- well controlled. Good edges here. No doubt a finished tool.
- Daugherty: Do you think it's finished tools.
- Crabtree: It appears to be, yes. They are nice straight sides. This basalt is very tough material, however, this one here may not have been basalt it looks like an overfired piece of the dark flint. Like it has been burned on the edge and it was starting to break down. Perhaps not, I don't know. It's hard to identify from one piece as to what the range of material was. Basalt material is very difficult to work. However, the variety and grade of the basalt is as variable almost as quartzite. And these show quite a refinement of using small flakes and slight retouches on the edge with nice pointing. Is there anything distinctive about the pointing? Notice how they are flaking these back from the tip to control the flaking and not break the tip and still retain the tip. The flakes start from the tip and are worked back on both sides of the point leaving a little projection at the tip. They are almost serrations.
- Bordes: *was* Heated, of course.
- Crabtree: Oh, yes.
- Bordes: No, question. Heated or burned.
- Crabtree: This one appears to be a little more lusterous on this side but the color would certainly indicate it was burned, all right. However, the flaking surface is coarse, like untreated material, but it may have been burned accidentally or imbedded in the meat during cooking or something like that. Because it doesn't appear to have been heat treated, yet this one from the older sites does appear to have been altered. This one shows a reverse again.

REEL 1 ~~(side 1)~~

I mean there are several styles and changes in flaking technique <sup>on</sup> ~~in~~ this particular one. The flakes go back at this angle and yet it shows a collateral style of flaking with a bending technique over the edge but still leaving the sharp ridge, which is quite different from this style of flaking on this point showing very fine, smaller retouching on <sup>this</sup> ~~the~~ side. This thick one here looks like some pressure retouch after percussion on the side of that one. This one here looks like another piece of petrified wood that has been altered by heat, however, there are still no facets that remains on that side.

Daugherty: This last group over here. Since obsidian is quite rare in our sites up at Washington, I brought some from a site that has been excavated in Oregon. Very late material. It shows the technique that they were using. This site was occupied within the last ~~1000~~ <sup>thousand</sup> years. There was no clear way that it could be dated but it is late. But it is of obsidian material, exclusively.

Crabtree: Percussion with a slight retouch on the edge.

Bordes: ~~Something~~ <sup>SAME THING</sup> here.

Crabtree: Slightly diagonal but quite deep indentations of placement of the tools, fairly heavy bites on the edge. These and the same thing with the other one. There may be some difference in random flakes and smoothing. The notching and the flaking were done at the same time on this one. No doubt a very small pressure tool was used. Single flakes were removed from both sides in their notching. Apparently, the same technique with these single flakes.

Bordes: Serration is different I think.

Crabtree: Oh yes, it is. This serration is from both sides. This edge wasn't serrated, peculiar one side serration.

Daugherty: One final point. This is Hell Gap and how does the flaking of that compare to the flaking on the Lincoulie material?

Crabtree: Very different on this particular one. They are not nearly the same. Because here they have the flakes bending over the surface while here, the flakes

REEL 1 (~~Side 1~~)

terminate right here, here, here, and here. And the flake scars are not nearly as well defined.

Daugherty: How about that one? Still different, isn't it?

Crabtree: Still different, Still different from the edges of that one there. This one has quite an angular direction of flaking while this one shows the flakes were removed at right angles. This one has a slight angle in comparison with this one over here. But here, again, we have the reverse or back-hand type of flaking. This is my first experience in finding this back-handed flaking.

Daugherty: They held it behind their back.

Crabtree: They must have. Or they must have had some genes that brought on this left-handedness.

Daugherty: Any other questions about this? Well, do it.

Crabtree: Something interesting, Dick, is the dating of the heat-treatment somewhere around the time of 10,000 years. There is not a sufficient array of this material for positive evidence but it is quite interesting to note the occurrence of alteration even to the Clovis and Folsom; and, yet in Europe there is no evidence of alteration. I was so in hopes that with such a tremendous range of time here in Europe that we could find some particular horizon in one of these sites, <sup>which</sup> ~~that~~ would indicate heat treatment and we would be able to follow its development, but it just wasn't here.

Irwin  
Williams:

We have here a collection this morning from Central Mexico on the Mes~~o~~<sup>o</sup> Central the highland plateau of central Mexico just north of Mexico City. This is material from two caves which covers probably the period of around 6500 B.C. to perhaps 1500 B.C. The material is typical, but not necessarily representative of the entire industry because I don't have still left <sup>out of</sup> ~~down in~~ Mexico, very much of the original collection -- just a few projectile points for casting and a few other artifacts. Well, in any case, they are arranged more or less chronologically. <sup>Over</sup> here the projectile points and over there, to their right

REEL 1 (~~21-1~~)

there is a relatively typical group of tools which would be typical of the early Pecalote or Hidalgo complex of perhaps 5000 or a little more B.C. This bunch of debitage on the right is again relatively typical of this period and, I think, a pretty well developed small blade industry. In addition, not seen here, are a whole bunch of large blades made in approximately the same way but about twice the size, or more, of these that we got here. There is a number of burins that I would very much appreciate any comments on as well as some forms and knives and things of this sort. So fire away.

**Bordes:** I will leave the projectile points to Crabtree and I look at the burins. Well this one is on a broken point or let's say a bifacial tool to please ~~me~~ Gerry. And it seems, really, to be a true burin, not a result of an accidental fracture. This one is also a projectile point broken and then there is a burin all right. This one is the best, by far. It's a burin on one end and an end scraper on the other, and it's really absolutely typical, no question. This one is, or was, a double or perhaps a triple burin, no question. This is just a broken piece of bifacial tool.

