

Chipping: Bordes working flint with hammer ^{interval}
Crabtree working obsidian with a soft hammer.

Crabtree: I have two ^{flintknapping} terms for this, ~~as a flint worker~~. Two things that ~~happened, there's~~ a step fracture and hinge fracture. The hinge fracture has this dip as the flake turned and went out on that side ~~on here~~ and so ^{stopped} caught there, but the step fracture has broken off short, ~~and~~ ^{and} its stepped off with usually a little air space underneath but still adhering ^{and} it carried ~~it~~ through and broke off short, ~~and~~ ^{of a step fracture} that's the purpose, to go in and meet ~~that~~ ^{it}. ~~and~~ the hinge fracture can be done purposely for scrapers and that sort of thing. (Chipping) I'm squaring up the flakes so that we have a center both ways and it will have a rounded contour. My fingers are feeling this underneath, you don't see them ^{or} what's happening, ~~but instead of eye sight you are~~ ^{it is like} working in the dark, ~~like~~ ^{the boy} the first time, ~~he~~ shaved in the mirror everything came out in reverse. These are difficult to do because you have a dip ~~and~~ ^{and} this you must come in underneath on this side in order to carry ~~the~~ ^{flake} this through ^{to} on that side. This is one, the edge ^{is} just a little further. These are short, ~~or~~ ^{change} changed angles so I don't go back in and get a step fracture on that side. I was following the ridges through. You can't strike this way, or you lose the ^{tip} point. My fingers are ~~kind~~ ^{tip} of supporting the point at the same time.

A.Smith: What did you mean Don, you couldn't strike this way? You couldn't strike which way?

Crabtree: You can't strike out toward the ^{tip} point. You'll lose it. So you keep the force coming back in towards the central part of the mass of stone. There was a thinning flake to take this through here on

and hinge

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this side, ~~with that sort of thing there.~~ I have a little ridge.

You see now we have a little more regularity ^{for} to strike ^{ins} these

ridges on this side. Here, now I may lose ~~a point,~~ ^{the tip,} but it's a,

thinning technique ~~on here~~ and I find by ^{using} a slight ~~Levalloisian~~ ^{Levallois}

~~sort of thing,~~ ^{technique that it works better.} But I find I need a little pad, a little support on

the underside. ~~Here of this with the shock we can show you here~~

by shock. I drag the tool here.

~~as to. I tried this one,~~ It's quite different from ~~what~~ Dr. Bord.'s

technique

This is taking too much ~~shock~~ shock to do this. I'm afraid I'll

lose the other end of it but we don't particularly care. I've got

a little too much, ^{platform, no} a little ^{stand this shock} round, ~~too much.~~ But it will stand a

lot of shock. ~~Even obsidian will do that.~~ ^{it helps the accuracy.} This kind of ~~helps for the~~

~~accuracy~~ if you leave a little hump ^{out} ~~down~~ at this end ~~here.~~ ^{it helps the accuracy.} ~~this~~ ~~it is~~

~~sort of thing here,~~ ^{distorted.} I got a double flake, but it ^{illustrates} is a thinning

flake, ~~like that sort of thing,~~ just to illustrate.

Tixier: ~~....~~ Technique. *Did you say this was Levallois technique?*

Bordes: We use the same technique. *yes*

Crabtree: But, maybe, a little different.

Bordes: In the striking, yes.

Crabtree: It appears to be a bipolar ^{break,} ~~sort of thing on here.~~ We have a little ridge on the center here, which we have to eliminate.

(Flaking continues, with occasional edge shearing.)

A. Smith: Are you trying to flatten it out now? *Don?*

Crabtree: Yes

Tixier: remark in French, ~~Bordes Ori~~

Bordes: *Oui*

Crabtree: I was surprised that Dr. Bordes ^{holds his artifact in} ~~(holds his)~~ the same style ~~almost~~ at the edge ^{as I do} but he uses a different indirect ^{blow} with the hammer than

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I do which has been a very ^{instructive for me.} enlightening thing. And with practice I think that ~~one~~ ^{of the antlers} will have a great deal more control than ~~by~~ ^{by} using a flat edge ~~on this~~. I got it. ^{A bad one} It crushed; if I ^{had} polished that a little bit, I ^{could} ~~should~~ have taken that one on through here.

Bordes: Question unintelligible.

Crabtree: No it's a little harder, I think I'm not used to the hammer, I'm over exerting myself.

Bordes: ^{you, I know.} ~~You~~ don't use it to try to knock off. ~~and~~

Crabtree: It's just a beautiful tool that you have there - ^{this percussion tool.}

Bordes: But you have to use it ~~more~~ ^{more}.

Crabtree: { Here, just to demonstrate the sort of ^{thinning} ~~business~~ in these areas.
 { We'll make a Solutrian with ~~two~~ points here.

