

Phil Smith: Do you find something like this around Wadi Holfa, Henry?

Irwin: This industry is very curious, we have an industry, ^{or} ~~at~~ we have two industries which have these little pieces that have arched back like this, but as far as I know, at least with the stuff that I worked with, we lacked micro burin technique. Except some which are perhaps very rare, you know, one tenth of one percent. With that industry over there, we get two forms of that industry and one form has little lamella dou and there is a date which Wehdorf has gotten, and I expect our date will be the same of 17,000 years.
(In French)

Bordes: All right.

Phil Smith: Curious Burin....

Bordes: Not quite. It's not quite ^{as backed} ~~that best~~ burin but it is an interesting burin. On one side a fracture and on the other side a kind of careful retouch in two direction. That's amusing.

Phil Smith: All right. Anything else about this industry?

Crabtree: There is one thing that I might ~~like~~ to add about this material. This point is so obviously heat treated. Even though there are no facets remaining, it is obvious. This type of agate, which is called in the old country onyx, and used for cameos, contains little tiny quartz crystals and, therefore, is quite irregular. And the surface is extremely coarse prior to heat treatment. You can see the color change from sardonyx to carnelian and this specimen is apparently from the pebble culture. Another thing is the uniformity of termination of these little flakes and bladelets. As they were removed, they do come right out to the end with very slight curves on the end. This little core shows a slight platform preparation, ^{if} making a facet to control the termination and regularity of the flakes making this uniformity.

Phil Smith: Do you think that ~~that~~ ^{have} heat effect could have been produced by a solar action?

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Crabtree: I don't think so, because if it had been solar action, it would have changed the whole surface. The color changes make this quite unlikely. This is certainly not a natural stone, ~~Unless~~ the heat would develop up to 350 ~~de~~ ^{degrees,} which is unlikely. I believe, Cynthia pointed out that this is when this change takes place. I doubt very much if solar heat, even over a prolonged period of time, could ever develop heat to this degree and cause this crystalline change to take place. The uniformity in the ~~array~~ ^{texture} of ~~these~~ ^{this} ~~smooth textured~~ ^{array of} stones certainly ~~appears to be man-made.~~ ^{indicates they are treated by man.}

Phil Smith: There is one last point. As Tixier remarked, the other evening, that all the points here are retouched on the left side.

Tixier: Ah, that's very important. Very important. Characteristic of these La Mouilla^H points. I don't know of one La Mouilla^H point on the right edge. They are all, all, all, all, on the left edge.

Bordes: *You know it does not tell much because right here next thing you can tell another thing. next thing*

Phil Smith: The next level ^{has been} given the name of ~~Sodeckian~~ ^{SOBEKIAN}. It comes from the upper level of the same site. ^{it has} Several carbon ^{fourteen} dates around 12,000 B.C. and a very rich fauna associated with it, but the industry is very monotonous. It's always made on that gray or tan colored chert without exception. Virtually all of the artifacts are long ~~retouched,~~ or slightly retouched blades or bladelets, really nibbled bladelets, but there is a small proportion of burins, such as the odd-ball that you can see here and a few end scrapers. One of the curious features about the cores is that you have the nucleus quasi, as they call it in North Africa. Unfortunately I didn't bring along a good example with me. *S.S.* back where you have ^{the core} being struck this way from that side and they turn the core over and do it at right angles. But most of the nuclei are more or less very, very steep striking platforms. Not always, but usually.

Bordes: Not always. There is one thing which strikes me about this core, you know.

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For this one a truncation of the striking platform and here too. And this seems not to work with pressure with percussion and percussion with a soft hammer and a very careful percussion that just take the edge a kind of glancing blow, you know. And takes off very thin blades with small ^{blow} burin but on the other hand some of them are quite different. This one on this side has a plane striking platform which could have been struck like that. But, on the other hand, it seems to have ~~and~~ a preparation that could be for punch technique or perhaps pressure technique because look at some of those very small blades. This, for instance, is certainly the kind of wood struck ^{stuff}. But look at this one, and there are others like this one, here with this very small bulb and I wonder if this is not either ^{punched} French with a very thin sharp punch or pressure. I don't know.