**Irwin Williams:** This is simply the kind of broken bifacial tool that they did convert into a burin.

**Bordes:** And that could well be also a burin. Not very, very good but obsidian does not take the burin blow easily. And that is amusing. It looks like a channel flake a little. They made a burin on it it seems because it is not only a fracture I don't think, there is a burin blow, all right on the end.

**Irwin Williams:** The point of bringing these burins here, outside of just indicating the kind of material that we do get in Central Mexico for burins is that these are not a minor tool in this assemblage. There are more burins in these early levels than there are projectile points. They make up to 30% of the entire group of materials so that these are really a major tool. They aren't just

REEL 1 (SIDE 1)

a minority piece, some of which could have been caused by chance.

Bordes: Oh, no some of them are not definitely not by chance. They can't. This tool it is quite impossible. Now I leave it to Crabtree.

Crabtree: This assemblage is quite a typical roughing out, preforming, assemblage. Some of these are well refined. <sup>Phen</sup> ~~They~~ seem to be a difference in preparation of the platforms. Some indicate the use of a billet on obsidian. Possibly they utilized the ridge to guide and make a series of flakes. Flakes were, no doubt, detached with considerable regularity. It does indicate that there has been a little extra platform preparation. However, these flakes are well controlled from the edge of the artifact. This does not look like a typical core tool. I mean, the flakes do not appear to have been detached from a core because when they are detached from a core there is a lot of regularity in this type of an edge, with a slight bending of the flake where it hangs onto the side of the billet. They were able to force these flakes clear across, using a small tool, while here it appears they may have used a stone percussion tool. When there is a great deal of shock, you lose the platform. There is also a shock pattern at the ends of these flakes where the flake was broken from the shock during striking and it leaves these lines or fissures. Notice the compression of the flakes. It appears to be the result of a blow by a hammerstone. The deep heavy scars and the bulb here on the top and the striations indicate the direction of force. There is a hinge fracture where the force was dissipated. Because the platform collapsed, they were not able to remove this flake. Back to this other group. The surface of the scars, with the exception of this one, and perhaps this one, have indications of being core tools or well-defined flakes. And this one most certainly is prepared in the same style as some of our pressure flakes, refining of the platform so that the flake is released easier. It does indicate the pressure technique of lifting the long flake off, but it is

REEL 1 (~~2-1-17~~)

difficult to tell their original length. Not having an assemblage, but just one flake, it is difficult to tell but it does show that they had the refinement of a pressure technique. The rest of these flakes required more than pressure and this one indicates a sort of a percussion thinning flake, yet still following the outward ridge. Back to Gerry's problem. These are quite interesting preforms made by simply roughing out with the flake technique to avoid transporting a lot of material back to the campsite. There is no refinement in this preform and it is not a tool, but the work was done merely to remove surplus stone. Another percussion type of a little preform that could be later shaped into an artifact. Now with this one, I don't know. Because you find many of these sort of thick objects that do not appear to be preforms, but used as tools as they are. So to sharply define the difference between this tool and this tool is a little difficult because the edges on this one right here show they haven't created a platform to thin it down and make a better artifact. So, this, no doubt, was the artifact itself. And the functional scars on this artifact indicate it has been drug toward the person. Wouldn't you agree, Dr. Bordes?

Bordes: Yes, I think so.

Crabtree: This is not a preform, but looks like a sort of little gouging, digging tool because it has been abraded back from this edge and it is not designed particularly for a preform. Each artifact must be appraised and one must determine the difference between a tool and a preform. This, of course, is a little difficult. This one certainly looks like a preformed object with no retouching.

## Reel 1

~~Side 2~~

Crabtree: Well, that a superb example of flintwork.

.....

Crabtree: This one appears to be the same technique being used on both of them. Both slanting in that direction.

Bordes: Do you think, Crabtree, that this could indicate that the man could use his two hands, because I think when I am doing pressure, I would have no trouble doing this kind of retouch.

Crabtree: It is very difficult to control the angle with the tolerance of having this flake and this flake meet, I mean the degree of angle just can't be measured. It is to perfection. So can you calculate the angle going this way backhand, and turning and turning and turning it around and going this way and retaining exactly the same angle. However, the last series of flakes is on this side and they were done from the tip back toward the base. Starting from the tip and flaking back towards the base in a back-hand sort of technique. But the changes of angles, even considering the contour of the artifact itself, require a great deal of skill to keep this very constant angle. I mean it is like setting up a machine to calculate in which direction you are going to have two points meet. For instance, if you are going to drill a hole in a bead, you have to balance the hole on the other side so that the holes on both side will meet perfectly in the center and that is similar to what they have accomplished here. It is certainly a very beautiful piece of work. This could be done by a right-handed man but reversing the platforms and changing the direction of the flakes, or it would be done by one who is ambedexterous.

Reel 1

~~Slide 2~~

Irwin  
Williams: Could you comment on how that would be produced?