Bordes: And from that they went on by pressure?

Crabtree: Yes. This is sure a sorry blank. We'll try it anyhow. ^{I'll get this bridge off.} By ^{using} pressure I ^{could} ~~can~~ remove some of these knots ~~on here~~, and this has a

Tixier:
 + Bordes:
 Friend

curve, ~~anyhow~~, but by pressure we can eliminate that, ~~(Bordes and Tixier converse in French).~~ Well I got some bad ones, but that is ^{how} where one learns by ^{studying} the poor areas ~~on here~~ of what, of just how to eliminate ^{them.} these. It's better to use sawn blanks for ^{demonstration.} the perfection of a thing like that. It's probably better to illustrate the bad parts ~~here~~ than it is the good ~~(disc in French in background)~~ followed by blank space in tape. ^{preparing the edge} I'm ~~smoothing it~~ and it'll bite into the tool, whereas if it's got a sharp leading edge, it crushes, ^{And once} you ^{have} crush the area you have ^{created step fractures and you have to reestablish a flake from the opposite edge of the artifact.} ~~disrupted the whole thing, you have to~~ go either in on either side or go in deep, on that. There I crushed it, see, ^{it will} and there is one way you'll just keep on crushing unless

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prepares a new platform
one ~~takes a little off this side~~ and gets underneath this crushed part.

Bordes: This blank is terrible.

Crabtree: Well it's really better for demonstration than a real good one because there are just steps and stages that go into the preparation that you never see in the final finished artifact, ~~like that~~.

Notice the direction ^{in which} of the flakes are coming back in. These are crushed ~~on here~~, but I'll try to pick these up on the other side to thin that down, ^{the pressure is} but ~~it's~~ always away from the ^{tip} point, and the pointing technique you'll see different styles, ~~on here~~. You can't go out

this way, ^{from the base} ~~this end~~ without losing the ^{tip} point, ~~so~~ there are about ^{three} ~~3~~ or ^{four} ~~4~~ different ^{ways to flake} ~~manner~~s that they put the tips, ~~or~~ So if you just ^{flake} ~~chip~~

^{in this manner, it will result in a double bevel.}
~~them off like this you'll end up with a bevel and a bevel.~~ Then ^{when} ~~the flaking is from the tip to the base,~~ they'll do it the other way and some will flake beautifully right up

straight like this, then the others will be at a slant, but you'll always find a difference in the change of direction in flaking right at the tips, ^{three} and there are about ~~3~~ different techniques that are used

for producing this. But I am working backhanded and actually left-handed and it's ^{not my normal techniques} ~~against ones~~... And ^{where I hinge these off,} ~~where~~ ^{meet}

^{the hinged flakes on the opposite side}
~~I pick these up~~ and it's starting to thin it down just a little

more. You normally wouldn't think that you would thin by pressure but it is possible to do. You see ^{by} ~~with~~ using this pad, ^{the} ~~your~~ flakes

crush, ~~But by using this manner I showed you the other day, by~~

^{the artifact}
~~supporting it~~ with a little piece of leather, or something, under the

^{back}
~~side here~~ you'll sometimes save your flakes, ~~But~~ it will give the

flakes a little different character ~~on here~~ and you have to watch

here that you don't get too much pressure on that side ~~here~~ or it'll

pop in the center. But, actually, you don't give it as much pressure with your fingers because while you're doing this it will cause it to break. But it will work. And now maybe I can leave a flake still adhering ^{to the artifact to show how the material bends} to show you the difference of how you pull this loose and how ^{one has} you have a muscular reaction that ^{allows him to} you feel it bend ^{and stop} and still the flake at the desired place. ~~leave it adhering to the other end, and.~~ I mean there is that much ^{flexing and} flux in bending in ^{the material.} this that you would never think, I mean in a few writings I see that there is material that is intractible ~~but~~ ~~by~~ ~~abouncing~~ of it, there's a certain amount of elasticity, ~~to this,~~

For instance ~~with~~ a glass cutter ^{will} if you'll watch him, he'll score his glass and sometimes you can watch the crack move ^{ahead with the} ahead as they are cutting, ^{scoring} actual see the crack slowly open! Twenty five years ago the Mass. Inst. of Tech. did some spark photography of glass breakage and ~~measured with spark photography the speed that glass breaks and they~~ threw a baseball at a window ^{which was} and they supported it ^{on} at all four corners, ^{The striking caused it to} so it ballooned out and it pulled in ^{on} at the sides and ^{the} ~~cracks opened up~~ ~~went in~~ at the rate of a rifle bullet ^{under} in speed but actually you ^{different circumstances} can measure it again and you'll find out that it took, it could be

^{of fracture.} measured with spark photography the speed that glass breaks and they threw a baseball at a window ^{which was} and they supported it ^{on} at all four corners, ^{The striking caused it to} so it ballooned out and it pulled in ^{on} at the sides and ^{the} ~~cracks opened up~~ ~~went in~~ at the rate of a rifle bullet ^{under} in speed but actually you ^{different circumstances} can measure it again and you'll find out that it took, it could be ^{could be} measured in parts of seconds, and to how long it took glass to break. So it depends on how one breaks glass, ~~as to the speed here.~~

A. Smith: Did you mean to say, Don, at least I understood you to say, that flakes had a different character when you used a pad?