Crabtree:

Well defined. Very excellent. ^{Certainly uniform.} From the control it appears that they used a fairly slender tabular sort of a core for their initial work, in order to get this depth with this narrowness to establish these and make a continuity of this sort of thing. ^{No leave} These well defined ridge ~~which~~ would take a fairly narrow core in order to produce these. These are extremely flat with almost no compression lines. You'll notice that they do terminate sharply at the ends without any ^{overhang} ~~overhanging~~ coming in from underneath the cores.

Irwin: Do you get loma crest, Phil?

Phil Smith: No. Well, yes I do but not enough. This Ouchtata retouch, as Tixier mentioned a few minutes ago, ~~is~~^{is} present on a good number of these also. Just what this industry represents is a bit hard to say now, but Mr. Tixier and I are having a slight argument about this. He prefers to call it a kind of Ibero Maurusien - Nile Valley Ibero Maurusien. I don't see quite eye to eye with him on this.

Tixier: There are four kinds.

Cambier: (In French)

Phil Smith: { There are no micro burins at all in this industry and not a single geometric.
{ It's entirely different from ^{the} previous ^{one} forms.

Bordes: Looks like.

Irwin: Does this occur locally, Phil?

Phil Smith: It seems to yes. You get it in the limestone deposits.

*Bordes
Tixier
Cambier* } (In French)

Bordes: An odd kind of Capsien.

Irwin: Looks pretty much like that bunch *from* —

Phil Smith: Yes, it does, yes it does.

Tixier (In French)

Phil Smith: O.K. Now one question. Do you feel that this is a burin flat? This one here. Double burin flat.

Bordes: Could well be. There is a nice burin on the percussion here *and these* ~~is~~ could be two. *yes, yes, yes.* Could well be, yes. Probably a triple burin. All right.

Phil Smith: We have finished with that one I think. This came from what was more or less a surface site. It seems to date to the late Pleistocene but, so far, I don't have any definite radiocarbon date for it. This industry was identified or found by Venoir about ^{forty} ~~40~~ years ago at Colombo he called it the aurignacian

when he got around to publishing it about ^{ten} 10 years ago, because of its typological resemblance to the European aurignacian. There is no question ^{but} that it does resemble the aurignacian in some ways although I won't call in aurignacian publicly. Well, the fact that I found some engraved Venuses on the cliffs just above this made the situation even worse as far as Messr. Venoir was concerned. Now he is all in favor of direct migration up the Nile Valley from Rubisere? ~~Yes~~. There are knobby cores almost no blades cores, true blade cores. Some have been reworked into steep scrapers of kinds, almost carenated ones. There is a huge proportion of scrapers of all kinds in this industry about 50% steep, some carenated on the end of blades end of flakes, and also some side scrapers. ^{Plus} ~~Just~~ these retouch blades, lamell triangle almost, which do resemble some of those found in the Antelian the so-called Aurignacian of Palestine.

Bordes: Why so called?

Phil Smith: We'll talk about that later. We have been arguing about that for ^{five} 3 years. There are very few burins, no ^{microliths} ~~micro~~-liths, no micro burin technique, and, at the present time, the whole thing hangs in the air. As far as I know, it hasn't been found elsewhere in the Nile Valley up to the present time. I think it's final Pleistocene around probably, according to its geological context, probably around 10,000^{or} 11,000 B.C. But I have to wait until I get a couple of hearth charcoal samples run before I'll be certain of that. Tixier do you have any comments?

Tixier: No Comments.

Bordes: The only thing that I can say is that I have seen, last ~~Spring~~ ^{Spring}, some of the material from what is the name already? ³ the big site in Lebanon ~~Zoroque~~ ^{Zoroque} ~~RE~~ ~~and~~ and some of the real Zoroque not only the aurignacian-like tools but exactly the one of the aurignacian. So, perhaps it has no ^{genetic} ~~geometric~~ connection with ^{the} ~~your~~ aurignacian but it is a little difficult to

call it another name. You know, because, if so, we can go very far and say that the horse of North American wasn't a horse because they were in North America. You know, not only when you say some special feature all right, but no more or not much more than you could find between two, for instance, aurignacians of France and one of Germany. It's even much closer to the aurignacian of France and the Focollere ~~collection~~ for instance and the same ^{proportion} collection of tools....which is exactly aurignacian. So there is a problem of this Near East aurignacian between quartz, if you like, but you know that old story about Shakespeare. Next one I think perhaps.