Crabtree: This looks like it is made strictly by percussion. Just by dragging the tools on the edge you can get this sort of character. They are random flakes on the side. It doesn't appear to have any pressure scars on it. This one has a peculiar technique of being retouched again after the initial flaking with a slight basal thinning and polishing at the base, which is a little unique with this type of hafting. This is apparently an example of gathering someone else's artifact, or blade, and retouching it again at some different date. And here is another one which certainly looks like some of the Eastern U.S. fluted points. However, there is a slight basal thinning on this one and as the artifact broke it hinged back in the other direction. But with this basal grinding it certainly is very characteristic of some of the work of earlier types. These have a uniformity — these over here. This is a type of point we see in Southern Nevada. They have changed directions of flaking. This type of roughed-out material with no regularity indicates that they have used ~~perform~~, then removed the ridges. This ridge, that ridge, and so on following through on the ridges until they get a better contour of the artifact, prior to the final retouch. As far as they were concerned, the tool was functional and was, probably, just as good as a tool as the other one.

Irwin  
Williams: There is an interesting little platform on the base of this one.

Crabtree: Oh, yes, there is.

Irwin Williams: Some of them apparently were made on flakes or blades.

Reel 1

~~2~~

Crabtree: You can see a little of the original flake, showing the scars coming from a direction other than the original flake scar. But these little thick tools, like this sort of thing here. Sometimes, they appear to be quite refined, however, this one is heavily keeled on one side and fairly flat on the other; while there is regularity with this one with no attempt at thinning. Apparently they wanted a very strong point for some purpose, whether projectile or what. I'm sure I don't know. This one up here--this long stemmed point. This is rather interesting. It is random pressure flaked but done with this technique to get the form and there is no continuity or regularity with this one. Let's see. Did I miss some of them?

Irwin: Oh, here's a serrated one you might comment on.

Williams:

Crabtree: The serrations have been made by crushing the edges. They did not do their serrating flakes at the same time as the surface flaking when forming the point. It appears that they just crushed in the edge--just flicked it over by pressure with a rodent tooth or something like that. We might check that--the angle of this one here. This is another back-hand. Two more back-hands. At this meeting we have seen more evidence of left-handed people than I have ever seen in my life. This worker didn't have a right hand. But this would almost be an ambidexterous man, flaking in both directions.

Bordes: Could be. I think that if I am good enough some day to make this kind of retouch that it will be very easy for me to make this kind of thing--just changing hands.

Crabtree: This one appears to be a utilized core. That's the balance of it. This doesn't show a great deal other than detaching flakes for making small projectile points. Was there anything that we missed over here or weren't you ready for them. I'm all through.

Reel 1

~~Slide 2~~

Irwin Williams: No that comes later.

Epstein: One question for Mr. Crabtree: Would you show us or explain to us in more detail exactly what you mean when you say this could be made by dragging the point?

Crabtree: What I had in mind, Gerry, was this artifact here. It shows removal of some small flakes in through here. What I mean by dragging is taking the billet and pulling it across the edge, which would square up the point. This can be done instead of leaving these projections like an unfinished article. If you have these bulbs and irregularity on a preform, they may later be used as platforms, and then again, they may have used these as tools just as they are if they wanted an agricultural tool for digging or something like that. It may have been of no importance. We have called dragging several different things such as referring to it as "shearing". Then we will have another word for shearing. This may be confusing, using terms that mean the same thing. But, I think, Dr. Bordes understands. When we dragged these billets as hammerstones across the edge it gives this sort of a character on the edge.

Bordes: Small flakes. Shocks. Something very regular. Looks like pressure

Crabtree: This is something very interesting.

Irwin  
Williams: Now what tool did you think might have been used to produce these?

Crabtree: It appears to be almost one of pressure. Very careful placement of the pressure tool and following the ridge very carefully. The end is quite distinctive of the type of the Valley of Mexico. The ends have the same characters that I get when producing these long prismatic flakes.

Reel 1

~~Side 1~~

- Irwin  
Williams: Most of the impulsively produced blades you get a little later have a distinct character of this little overhang which is very often not removed and a very heavy bulb, even heavier than that.
- Crabtree: Is that so?
- Irwin  
Williams: I don't have any with me, unfortunately, but they look much like you have been producing.
- Crabtree: This is the only one that I found that was quite distinctive in this array here.
- Irwin  
Williams: It might be something ancestral, very easily. Ordinarily we don't get them coming in until the very late pre-ceramic or very early ceramic.
- Crabtree: This is quite an interesting incomplete sort of thing, having the character of almost a side-struck flake and leaving the original cortex and almost finishing it by pressure.
- Txier: Crabtree, we spoke about this flint and I think that it is an unfinished one, you see.
- Crabtree: Yes.
- Irwin  
Williams: Well, I have no objection to it being unfinished one way or another. However, it was part of a burial outfit that was buried with a woman. And I wouldn't be surprised if, in this case, the thing was just a mint condition artifact, which could have been hafted by that back end there. Very often this is the case of hafting like this. Because, as I say, this and a long bone awl were crossed at her side ready to go, I suppose, to be used in the after world.

Reel 1

~~Side 2~~

Crabtree: That's quite unique.

Irwin  
Williams: I never found another one. There's one at El Arbillo in the somewhat later classif.

Crabtree: The thing is, generally, the preforming is done by percussion methods, but this appears to have a great deal of pressure retouch that they were doing the whole thing with pressure rather than percussion which is a little different and unique.

Bordes: They seem to have a little trouble here taking this off, and they did not bother to go on. And, probably, it didn't matter to them. But you see this kind of thing we meet, well, often enough in some bifacial type of side scraper which looks more or less like a German <sup>Beitzspatzen</sup> ~~Blatspatzen~~ (check with Earl) in the North of France in the Ethna ~~(check with Earl)~~ Valley where you have some bifacial tools, follette tools and with this kind of flat thing left probably to hold it better or things like that. And perhaps the man wanted to make a projectile point and then said "well, after all, it can make a very good knife".