Crabtree: They do have. They will feather ^{and I get a popping sound, not a snap.} out and on many of them.... But when I go through like this ^{apply inward and downward pressure} I'm forcing a mass of material ahead of

^{the pressure tool} ~~me~~ and someplace I must stop, ^{the flake or else it will remove the opposite side of the artifact} or else go off the other side, but with

But, with the pad, *the flake*
~~this~~, it's faster and it will let it feather out, ~~this is the~~
 By feathering ~~that I speak of there to let these come out to infinity.~~
I indicate that the flake goes

A. Smith: And you can tell ^{by} a flake whether a pad is used or not?

Crabtree: Well, if ^{the pad} this style is used, ^{the flakes will go} you'll find they have gone across ^{the} ~~the~~
~~median line and must be stopped before they reach the~~
~~opposite edge~~ they will stop and go over and stop here, ~~then they will pick~~ ^{be met}
~~by flakes from the opposite side and will stop as a~~
~~these up and these will be~~ step fractures, and not hinge fractures.

You see the flake will break off short with a sharp edge break ^{on a step} and
 as ~~then~~ you lift the flake, ^{off} and that makes a sharp right angle break
~~here~~ at the end of the flake rather than ~~this sort of a hinge~~ ^{fracture,}
~~coming over like this.~~ You see this ^{flake} was bent out. From here

you can't bend it out because your pad is in the way ^{and it's a} ^{typical}
^{of a leather pad technique.}
~~bit of character.~~ Some types of artifacts are covered with these

little scales, these little micro scales of little step fractures
 while others have none, ^{techniques show the flakes} and some ^{of them they were met in the}

center with ^a ~~little~~ step fracture, ^{the artifact} ~~here~~ but that leaves a little
^{with a slight concavity} hollowness that you see in this sort of thing particularly with
~~thin blades~~ ^{artifacts, the flakes} where they're very thin they will meet in the center.

But there are ^{maybe many individual characteristics and} ~~maybe a half dozen different ways of interpreting~~
~~behavior patterns of pressure flaking - each will be~~
^{distinctive.} ~~these things that may be characteristic of certain techniques like~~
~~this, and for me, with this group here particularly to make any~~
~~set any hard & fast rules that would apply to all artifacts,~~
~~statement that this is a set and fast rule like that, you have to~~

~~see the artifact.~~ ^{One must study many groups to} But it's a character too that one can observe
~~and see whether it happens to be characteristic to the particular~~
~~workmanship~~ style of working. But certain things, ^{collateral} with big wide lateral flakes,
~~they must meet in the center so they must~~ ^{meet with a} ~~have~~ step fractures in ^{the}

^{middle} ~~here~~ if they have hinge fractures ^{they will be slightly} they're going to have great deep
^{concave in} ~~holes in the middle of the~~ ^{artifact} ~~point here~~ and sometimes they do get a

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~~hinge fracture.~~ ^{It is} I mean it's not impossible, but it's better to get
~~in the center then meet it from the opposite~~
~~a step fracture and an even step on the other side then you'll get~~
~~side~~ ^{surface} a ^{sometimes goes to do it}
~~a perfectly flat face~~ but with your hinge it does dig down into the
~~stone as it goes off the other side.~~ ^{artifact and must not go} ~~we~~ ^{we} ~~are~~ ^{are}
~~I forgot~~ ^{ok} ~~we~~ ^{we} ~~were~~ ^{are} ~~holding~~
~~pictures here,~~ ^{T. V.} we were supposed to be doing a demonstration. ~~for~~
~~gotten all about this sort of thing here~~ But these ^{different methods} ~~points~~ come up
~~in holding, while we are working~~ ^{come up} ~~and we could go on for weeks~~ ^{along with different}
~~actually, with this and the various different things that happen~~ ^{holding techniques}
~~When Sam working at home~~ ^{When Sam working at home} and I work in the evening ~~and~~ I should put down some notes, ^{on} ~~such as~~
~~"Well that's peculiar"~~ ^{planned or} with each thing and you get ~~sometimes~~ accidental
~~fracture for interpreting purposes.~~ ^{fracture for interpreting purposes.}
~~things that happen and they're difficult ... to interpret.~~ That was
~~a rebound here.~~ This ^{holding} style that I am using now is my ~~own~~ normal way
~~of doing this,~~ ^{knapping} the other ^{holding methods} things are changes and they take ^{it} a long ^{time} ~~er~~
~~time to do it.~~ But ^{the hinge fracture produces a} this is prettier work where ~~may be~~ you will use
~~more refined flaking,~~ ^{more refined flaking,} so let's try another one.
~~hinge fracture on here so that means we'll~~