Phil Smith:

The next one represents the Sevillian industry which Venoir found at Colombo about ^{forty} 40 years ago. Yes, the whole thing. This is the middle Sevillian, most of this is the late Sevillian ^{where it became more microlithic.} ~~which is more micro lithic.~~ Unfortunately, I forgot to bring along some cores or some nuclei for the Middle Sevillian but some of these here give a fairly good idea. It's a industry which starts out very much in the Levallois tradition, and then gradually loses it although it never quite disappears. At the very beginning, and there are very few of the early sites known, it seems to be hardly distinguishable from a Mousterian, Mousteroid type of industry. At the end which comes at the end of the Pleistocene and the beginning of the ^{HOLOCENE} ~~Oligocene (ok spl.)~~ it's truly ^{microlithic} ~~micro lithic~~ using the micro burin technique. They made a great many geometrics and blades, but still a small proportion of the Levallois core. In some respects, in fact, it's kind of a second cousin to this industry, I described at first. But typologically it's ^w quite different, Technologically it's somewhat the same. Typologically it is completely different. There are absolutely no burins found in the Sevillian, only micro burins as far as my experience at Colombo went. The most distinguishing thing about the Sevillian, of course, is the fact that these triangular and trapezoidal flakes, which are common throughout, and the fact that the bulb is almost always removed and this curious U shape curving truncation.

This is a Bordafact, not an artifact. He made it last Summer for me. You can tell how he makes it.

Bordes: Oh, well, that's not difficult at all. You take a flake, a Levallois flake if you have one in your hand, if not, a flake which is not special like a Levallois. You make a truncation to give ^{the} a shape, and then you put it on a stone and you make a second truncation taking off the burin, and that's very easy to do, you know?

Phil Smith: Here's a kind core which is Levallois core which is found quite often in the Middle Sevillian and even in the Late, and this core is more like those found in the Early Sévillian. In the Early Sevillian most of the artifacts are done in basalt and diorite, as Venoir observed. In the Middle and Late they tend to swing more and more to flint.

Bordes: This is a discoidal core, not a Levallois core.

.....

Phil Smith: No, it's not a Levallois core, but you ^{can} find those in the Early to Middle. Towards the end there are quite a number of back bladelets present: triangles, trapezes, scalenes, virtually every geometric form that one can think of. And in one very late Sevillian site I found these three artifacts which Venoir hadn't reported. They seemed to be in place, and they are really slugs, *limas*, ~~slugs~~, with what might be, it's hard to say, I think, it's percussion retouch.

Bordes: Oh, ya, ya, ya. Micro flakes. You know what there is. It this a break, oh no, if this is not a break of the tool after completion, it is not struck. For typologically to be a true slug, you have to have retouch all around. This one would be better, not the shape, ^{just the type} and this, what is the matter with this?

Phil Smith: That's a small version.

Tixier: So called....

Phil Smith: Double concave scraper rather spoke-shaped. Very large number of these. Not

this one, but quite a ^{few} ~~lot~~ ^{the} of these Sevillian points. ~~They~~ are not retouched except that the bulb ~~are~~ are left. I don't see one at the moment. This comes close to being it. They are left in their natural state after being struck, usually, from the Levallois cores.

Irwin: Phil, do you get a lot of micro burins with this?

Phil Smith: Quite a few yes. They tend to be heavier than those.

Irwin: Little ones, Do you get little ones?

Phil Smith: No, they tend, no they are not as small because all the bladelets in the Sevillian are rather thick. You don't get any very small micro burins such as this. This is more typical, although it comes from a different industry. This is more typical of the Sevillian type *burins*

Irwin: But you don't get any of these little ones? Less retouch.

Phil Smith: No. They didn't have a very delicate bladelet technique.

Irwin: You got a little blade.

Phil Smith: Yes, you do but they... *apparently they didn't. I found no very tiny micro burins*

Irwin: They didn't do it by a micro burin technique.

Tixier: Proximal ones or distal ones?

Phil Smith: Both.

Bordes: Well, we have still two tables at least to examine in a very short day and very short time so it could be, could be, could be.

Phil Smith: O.K. well.