Byers: May I ask one question? Don, did you say that the lama point is a preform or is it finished?

Crabtree: It appears to be a finished point. It's just not adaptable for anything else other than just what it is. I mean there is just no angle left for thinning this down or for changing the character or shape of the artifact. It's a finished artifact, whatever it is. It's not a preform. That was the thing Doug to determine the difference between a preform and this sort of thing.

Reel 1

~~Side 2~~

Bordes: You know what you have to do. You have to make things like that and when you have made one or two of them then no questions asked.

(Laughter)

Epstein: All right, I will make one.

Bordes: No, not one but many.

Irwin Williams: All right, well, I haven't any more questions. Does anyone else have any questions on the obsidian lot, otherwise we can move to this other material.

Bordes: Yea. Let's go to the other material.

Irwin Williams: We are going to go to a collection of casts of material from somewhat farther south in Mexico. These are from the Vasequillo (~~archaeological~~) archaeological zone south of Puebla, Mexico, and they are of considerable interest in that they occur in <sup>direct</sup> ~~association~~ association in non-rolled material with a rather large extinct fauna characterized primarily by mammoth, camel, horse, mastadon, an extinct four-horned antelope tetramerix, and a wide variety of other extinct animals. Now I have them arranged in essentially what I believe to be their chronological order, from above left in sort of a reverse S to lower right. So that the latest material here is that just in front of Dr. Bordes.

Bordes: The oldest is here?

Irwin Williams: Well, this is the oldest, these two are probably the oldest collection here, yes. These first three plaques were found directly stratigraphically one above the other. This is from a separate site which we don't have directly dated in relation

Reel 1

~~2~~ 2

to the others and so it is probably of approximately the age of this little collection of flaked points here. I might add that all of the little flaked points, with the exception of this one have occurred in direct association with the bones of, well, camel and mastadon, in these cases. This one was found with a horse kill among the horse ribs. This was among a bunch of horse bones, but not probably a kill. So any comment you have on this material will be extremely welcomed. Oh, this material here down on the lower right was with a mastadon kill. This, for ~~whatever~~ it is worth, scraper or whatever, point or whatever, was among the mastadon ribs. The <sup>other</sup> ~~other~~ material was scattered in among the butchered bones. So, as I say, any comments you may have I would be most appreciative of, and the more detailed comments I can have on these the better.

**Bordes:** I am very much impressed to see tools which have been found in direct association with mastadon. The more because, here, in Europe, the mastadon are very, very old. I know that they are not so old in America, but nevertheless you know, mastadon that is something else. Mammoth were use to it, mastadon. Let's see these flakes one by one.

**Irwin Williams:** This is probably just a flake, possibly used on one side.

**Bordes:** A flake which had been detached by a wood billet or soft billet. That could be a burin of the same crazy kind as in Alaska, you know, with this pointed tip. Could well be, could well be a kind of burin, you know.

**Irwin Williams:** Well, this was directly under the one ala of the mastadon pelvis.

Reel 1

~~Side 2~~

Bordes: I don't know what they wanted to do with a mastadon pelvis and a burin. This, if this is a point, it is a rather crude one. If this is a scraper, it is not a very good one either. But there is certainly some trace of utilization. That's slightly retouched looks like a bad end scraper.

Crabtree: Could be an end scraper.

Bordes: You know they were rather brave to attack a mastadon with such tools. And that is also a flake with a dihedral platform. <sup>Perhaps</sup> ~~Perhaps~~ you could call it convex with a small flake here. It's rather difficult to tell but probably *struck* with a wooden or a soft hammer. Some retouch on the concave edge, not much. And there is also, here, a little bit of retouch. That's not much, you know. It seems that these people have used anything that they had in their hands at the time they found the mastadon because did they kill it or did they find it dead. That's the question?

Irwin Williams: If this is a point, they may have killed it, if not we don't have much of a conversation.

Bordes: Well, that's a rather small point for rather a big animal.

Irwin Williams: But these are smaller.

Bordes: Yes, but they are better. This is something else again.

Irwin Williams: These people were apparently accustomed to split the mastadon mandibles for one reason or another, and this was found imbedded in one of the mandibles just below the teeth row. We took it out in block.

Bordes: That's a completely typical tool. You know that's the kind of thing, yes what we call backed-<sup>burin after</sup> ~~burinalter~~--graduating big, which gives you an edge, a cutting edge like that which is very strong, you know. With that you can cut like that, you see. Like a burin but a different technique. This, this could be a point. Oh, ya, probably is--is some kind of point but it can be also some kind of scraper. Difficult to tell with this American stuff.

Reel 1

~~Site 2~~

Irwin  
Williams:

My impression is that it might be the point end of one of these others.

Bordes:

Ah, that's interesting also. That's just a pointed flake but they made a kind of stem, a little bit like a ~~Conrobert~~ <sup>Font Robert</sup>--a bad ~~Conrobert~~ <sup>Font Robert</sup>, but if it had been found in ~~Perigordian~~ <sup>Perigordian</sup> culture in France we would call it a very bad ~~Conrobert~~ <sup>Font Robert</sup> or at least a pitingrated point.

Irwin  
Williams:

I wonder if you will notice here. The platform, apparently, has been faceted before striking off this long flake.