~~make another one on here probably. Don't shift in the point (2)~~

Doughty: Where do you put it? -
you put the tool right along the edge here. sort of like so, right in the middle?

Cabtree: Uh, huh, if you'll notice I ~~beat~~ ^{leave} this razor shapp ^{on} ~~along~~ the edges, ~~there~~. I mean
this is just as ~~sharp~~ ^{sharp} as a razor ~~without~~ ^{you} crushing, ~~so~~ I take off the edge, with ~~the~~ plat-
form and that ~~leaves~~ ^{leaves} a cutting edge. Now, here, this will break down to that point ~~there~~, ^{there}, so

I'll ~~take this and~~ move the ^{tool} just back of this line of operation here and ~~then~~ I'll
~~apply inward and downward pressure but if the pressure isn't applied right it will~~
go in and down ~~and~~ if I don't get the right touch of this, it's going to hinge ~~on~~ again,

But I ~~hope to~~ ^{hope to} pick it up on the ~~side~~, ^{opposite} but that's all right but sometimes ~~you~~ ^{one} end up
with a ~~mass~~ ^{mass of stone} in the center. ~~And my only way~~ ^{now} ~~to come through here and catch it.~~ ^{to overcome this is to}

I'm trying to get this knot out of ~~the~~ ^(the middle here) and I'm taking fairly heavy bites ~~of this~~. ^{with the tool.}

The ^{desired} thickness of the flake ^{determines} ~~is~~ ^{one} how far in ~~you~~ ^{set} the tool, ~~how thick~~
See, that ~~removes the heavy mass in the center~~, ~~worked~~,
a ~~flake~~ ^{that you want}. See that got my little ~~thing~~ ^{hump on here} that was hinged off. This

~~here's a bad one~~ This is now distorted and can be finished as
~~one, it's just distorted but this would have to be a knife instead of a spear.~~
~~if I continue this technique now with this distorted~~
But there is no use making any more curve in it than I have already have and if I come
flake, it will just be more concave than it is now.
~~in to meet this one why we'll get more of a dip than we had in the curved flake.~~

Doughty: When you ~~put~~ ^{set} the tool ~~you go along~~ ^{at little ahead of} this bump here, ~~and push down that~~ ^{then}

way, is that right?

Cabtree: ~~This on this side~~ ^{yes, that's right} I will ~~do this~~ ^{more the tool in} so that ~~it is~~ ^{it is} directly in line with this groove
~~and this~~ ^{with} my force on ~~there~~ and now with this flake ~~there~~, if I were going to take off
~~another~~ ^{which I can have} ~~projection in here~~, I would move ahead and set my platform ~~in~~ ^{region} here to take

^{flake} this ~~one~~ off and use that ^{ridge} to guide ~~it~~, but you start at ~~one~~ point or the other, ~~and you~~
~~use that.~~ ~~Now you see I had a distortion here, even flakes like some of these samples are~~
~~the even flaking on some of the samples here.~~

here, but those will guide ^{Symmetry} and control the ~~symmetry~~ and regularity, if you have a series
~~of percussion flaking~~ ~~it is because it was regular from~~ ~~the start to the finish,~~ ~~and you must~~
~~be evenly graduated all the way, with the same spacing for~~

~~be graduated all the way~~ ~~at different space,~~ but each time ~~the~~ tool has to be set
~~exactly in line.~~ Now some of them are ~~longer~~ tool so there is no ~~give~~ in the ~~stroke~~
~~Dr. Bordes uses a longer handled tool~~ ~~the percussion method of~~
~~striking and delivering the blow~~ ~~to the edge of the artifact at right~~
~~angle to the longitudinal axis~~ ~~which gives the~~ ~~the same results~~

same as ~~when~~ I ~~take~~ this ~~way~~ ~~or whatever,~~ but you can see in the ~~low~~ and ~~this~~ ~~line~~
~~as when I tilt the artifact but still following the same ridge~~
~~pattern.~~

certain advantages to use ~~it~~ in this manner but with a longer tool you'll not have this
~~wiggling~~ ~~and you'll have,~~ ~~keep a~~ ~~and reach over a better~~ ~~straighter style,~~ so even your tool
~~can produce flatter and better controlled flakes.~~

that you may have used if it was ~~longer~~ ~~here~~ will give you a more direct ~~precision~~
~~flakes than this.~~ However I'm use ~~to this~~ and I'm a little ~~(altered?)~~ with the other. I
~~and am a little~~ ~~skewed~~ ~~with the longer handle.~~
~~think that,~~ the ~~long~~ will give you a little more precision and regularity than having too
~~at think a longer-handled tool gives more precision and~~
~~regularity without the wrist movement.~~
~~much wrist movement~~