Bordes: *it is* ~~Which~~ gives the name of ~~the~~ site of the Solutrean but not the type site. You have this white flint from.... And then you have here some casts of some very good points, which are probably the most magnificent Solutrean ^{points} ever made by man. These are two American tools coming from a collection which is very, very rich in beautiful tools with what a pity more emphasis on the price than ^{on} to the rest ~~than~~ than ~~from~~ the origin, from which this is Illinois, which is rather big. And this one is Kentucky. And here you have tools and things that

is from Solutrean. This is a very very Solutrean which comes from upper Paleolithic. And that is what could pass for a Solutrean, *point a spa splen* but it is much later since it comes from a chalcolithic ~~(Chalcolithic)~~ level. You can see here ^{these magnificent points.} many ~~definitions~~. These are casts, of course, and the tools are much more magnificent than that, ^{even so.} and which are very, very long, rather wide and very, very thin, and they seem, however, mainly to have been made by percussion. Either indirect percussion or only percussion by somebody who really did know his business. I can't tell and I would like Mr. Crabtree to comment on this. That was a cast, and there were about ^{eighteen} ~~18~~ or ^{twenty} ~~20~~ pieces like that. All magnificent.

Crabtree:

There are many mechanical problems involved in doing this type of work. You'll notice the size of the detached flakes - the amount of stone removed in relation to the edge - strictly a mechanical and physical problem. The angle is very critical and it must be at right angle to the artifact. It must not veer a degree, otherwise it will break the artifact. Yet when this much area is being removed, it is hard to prevent the edge from crushing because of the shock to the ends. Because if there is the slightest tap on the end the other end flies off as a hinge. But the trick must be to somehow dampen the shock and apparently to use some sort of a bipolar technique to get this feathering out. However, some flakes do appear to have met on the opposite side as a thinning technique and apparently were made on a very large blade or with the core technique. But the placement and the regularity ~~of the~~ ^{by} flakes are staggered in order to remove the stone in between each of the flakes on the opposite side ^{shows good control & design.} and they are almost full flakes without a great deal of overlapping. They haven't used the next ridge to guide their flakes, but have used the flat surface and regularly spaced them. Therefore the flakes are conchoidal rather than parallel. There may have been a slight amount of

which the

pressure retouching done on the marginal edges. However, if you'll notice they didn't take off these projections left from previous flake removal, but utilized, ^{the strength of the} ~~this~~ material to remove the flakes on the opposite side. Therefore, they didn't pull out a half-moon portion with the bulb of force. But they have resorted to every possible mechanical law in order to produce an artifact such as this. They are truly magnificent pieces of workmanship. There appears to be a uniformity of manufacture of straightness and regularity of these artifacts that would suggest the use of indirect percussion. They most certainly have been ceremonial objects. But for slicing elephants, you could take an awfully big slice.

Bordes:

Well, this is many levels of the Solutrean. Where the thing was not too good on the edge. And so it is not as beautiful as in other Solutrean sites, but it is interesting to see the wide range of variation between the most elaborate ones which are sometimes not bad at all. ^{Like} this one for instance, and this one, and ^{some things} ~~some things~~ which can be, how you call it, preforms. Could also be heavy tools. This I wonder if it was ever intended to make a Solutrean Laurel Leaf. I don't think so. There are also, you know, that there are a kind of small hand axes in the Solutrean and this is probably one of these small hand axes and not at all a preparation for a Laurel Leaf. We have also the same problem that you have got in the States. Here is an interesting one, which will also remind you of thing we have seen, ^{Phalca} a piece on which ^{they gave} ~~it give~~ a burin blow. There is another one here. The question is is this really to make a burin or is it to make a kind of stem? That's another question. This one, no question, it is certainly a burin blow. We have a lot of burins made on broken Laurel Leafs. I have seen another one; I don't know where. And that is a point which is different. In that case, in that case, it could be a burin blow, but it could be also something a shock. And that ^{would} ~~will~~ be interesting

because it will show that relatively big things could be projectile points ~~to~~, not only knives, as some people have said. That's a thing that ~~was~~ happened to them, you know, flaking it and then took too much of a bite in the flint and bang, it broke on the side. And there were some here which are interesting with a stem, some not very well.

Cambier: Question in French.

Bordes: No, no, no, that is certainly Solutrean. In Perigeou - well these are some in Laurel Leaf etc. And also one of the characteristics of Solutrean of this site is that very often they made things which were just worked a little bit and left a big unifacial. This one with the exception of the stem; it's not even unifacial. Just a little one almost. Ah, here, that's interesting! What do you think of this one, Crabtree? Do you think that is pressure work here?