Bordes:

Very slightly.....It can be just rubbing the hammer here to prepare a little bit of platform. And it seems to have been struck also with a rather soft hammer, with this lip, But anyway, this hammer was not very wide for it was struck as I do for the blade, you know, vertically, because over there you have a good bulb. It looks like a Levallois point. And this is the most interesting of all, because there is one question. It is certainly a point but was it hafted like that or like that? Looks very much like some transverse arrowheads we get in the <sup>MESOLITHIC</sup> ~~Neolithic~~ and Neolithic in our home.

- Irwin Williams: Well, perhaps it will help in that its position was point first under a camel rib.
- Bordes: Under a camel rib, You know, that's all right but from which side of the camel did it get in.
- Irwin Williams: South.
- Bordes: And it can go pretty deep. Even in the camel.
- Irwin Williams: True, true.
- Bordes: In a way that's interesting, you know. Because it shows that oh, ya, I would like you to find others like that.
- Irwin Williams: So would I. This doesn't show particularly unless you point it out, but the entire base of this, all the way around on both faces, and the side, was polished, ground, for one reason or another. Apparently not I would guess to do with the flaking technique, but to do with its ability to be hafted.
- Bordes: That could be. Anyways that's a kind of point made with small retouch. And these people didn't seem to bother much about retouching their points.
- Irwin Williams: No, there is no bifacial retouch in these lower levels at all.
- Bordes: There is a kind of bifacial retouch.
- Tixier: A little curving - very short.
- Irwin Williams: Edge trimming, yea.
- Bordes: Now we get to that. That's different. That's a good positive point, broken, or knife, you know - this bit.
- Irwin Williams: That's just a fragment of a biface.
- Bordes: That-that's a fragment of something bifacial. Something bifacial. Oh, no, I don't think so.
- Tixier: Maybe something of a projectile point?

Bordes: Could be, I don't know. This is a nice one. Seems percussion made, rather than pressure. And that-that's a strange thing. It's difficult the casts are good but not a good point.

Irwin Williams: That wasn't a very good piece to start with.

Bordes: What?

Irwin Williams: That wasn't a very good piece to start with.

Bordes: No. I can see that the material is bad material and the retouch is not very easily seen on here. That I don't know what it is. It can be anything.

Byers: It looks like a drill or a ~~cores~~ <sup>bore</sup>.

Bordes: Looks more like a bad drill than anything else. Ah, here, ah, <sup>ya</sup> ~~ha~~. Here is a bifacial tool. It is certainly not a projectile point. Probably a knife. With a basal end untouched, <sup>notched</sup> notch, very outward. And it seems that here either, they made a burin out of it or they tried to get small blades. Who can tell? It's difficult with such things. You know, since I have seen the Japanese stuff, where they began by making a kind of thick Laurel Leaf and then they break it one way and then they do all this work to get small blades like that. Well, of course, you say they are Japanese, and Japanese are always pigheaded. I wonder when I see something like that if it is a tool or if it is a core. You know, you never can tell. That is not too good. That is a faceted striking platform with a little hinge but anyway it was not done with a stone. You never get this overhang with a stone. But it was a hammer which was medium hard, not too soft.

Irwin Williams: This apparently has had some sort of gouge or leading edge maybe.

Bordes: Oh, ya, a kind of scraper anything, you know. Scraper is a good word because it does not mean much. It has a very wide acceptance. That's a very nice positive point. I don't think that this is fluting. It could <sup>be</sup> the

face of the flake and it went into something hard. And that is certainly probably not a burin. I think rather it went against something hard, camel skin, perhaps, I don't know. What was with it?

Irwin Williams: The horse and camel.

Bordes: Horse and camel. Ah! But no, it went against a bone or a stone or something like that. Ah, that's another thing. That's a small flake with platform which has nothing special some facet of that. And it is difficult to tell what was tried with this one. Could be stone could be something else. But an interesting thing is a very outward truncation of the right of the burin and very, very, outward by small retouch, no work here. It is not a borer. It seems that the truncation was a one. Nothing else. I don't know, perhaps it was two.

Irwin Williams: No, a concave scraper.

Bordes: It's not a scraper, it's too outward. It has something to do with camel hunting. I don't know. Other comments from other people?

Crabtree: I would assume that the casts are replicas, as near as possible to the color of the original material.

Irwin Williams: Approximately.

Crabtree: And, no doubt, it is chert and flinty material. This is something I wonder about. In Mexico there is an abundance of obsidian and yet these points are of nothing but flints and cherts. It seems characteristic of many of Ancient Man's sites that he wouldn't touch obsidian when it was right in the Valley floor below. I'm speaking of my experience with obsidian in Southern Idaho. For some reason they seemed to desire these flints and cherts and yet we have a lot of obsidian there. But this group proves that they had some well-controlled, well-defined flakes. There is one little flake here showing

a hinge fracture. This shows a little specialized retouch of spacing. I mean, there is not enough of these to show any uniformity, but it indicates that it was used scraper-wise in that area. But these three show the position of seating the pressure tool each time rather than indicating percussion or function. This side indicates a bifacial flaking, such as Dr. Bordes explained. This one also shows a bifacial retouching. This one appears to have been <sup>abraded</sup> ~~abraded~~ on the tip like it may have been one of the gravets or a little engraver. That is all I have to say on this.

Irwin  
Williams:

Do you have any suggestions how the retouch on these later points, well this particular later point, would have been done?