Alvin French (H. French?)
 Question. (~~Don't~~ ~~hear~~) ~~unintelligible~~ (~~how much~~ ~~you're going to take off.?~~)

Crabtree: Well let's make ~~it~~ more of a curve and try to meet this one in here. See this one

~~from a~~ ~~that we~~ ~~can~~ ~~dig~~ and we ~~cut~~ a big groove in it. ~~and~~ ~~here~~

~~the bending of flakes.~~ See this little flake ~~still~~
~~is~~ ~~let me demonstrate here,~~ ~~to see the bend,~~ these little ones here that are still
~~attached~~ ~~you see the molecular attraction where I pull that together,~~ ~~just the~~
~~the fingernail~~

~~pressure of the finger nail bends the stone.~~ It might be a little easier here if we could
 pick up this ridge, Here's a little step fracture, ~~we~~ can scrape... ~~down this edge~~
~~to make a platform~~

of flakes off the edge of this artifact to show how the worker can leave a razor sharp edge.

I'd like to do a series of that you can see how to achieve the sharpness of the edge

It is a sharp edge like a sharp edge of a knife, this is a dulled out edge now, and nearly worthless as a tool. So I will resharpen the edge by removing a series of flakes taking the platform with the flake, and a sharp edge will result without crushing here because we have all of this distortion right here but if we could take a row of regular flakes. This one here as we go down to keep from losing the point, I'll try to

Sam applying inward & downward pressure and directing the force toward the base to keep from breaking the tip. I'll try to get the series... You can... but I'll move ahead, I know it's underneath. I know from practice, the position of the ridge, even tho it is underneath and I can't see it. I know that this flake is going to turn so I don't have to turn it each time, and I know where the flake is going so I don't have to turn the artifact over after each flake removal to see what happens. I'm changing from this direction back to this to the slant now. I'm changing the direction of the flaking pattern to a slant now.

A. Smith: Have you done it enough so that you can remember the under side?

Crabtree: Oh yes, You know what happens just by the sound and the feel. But if I hear it go crunch, or if it makes a noise like a mouse crying, I know (there's something wrong),

A. Smith: You can actually visualize the under surface?

Crabtree: Oh yes, you feel it. Most of this is done mentally, actually. And to get these to meet together blindfolded. It's almost that sort of thing because your angle of flake removal is so critical that I'm amazed at some of the precision you have. They had in taking they removed long thin flakes only and the long thin ones may be only an eight of a inch wide, that they carried through to the center.

It's simply amazing... you can see where we did over on this side here.

Change that. I've forgotten the surface character of the artifact so we'll have a look here, but I'm trying to establish

a little projection. The finer the projection, the more preparation you use, and the

easier the flake ^{is detached} comes off, ~~it~~ however, this is a long one, ~~this~~ ^{and it} went clear across

~~the other side~~ ^{and} ~~and~~ ^(...) ~~and~~ took off the ^{opposite} far edge ^{on here}. ^{Unintell. remarks - laughter} You ~~might~~,

~~there~~ ^(see) isn't very much that I can do with ^{this} ~~it~~ now. Epstein: Did you say you can smell it?

Epstein: Question (couldn't hear)
Crabtree: No - but I do feel with the hand
Crabtree: Oh, no, I did that by touching the hand..... ^{I don't use my sense of smell but I do hear}
~~unintelligible remarks - laughter~~
This is... I don't ~~use~~ the sense of smell but you

Wheat: Did you ever try to chip ~~of~~ oil shale?

Crabtree: No, I ~~did not~~ ^{haven't}.

Wheat: You could use smell ~~there~~.

Crabtree: You could smell that, ~~too~~? Well, phosphate rock smells a little too.

Bordes: Well ^{when you work flint} ~~what you make~~ with ^a stone hammer and you miss your blow, you smell it. There is a kind of crushed flint, and you smell it

~~And you smell it...~~

Wheat: ~~there~~ There is some ^{cherty} limestone that you can smell too....

Crabtree: ^{There is a side effect of shipping} ~~There is something with this sort of thing here that I don't do this a lot~~
I developed a ^{bit of a} ~~catch~~ ^{as a pad - instead of leather it and} and if I use a cloth... ^{collects the dust residue and causes the cough} now there is a technique

that I use ^d to use, till I cut ^{the} this nerve in this finger and it was a beautiful technique.