Crabtree: There are two indications of pressure work here. This one appears to be of pressure work and yet the normal Solutrean has a square termination of the flake and a series of these flakes are removed. I mean, the principle of working flint in Solutrean blades is spacing each flake so they are separate and away from each other. It is most certainly this sort of wide flake and the narrowness at the proximal end of the flake leaving both sharpness and regularity. This is no doubt, pressure retouch on the marginal edges showing quite a little refinement.

Bordes: And here, they did not bother to take this off. They could. They could. That could have been done, just holding it a little here and oblique blow on there, the same technique to get rid of square edge. It could have been done by pressure, by percussion, but it did not seem to bother them enough, and so they kept it like that.

Cambier: Question in French.

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Ah, yea. In the Upper, ^{level} Solutrean you have this very this one is certainly pressure work I think, and made very often flat. One face is not retouched, almost none. And here, ^{on} this one-it seems to be the preparation of a platform for pressure flaking, which is not very often seen in the Solutrean, this preparation.

Crabtree: No, this is different from what they did.

Bordes: It was removed or it was not done, you know. Here for instance, it does not seem, it seems that the bulb is there, all right, and they did not seem to have prepared any platform for pressure on this one, you see.

Crabtree: A sharpening. But he was bending the flakes across which was not distinctive with the normal Solutrean. This is a little variation from what we saw at the museum yesterday. This particular technique is showing up. They are following the ridges; overlapping; double overlapping, following the ridges and are able to carry their flakes longer and up over the surface which shows a little change in technique between ^{those in the museum.} the burins and this.

Bordes: Ya, ya - between the burins and this. Yea, yea, that's an end scraper on it.

Tixier: Don Crabtree, here there is a little polished edge. Do you think it is after or before flaking? Utilization or preparation?

Crabtree: This appears to be utilization. As for the projections, they are turned down the wrong way for a polish to serve any purpose for flaking and seem to serve a utilization purpose.

Tixier: *Camblier*
Yea, I think, so. *(French)*

Bordes: And this, this chacolithic tool. It is quite something different, you know?

It's a blunt edge.

Philip Smith
Bumlines
Discussion in French.

Crabtree: This shows a slight amount of platform preparation on this edge in taking these flakes along here, very regularly spaced, very nicely done. He couldn't

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have carried them any further because he had an indentation in the original flake. It is also interesting to see the straightening of the flake by removing the two curved ends. A little different style.

Bordes:

Yea, ^{what} much later. *ya!*

Daugherty:

Is that Solutrean?

Crabtree:

I can't tell from that. I just am not familiar enough with these stones. There seems a slight difference but I am not sure.

Bordes:

Yea, it looks. Perhaps.

Phil Smith:

One of the things which might account for the relatively scarcity of finely retouched pieces of Solutrean is the fact that it is just about the only important open air Solutrean site known, and very possibly it was a seasonal encampment rather than a place where they lived for longer periods. This might account for lesser interest.

Bordes:

Ah, yea. You could say. Look, that's a Laurel Leaf and here probably on that side, I don't know if it has been done, oh no, it's done from this platform, you know. The leaving of the ridge here. It's not exactly fluting. Very close to it.

Crabtree:

Some fluting technique.

Bordes:

Very close to it. With this preparation of platform, no question. If it was smack in the middle.

Crabtree:

If it was right in the middle. There we would have it.

Bordes:

That's very interesting. Oh, no, no. That's much better, because what poor man called fluting is just, ah, I have no blade here.

*poor green
Cambien!*

(In French)

Bordes:

Ya, ya. This one is a damn good one you know. ^{this} With preparation.

Tixier:

Do you think it is intentional?

Crabtree:

Excuse me, one other thing. You are wondering how to remove the long flakes, and this has ^{a curve} occurred here. Once this flake had stepped off, there was no

way to get any further. So he followed all the way through, till he hit this ridge, which would guide his flake showing the flake coming clear across, then he could go all the way across the top of the artifact. But it is just a matter of mechanics.

Bordes: Ya, ya, and probably there was also a slight changing of angles. The angles was much like that and not so flat.

Crabtree: He had a little ridge to guide the flake right over the surface.

Bordes: Yea, yea, yea.

Crabtree: He could keep going with long flakes.

Bordes: This one is interesting you know. ~~No~~ question, they prepared the platform and they took this off.