Crabtree:

This appears to have been done by pressure on this side. However, the technique is not too refined. You can see the little step-fractures where he hasn't applied sufficient pressure and this character is not common with the percussion technique. He has undercut and left fairly heavy deep bulbs on the edge which produces quite a sharp edge. This is, of course, bifacially done. It is quite heavily <sup>abraded</sup> ~~abraded~~ on this side. This edge appears to be the tip of the tool. And, again we have these left-handed rascals. There is a slight retouch here on the edge of this one, indicating it may be a reworked artifact. There is not much showing here, but it appears pressure was applied away from the tip and back in again on the opposite side. This one here, however, is in reverse. I mean the flakes are directed away from the tip which is difficult to accomplish without snipping off the tip. He took very wide flakes clear across the surface. The normal reaction when pushing down this much is to get a shearing of the flake because you must keep your pressure away from the tip. But with this specimen, he reversed it and applied pressure towards the base. He may have carried his <sup>finger</sup> out in this manner and used it as a sort of support for the tip. This gives

good support without losing the tip. This certainly does appear to be pressure work on this particular point. I'm glad you brought that one up. Don't you think, Dr. Bordes?

Bordes: Ah, yes. *no question*

Irwin Williams: Well, do either of you have any comment on the kind of tool that would have been used to produce this rather large flat retouch or chipping on the biface here?

Crabtree: It appears to be done with a billet, horn, wood. Something like that.

Bordes: Something like that, yes.

Jelinek: I have a question for Tixier or Bordes. How similar is that small stemmed point to an <sup>ATERIAN</sup> Iberian point.

Bordes: To an <sup>ATERIAN</sup> Iberian point.

Jelinek: To an <sup>ATERIAN</sup> Iberian point.

Bordes: No, it is not. Not the same technique.

Jelinek: What would the distinction be?

Tixier: The distinction is at first the stem is narrower and well shouldered, you see. It's very well shouldered in an <sup>ATERIAN</sup> Iberian point. On one side, yes. Here is something like an <sup>ATERIAN</sup> Iberian point, but here, no.

Crabtree: This is just a comment to Cynthia. With the Paleo-Indian artifacts, we find occurrences of the back-handed technique and, yet, in the recent material, we see none of this. An apparently distinctive technique was used by Paleo man at your site. It appears on the two retouches that we find in Solutrean that we find only two but yet they are distinctive and different while the rest of the specimens show very regular and very uniform flaking. Whenever this retouching was done they applied pressure in the direction of the tip and away from the base.

Irving: Mr. Crabtree, in view of the fact of your earlier observation of the hand-holding the piece being flaked does most of the work, do you suppose it is

possible that they have here a tradition of holding the piece being worked in the right hand and holding the tool in the left? This done by right-handed men.

Crabtree:

This, I think, Dr. Bordes should know. He is ambidexterous and he can work either right or left handed and can change angles from one direction to the other. Right-handed persons have their strength in the right arm and that is where you actually need it. If a right-handed person were doing this with his left hand he couldn't free hand hold it. So he must, therefore, hold the artifact against a log or some part of the body. Right-handed persons will naturally thrust and pull inward toward the body when applying pressure. But to push away from the body, one lacks control of flaking. It is normal for a right-handed person to pull something towards himself very carefully and very gradually, if you understand what I mean. I mean to exert pressure toward the tip of the point and away from the body is not the normal thing for a right-handed person. Therefore, I assume the worker was either left-handed or ambidexterous. Another thing - the accuracy needed for flake removal requires seating the tool each time pressure is applied, and this back-handed method would make seating more difficult. This would also be rather tiring for a right-handed person. Because of the mechanics of flint, it is more likely to break when pressing toward the tip rather than toward the base of the point - or toward the body. This back-handed technique takes greater control for shaping points, yet with this particular one, they were applying pressure in the direction of the tip rather than into the body of the artifact. Now, no matter whether percussion or pressure is used, we have to keep the blow towards the center of the artifact, otherwise, we'll break it. I mean it will break in the middle or at one end or the other. Well, the same thing is applicable to

pressure work. If a person has been using the right hand for pressure, I just don't feel that one can alternate and use the left-hand for pressure with any degree of control. It's just like writing right-handed or left-handed. And these scars are just as identifiable as penmanship, almost. You'll have certain styles, whether it be Palmer Method or printing. When one develops these rhythms and the muscles develop for a right-handed technique, it is very, very difficult to change over. It would require much practice and many hours for me to change from one style to another. For instance, last night I was trying to change techniques and do a Hell Gap style of flaking. I haven't mastered it as yet. Dr. Bordes was making a true replica of a Solutrean and he feathered out the flakes with fairly deep bulbs. The way he applies his tool and affixes it to the edge of the piece of flint determines the popping off and the feathering out of the flakes. So I tried to use his technique to show a little of the ripple flaking. The flakes would go clear across and take off the other side of the artifact. I mean, I just couldn't get the feel of it. These are the things that are distinctive with pressure retouching, probably more than percussion. However, I think that at some later date, and I think Dr. Bordes will agree, that certain percussion techniques are going to be as identifiable as well - when further work has been done and more collections studied.

Bordes: Oh yes, yes.

Crabtree: Not from one group, because we have millions of people whose techniques we are trying to identify. And, there may be almost as many techniques as there is with handwriting. Maybe we can get a character analysis here from some of the stone work.

Bordes: Well, any other comment on this collection?