You caught ^{the flakes} them between your fingers but ^{the} when it ^{once a flake crushed and} crushed it when in and cut the nerve ^{on} on this finger. ^{this technique} ^{obsidian particles fly in the air} But with ~~that one~~ the dust flies and you could almost get a little silicosis ^{is a} ~~from~~ from this sort of thing. It might be something that one of the ^{one way of identifying} ^{stone markers} ^{is a} ~~is a~~ ^{reburials} ~~of a~~

~~member~~ in a group of people. I don't know whether this would still be in evidence

in the medical profession but there may be an accumulation of silicious dust in the

Bordes: With obsidian, yes.

lungs from doing this a kind of occupation... In the strong sun light you can see

fly in the air.

the dust a lot if you use a rag or cloth, I don't know, this piece of canvas I've got

This technique of using a rag as a pad to protect the finish and some place here, but I don't know really but the style that ones uses with this is

second ~~quite different and Dr. Bordes..~~ gives ~~it~~ a whole new character, ~~to~~ well I don't

I'll try to demonstrate this technique.

~~know whether I can do it here but I'll show you the style with which this is done but~~

get you quite a bit of leverage but you lose strength in your fingers, ~~of solidness~~ *for they must support the artifact* But

you can develop a curve ~~and~~ *flaking* is to you catch the flake between ~~this~~ *the 1st & 2nd finger*, this should be

The pad should be soft between the fingers and soft in here and supported with ~~by~~ *by* the thumb and the flakes are ~~going in this manner here~~ *being removed at a diagonal*

~~and~~ you can feel them very well and for some reason the character developed ~~here~~ *by this* ~~cannot be duplicated by the normal palm-supported technique~~ ~~reverse and put back into my hand.~~ I don't know I get a truer, better flake and ~~it is~~ *it is*

Straighter ~~better in line and percission~~ by using this ~~sort of thing and that~~ *technique* then again I've used

a crutch for ~~with~~ *removing large flakes* making heavy work, your elbows here and I notice that some, ~~no doubt~~ *oblongation*

use this method ~~on here~~ but if ~~you~~ *you* support ~~it~~ *the artifact is* on ~~this~~ *a rest*, and I can show you here on anything

~~solid~~ *up* and a block you end up with a whole bunch of step fractures, all the way along.

Without a crutch but using a rest, the ~~it has no place to go and these little flexible thing just shoot back in.~~ *flakes go into the artifact causing step fractures.* ~~It possible~~

The rest method was, no doubt used for knife sharpening and retouching. ~~This technique caused a beveling of the edge~~ *for very straight flakes was used for knife retouching this sort of thing along here,*

~~as they set the flakes along, and so you'll have particularly those beveled edge points~~

similar to artifacts found, ~~that they have in the M₁ ss. Valley where they have been retouched and retouched and are~~ *chawing* ~~and are~~ *causing*

excessive beveling.

~~no doubt knives rather than spears and arrows that twist in the air and that sort of~~

~~thing, you know, *When they are* reshaped in resharpener like this *and the artifact* and supported~~

supported creates a distinctive

~~of the edge which gives it a certain edge character, from that, *But* it's not *adaptable* very good~~

~~for making other than very thick arrow points, yet somehow *it seems* these diamond some~~

that some of the

~~of these diamond cross-section pieces have this, character of a support of something~~

feathered out.

~~sharp and hard that each one is feathered out, *Hand* will not produce~~

this character for there is,

~~too much rolling of the flesh and you do need a solid support, *Like* this piece of rubber~~

~~or some heavy neck leather or something like that, *That's feathering out show* that they have just a little different~~

~~a definite support method. *There is shock,* but the hand rolls *stays* system for feathering out. *It's a shock,* but here you let your hand roll through~~

on thru

~~and actually with your *pressing* you are controlling the flake with your left hand *and* *although*~~

the right hand is

~~you are a little more fixed, with your right hand but there of this group in here~~

~~on flintknapping and each one had you not seen one do this in each one~~

~~and Butler was the only one who could see you do this everyone had a different technique~~

~~some had them down on they had a of edge pressure like this and each~~

and each holding method,

~~one of them had merit but each one gave a little different character, *to the artifact,* and it also kind~~

For instance,

~~of goes to show that with Dr. Bordes *he* doesn't feel comfortable using this *holding method*, so he~~

~~has a different style. Perhaps the aboriginal child learned from had a little different system and he each one is apt to have learned that and would do~~

~~his father and so we have different holding methods. I recall seeing that as a child and these patterns do seem to follow through. Now there was a group~~