Crabtree: Right.

Phil Smith (In French)

Bordes: This kind of fluting I very often do to get rid of the ridge.

Tixier: I think it is a broken Laurel Leaf.

Bordes: What?

Tixier: It's a broken Laurel Leaf, I think.

Bordes: No, no. I ^{don't} think it's broken.

Tixier: Is it not broken?

Bordes: Yea.

Tixier: Before flaking?

Bordes: I think it is a.... they made this with a broken flake as I take very often when I began to make a Laurel Leaf. Work this. I don't think it's a broken piece. No, I don't. No, no, no, no.

Bordes:
Tixier:
(Discussion in French)

Epstein: May I ask a question of Mr. Crabtree? As I understand your description of the flaking technique done on these large Laurel leaves, you point out that they

did not utilize the other adjoining flake but went on beyond it. Or, in other words, they did not use the flake scar here but went much farther.

Crabtree: Very true.

Epstein: Now I don't know whether I understand you correctly or not, is there an advantage to this, as you see it?

Crabtree: Yes, to attain this extreme thinness one must space the flakes so that you are leaving material between them. Then you can utilize this material each time to provide strength to detach the flake from the opposite side. Therefore, you will have a little material in this area for a platform. Then when detaching the flakes, they will meet in the center to thin down the artifact. A type of thinning flake.

Epstein: Then in other words, it's the nature of the material which almost demands a technique of this kind or something related to it. Is this correct?

Crabtree: Well, it is just a matter of stresses and strains in this material. As you are moving ahead, you must retain enough material to withstand this amount of shock on the edge. So by spacing the flakes further ahead one can provide a platform and then ^{do} the opposite side. ^{to get the thickness} One can do a flat side without this technique, but to thin the opposite side, you must still retain enough material for a platform. By leaving this amount of material, it assists sufficiently to take off the flakes on the far side. As you see, the flakes are staggered. So by spacing the flakes in this manner, one gains a little additional strength in order to detach the flake on the opposite side.

Epstein: Mr. Crabtree, then do you see in some of the very thin bifaces of Hopewell. Do you see the same technique? I don't remember from when we discussed it the last time.

Crabtree: There appears to be a similarity in the techniques, however, they didn't get as thin an artifact. However, between these two points, had he not trimmed

off the material, he could possibly have removed a very, heavy, big flake by using the edge strength to withstand the shock.

Epstein: But, these of course, are not quite as thin as these.

Crabtree: No, this type of thinning hasn't the regularity. These flakes are fairly regular on this side, but he hasn't taken advantage of the material in between. Here he has used it to a degree, but not to the degree of uniformity of these Solutrean tools.

Epstein: If you were doing something like this, would you prefer since this technique of staggering flakes demands a fair amount of precision, would you prefer to do this with percussion?

Crabtree: Oh, yes. I think percussion is the only method for removing large flakes. But it is strictly a problem of mechanics of flintworking, Gerry. I feel there must be some sort of support for the artifact to remove these large flakes and it would also confine the shock to a restricted area. If it is held loosely, the ends are going to fly off and you will lose the artifact. But you must have this either covered with clay as Dr. Bordes mentioned to dampen the shock or you may remove small flakes as you go along the edge. Because when it is unsupported, the shock is dissipated into the artifact creating stresses, which will fracture the artifact, and when you thin down to this degree the shock is terrific.

Bordes: Yes, but you have to be very careful to work on something not too hard. Probably ^{four} or ^{five} layers of leather or something like that.

Crabtree: Some wood perhaps.

Bordes: Some wood, better than wood. *could be hard.*

Epstein: Suppose one were to just dig a hole in the ground and put a rock underneath say a couple of inches, ^{three} inches in the ground, and then just put dirt or sand in and cover that and then place his biface edgewise into the dirt. Could that accomplish that effect?

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Bordes: I don't know.

Crabtree: I don't know, Gerry.

Bordes: I don't know, but I don't think so.

Crabtree: I don't think sand would offer sufficient support and as you strike outward you would still get flexing, even in sand. You need to use sort of a bipolar technique but not get a bipolar flake. You must just miss opposing forces in order for the flake to terminate similar to the Clovis fluting in order to get the flakes to feather out and yet keep control and confine the force in one small area. Because the flakes do radiate out and would most certainly cause a break.