Byers: I think it's very interesting that Don Crabtree has picked up this concentration

of left-handedness with this early material. The preliminary indications from Tetohuachan which is about 40 miles away, Cynthia.

Irwin Williams:

About 60, I believe.

Byers:

Is that the population there is all very <sup>inbred</sup> ~~inbred~~ and this concentration of left-handedness may coincide with an inbred population.

Crabtree:

This ambidexterous <sup>or</sup> ~~of~~ left-handed work is quite a rarity. Extremely unusual. It is one of the first fine examples I have ever seen showing this precision and control. I think this is a classic in demonstrating this particular type of technique. I haven't anything here that compares with that. I thought if we were showing different techniques that something in this array on the table would demonstrate many different techniques. But most certainly not with the accuracy and precision shown in the making of that particular artifact.

Wheat:

I have one question. I was wondering, Don, almost all pressure flaking that I have ever done or that I have ever seen done has been done against the palm and consequently on the force side of the blade from the chipper. Have you ever attempted to do flaking on the top side of the blade and if so what kind of control do you get on that?

Crabtree:

Well, to answer your question Joe Ben, when I tried flaking from the top side of the artifact, I used a popping motion up and out from the edge. I do use that technique mainly in platform preparation. But to do an alternate opposite work on the top even to take off a right angle edge, it's much easier for me to reverse sides of the artifact rather than work back-handed. However, you would hold the preform a little differently in the hand, if you were going to flake from the top side. For instance hold the point like this and work backwards such as that. The fingers must hold the artifact so they

are in the way when the flakes are removed toward the fingers. When using this method, one must flake by placing the tool on the underside of the leading edge, pressing upwards and toward the tips of the fingers. The flakes, if you are successful in using this method, will go into the tips of the fingers. If a pad is used, it will prevent the flakes from terminating and we will end up with step-fractures and it will not have the character shown on these pieces. Well, this would be easier to demonstrate. I'll be careful, Cynthia. It is difficult to correct an angle when working on the top side. Now, if we would use this technique on the top side and have a leather pad to protect the fingers, we will catch the removed flakes between the pad and the ~~art.~~<sup>artifact</sup> and we'll end up with little tiny step fractures on the ends of the flakes without termination. We must hold the tool underneath the leading edge in order to get the flakes to feather. So to hold the artifact with the surface exposed, the tool will waver and we can't get this type of a snap which was, no doubt, used to terminate these flakes. For it takes a fairly heavy bite on the edge to pop them out from the edge upward. Notice the extreme sharpness of the edge of this artifact. No crushing of this edge, but very very well done and the angle of the flakes is quite consistent. It may be possible that they devised some sort of method of holding the stem in this way and following thru and they could have developed precision in flaking this way. It is not necessarily maybe a left-handed technique but it is one that goes from the base to the <sup>tip</sup>point on both sides and it is a holding method that is foreign to a right-handed person. Maybe some day we'll know more about this. The angle here is very good to keep a good straight edge, but they didn't do it that way. With this one they did it only on this side here, because you can see the overlapping of the series of flakes and it demonstrated they only did it from one side

rather than an alternate opposite. Otherwise, we get a sinuous effect on the edge, not the same thing.

Tixier: Yes, yes, yes - here also on the other face there is no bulb. ~~That is~~ *But it is* quite different in direction.

Bordes: Well.

Tixier: ~~This was the last series on here.~~ But it's quite different *in direction* ~~the same.....~~

Crabtree: But this technique to have appeared between 3500 and 5000 B.C! This refinement is quite different and it seems like it is an original. It doesn't show up very many places maybe other than in this particular geographical area. It is quite an uncommon technique and very distinctive and perhaps could be traced much easier than some of the random flaking which doesn't show refinement. This sort of thing just shows mainly ~~pressure~~ *by pressure* trimming the rough surfaces off *without any regularity.*

Alan Smith: Prof. Bordes. We have three other tables to look at. Before you we have Phil Smiths material. Then we have Msgr. Cambier's material. And then finally Don Crabtree has laid out a sample of artifacts of different techniques.

Bordes: All right.

Phil Smith: These collections are all from upper region a place called *Bolombo* ~~Gomonbona~~ far from Aswan. There are <sup>five</sup> ~~3~~ collections here - <sup>five</sup> ~~3~~ industries and they represent the Egyptian equivalent of the Upper Paleolithic. They were found on a silt plain on and below the surface and I'll describe each of them in very brief detail and roughly the order in which they come. The oldest dates apparently to about 16,000 B.C. That's ~~the~~ one on my left and the youngest to about roughly 10,000 B.C. at the end of the Pleistocene. This is an industry which is curious because it hasn't been known in Egypt before. It seems to have been found recently in the Wadi ~~Halfa~~ <sup>HALFA</sup> area of the Sudan by the New Mexico and Colorado groups. There, I think, they called it the ~~Halfen~~ <sup>HALFAN</sup>

industry. It's made <sup>by</sup> using the levallois technique. The micro levallois technique of small prepared cores very often with the ~~chapeau de gendarme~~ <sup>Chapeau de Gendarme</sup> striking platform effect, which I mentioned yesterday to Gerry Epstein. Associated with this rather archaic technique are polished bone needles, awls, and very well developed grinding stones, as well as burins and end scrapers. Should we talk about this one first and then I'll go on to the others later.