~~a collection and every artifact in the bunch looked like it of points one of the amateur collectors brought in and in this full array, there *was*~~

~~had been made by the same man yet there were big ones, there *were*~~

~~little ones, and all *types* of things, *but* they all had little step fractures, *well* done,~~

~~it appeared that one worker had produced all~~
~~but the character was just as well like as if one arrow head, I mean one arrow head~~
~~of them~~
~~made with a dozen or more things yet they were all found at a buffalo jump, as if one~~
~~man jumped a whole bunch of buffalo, you know, so these things seem to be somewhat~~
~~characteristic. What variations and things like that are just going to turn up with~~

~~additional study. All of these things examining different collections, different groups,~~
~~will, no doubt, show up the variation because we can't make~~
~~an analysis with just one point~~
~~because as an individual point for analysis it's very difficult you need an assemblage.~~

~~For instance, look how many different styles and~~
~~techniques we find in Clovis.~~
~~here with this Clovis style thing how many different styles and~~
~~techniques we find in Clovis.~~

~~how many different techniques come up with different Clovis styles, like that. And~~
~~may be everyone of them is going to have an entirely different technique, there's going~~
~~to be no continuity, and it's going to be an interesting thing for someone to do a little~~
~~paper on Clovis techniques and the variety of fluting, edging or grinding all of the~~
~~things like that and surface characters, etc.~~

Wheat: ^{Bill} ~~there~~ ^{is} a little paper ^{on that} ~~like that~~. It's published in the Ohio State ^{Archaeologist}.

He recognizes about 3 styles of fluting techniques.

Bradlee: ~~So that so. I haven't read it, but it sounds interesting.~~
~~I can't actually ... What do you think ... of this.~~

Bradlee: ^(Break in tape)
~~This is no preparation. He may have been going to take another series and decided there~~
~~goes the buffaloes. Let's take out and we'll fix this. ^{later} Because it's just not ^{quite right} a question.~~

Wheat: Maybe they used it as a drill, for a pipe or something.

Bradlee: Yes. But it's like it is unfinished

Bordes: ^{yes, yes but} Let me tell you something. It looks to me like the man was not ^{very} really clever, ^{Because}
~~yesterday when I ^{tried} drew up my pressure I got ^{exactly} the same edge and I could not go farther,~~

It was too wide, and I could do nothing so I just left it and began my *percussion*

~~That's what you know...~~

And it could be because the man was not very good

You know it strikes me..

Crabtree: He was able on this side to press very well.

Bordes *ya, ya* ~~Yes.~~ But you know on this side *he did fairly good pressure work*

and when they ~~went to~~ *wanted to go on* the other side they couldn't *get exactly that. So I will say that the man was learning.*

Crabtree Well, some of these ~~things you have to do~~ *techniques require* backhand work and it's almost like using

a left hand, I mean ~~you are~~ *it is* awkward to ~~use~~ *use* one position and ~~then~~ *then* turn around and change direction of ~~the~~ flakes. Your muscles are just not keyed ~~to where you can break them in~~ *to this technique and you use* and you *different muscles for each technique.* ~~have a different muscle as well as you have a backhand.~~ *Therefore* You are not as accurate.

Like in writing ~~we are used to a stable support for writing and it is hard to stand up and write with just hand support.~~ *we are used to a stable support for writing and it is hard to stand up and write with just hand support.*

And it's different feels that you have to do that and so this one of *Dick's artifact* of *Dick's indicates that the worker* it's just like he hadn't finished the one edge ~~and maybe~~ *maybe* he had sufficient weight

for that particular type of ~~work~~ *projectile point and* he didn't want to take any more weight off of it and

he wanted a balanced set so he left it ~~the~~ *the* point was good the rest of it; penetration was the same so he may have decided. *This is good enough*

Bordes *Ya. ya, ya.* They were ~~a very prolific people.~~ *certainly skilled* ~~Some people~~ *Some people* were very handy with their hands ~~and people were not so good and people...~~ *others were not so good and* ~~and people were not so good and people...~~ *and people were learning* you know. What can you

say... *maybe they* ~~And they were children~~ *And they were children* ~~learning to work with it~~ *learning to work with it* ~~and so some~~ *and so some*

of the things which ~~as it could just~~ *looks rather crude are* ~~as it could just~~ *looks rather crude are* ~~beginners work~~ *beginners work*

Could be that too, or it could be that the man was in a hurry, he was ^{starting} studying, ^{wanted} he went
 to the spear-head to ^a ~~the~~ spear heads to kill something and ^{would} fix it up ~~up~~ after. Why not.

Tipier Because of his wife?