Bordes:

As you like. I think here that most of the speaking will be made by Tixier who knows African material much better than I do. However, there are certain Upper Paleolithic similarities. But for this first culture, I would like to point out this small nest of some of these <sup>L</sup>levallois cores which made flakes which were no bigger than a nail and one can wonder what could be the use of such flakes. Sometimes, in the Mousterian, we find very small but never as small as that. About this size is the smallest I know in France. Now to Tixier.

Tixier:

They are very, very little such <sup>L</sup>levallois cores in North Africa particularly in Upper Arterian. Arterian of North Africa there is most flakes of Arterian are the <sup>L</sup>levallois technique and they are very, very little cores like this. But the thing is striking me, I think it is the first time it was found, the <sup>L</sup>levallois techniques, with needles and bones and worked bones and it is very very interesting. And there is a question. Do you think, Philip Smith, these men are like in North Africa with suppose Neanthethral men or almost like them?

Phil Smith:

We have no clue at all. No skeleton material were found with it.

Irwin:

I have a comment. We found a jaw, homo sapiens, associated with this sort of thing.

Tixier:

I would think so. Yes. I would think so.

Irwin: This jaw ~~is~~ with a bit of core.

Phil Smith: Perhaps the unusual feature about these Levallois cores is they are faceted at the bottom. And I don't know whether that was done to form the bottom of the flake or whether it was used as a technique for resting the core or to strike it off. In other words to give it some firmness at the base.

Bordes: For such a small flake I don't think that it was necessary to rest the core on something because you can strike it very well in your hand.

Tixier: (In French) <sup>to</sup> Philip Smith

Bordes: So we finish with this one now and go to the next one, which was found at the base of a stratified site in a silt base here in the middle. This is the lower industry in a stratified site which had two industries. This is the upper industry. This seems to date about 13,000 B.C. and as you can see it is a highly microlithic industry. A large number of retouched backed bladelets, blades and a good number of micro burins. There is also a fair number of true burins of various types on truncature, dihedral on breaks so on such as this. Cores are all small <sup>and usually</sup> ~~usually~~ the materials are made in exotic materials that come from the bed of the Nile. Agate, chalcedony and various others fossilized wood several other things.

.....

That's a ticklish point. I had been calling it the <sup>Silcellant</sup> ~~(Silcellan)~~ etc. sp. from Java, Silcella ~~(Silcella)~~ where it is found. Tixier and I have just about decided that it is probably an eastern relative of the Northern African Ibero Maurusien which is better known as Tunisia and Algeria.

Bordes: I'm quite sure. It could be.

Phil Smith: Perhaps you can comment on this.

Tixier: I'm quite sure because there are tools which are very characteristic of Ibero-Maurusien and which are, like this one, little bladelets. Little backed

bladelets with their striking off a micro burin, a little one. We call this piquant triedre in France and in North Africa, and, in France, point oblique. It has two names but, I think, piquant triedre is better. And this is a regular characteristic kind of technique in Ibero Maurusien. Usually, removing the flaking of micro burin is the preparation of truncation or geometric neolith but here it is not a preparation it is a finishing tool to be more pointed, more sharp, you see. And there is also what I call Ouchtata retouch, because of Ouchtata in Tunisia. It's a very, very little retouch, very short one - sometimes a little abrupt but often a semi-abrupt, sometimes never, you see, and it is a very very characteristic retouch of the Ibero Maurusien. And this retouch very often begins near the bulb without striking off the striking platform near the bulb and it becomes very narrow and very thin and disappeared before the distal end of the bladelet. Excuse me for my bad English. It is very difficult for me. It is very difficult for me. And also there it seems there is statistical balance of these flakes is very near, it is very close, is very like North Africa ones from Iberia, Tunisia and Morocco.

I'm sure (French)

Phil Smith: He says that they are not the brothers of the Ibero Maurusiens, they are the first cousins. Two little things I'll point out. There are very few true microliths on the acute triangles, trapezes, and half circles and segments of circles, <sup>But,</sup> they are very <sup>rare</sup> ~~few~~ in spite of the fact that the site was screened

Bordes: I would hesitate to call this segment a circle.

Just barely, if it is round. Barely. It's more like a true convex truncation.

Tixier: Yes, when the bulb is not removed, there is no pressure, no segment. But <sup>when</sup> there is no bulb and no striking platform and retouch all along here. This one is retouched a little bit of the bulb.

Phil Smith: Perhaps you can mention the Points de La Mouillax.

Tixier: The Points de La Mouillax one, oh yes there are many things about this. Here is, you see not a good one, a bladelet. A little bladelet thin one, but backed with the retouch. And then, with the removing of the micro burin and these I call these points de La Mouillax. It's very important because it's a characteristic tool and we can easily gain experience from Points de La Mouillax. I made a very good number of points. It's very easy.

Bordes: What else?

Phil Smith: ~~The other thing is.~~ The other thing is that all the nuclei recovered are very small in fact there is nothing much which is as large as these from which undoubtedly they were struck in the first place. In other words they have all been worked down to very small proportions.

Bordes: Here is an amusing thing. That this micro burin of this culture is bigger than the *L*evallais core of the older culture.

Crabtree: They do show a great deal of refinement of removed blades in their core technique. This thick blade was removed from the core but it also took off the flake scars from removal of additional burin flakes, but they do show a great refinement. The thermal treatment is very evident in this array of material. One of them here particularly shows the changing of texture and color of the chalcedony, which is a very nice change. Also the distal end shows the original facet prior to heating and shows the distinct altering.