Bordes, No. Another interesting observation of ~~cross-section~~

Leobtree Notice the tears and the flake character, ~~Why~~ certain flakes were certain shapes
 and then a comparison I ~~mean~~ ^{of the} where you will get a slight crushing of the edge, You can
 see a part of a platform preparation still left on these right here, ~~but we can pass these.~~

Bordes, There is one thing... I shall try. To work obsidian with a
 soft hammer.

Leobtree So there is not so much shock.

Bordes ^{Ya, ya ya} Best thing ^{to work} ~~obsidian~~ ^{perhaps} by percussion would be to find
 something that is a little softer than this. Not much

but a little. ~~There is nothing.~~ I know I work with ^{soft} wood ^{you a very long time.}
 The ^{best} ~~best~~ wood hammer is just about like the ~~work~~ ^{work} of antler.
 Leobtree Let's use a wooden ^{bill} ~~bill~~ on this and see the difference, ~~on this.~~

Bordes Let's see. I will try with wood

Leobtree Good very good.

Bordes, You know this part ^{of the} (Break in tape) the edge is just crushed but the crushing ^{become a part} ~~come in parts,~~ but

this because this is a tool now, ^{and then also} ~~a general tool,~~ because I am not too much happy with
 this anymore ^{and that is} ~~exactly~~ why I ^{throw this out} ~~like that,~~ ^{al would} ~~like to hold~~
 it here. ^{It would be better to hold it} ~~like that,~~ ^{it would be good}
 but I ^{could} say ^{that perhaps} to keep this is this shape, as an example, because I am not sure

I can go on, now.

Brother Like a ^{preform} free form. ~~It~~, It doesn't have the appearance of a regular ~~free form~~ ^{preform}.

Budes No., no, no, no, no, ^{It's} something else. You know I am ^{now} ~~not~~ very sure that the man, a man you know with ^{who was very hands} ~~obsidian~~ ^{a good hammer and enough} and with obsidian could make things

almost as ^{perfect} as the one you made by pressure. Not the one ^{small one} but the wider retouch. I am fairly positive of this. ^{because,} look, and I have no technique with ~~that~~ obsidian.

Ah, that's an idea, you have some idea, and if you have some time, you'll notice this interesting ^{way of retouch} ~~met~~ ^{meets the center}. But certainly you ^{do} have seen ^{Egyptian} and some Egyptian knives, you know that ^{met} in the center, and some is so nice, you know.

Doughty Don. Could we get you to try one more blade with two different people doing it

Brother; Well, if I could get ^{some way} to save some of the flake or ^{blades}. This wood billet, ^{I have may be} a little ^{hard} apart, it may be a little rugged.

Budes. I would not like to say anything against ^{country} ~~was~~ as beautiful ^{as yours} ~~as yours~~ ^{a job of} with pressure flaking but I guess somebody ^{who works flint or obsidian everyday} walks and talks ~~against~~ ^{by} everything like ^{percussion} ~~pressure~~ flaking could get things almost ~~as~~ regular as the big ones. I don't speak of the small ones or ^{crazy} ~~great~~ chips and so on, but ^{regular forms} ~~forms~~ ^{ordinary} organized knives or ^{projectile} ~~for chipping~~ points you can get by ^{percussion} ~~compression~~ chipping almost ^{to} at the point of pressure, when someone is really trained.

Wheat What differences would show ^{up on the points} ~~these points~~ to be...?

Budes: Well, not much, to someone clever ^{Technically when you are really} I believe ^{controlling your percussion} you take out long and it looks very much like ^{pressure} ~~and very much almost like~~ pressure.

Wheat: But there is a difference in the way the flake ^{turns loose.} ~~curves away.~~ A difference is ~~the way the flake turns loose.~~ That is in the pressure, the pressure builds up slowly and then it's released suddenly and on the percussion it's hit suddenly and...

Bordes: Ya. but all that ^{is a} ~~doesn't matter~~ ^{of ratio between the hammer and} ~~the hardness of the material.~~ ^{what.....} ~~between the hot ash and the vitrial,~~ ^{walking} ~~it's about the same...~~ ^{hardness of the hammer and} ~~of the hardness is about the same you know there is~~ ^{you are working!} ~~not much apparent between pressure and percussion.~~

Wheat Well, this is what I wanted to know.

Bordes: Not, much. ^{there is,} for instance, any of the tools made by ^{Crabtree} ~~you~~ can see very ^{easily} ~~clearly~~ it's made by pressure, ^{but} in some other case like ^{a lot of Laurel} ~~or~~ ^{leaves in} ~~France~~ ^{well,} in France but I am not enough of an expert.

Crabtree: The large one that went around here. This is percussion.

Bordes: Ya, ya, ~~that's~~ ^{no question.} ~~percussion.~~

~~So, I mean,~~
Bordes We will look ^{them at the museum Thursday morning} at these some..... You'll look at the ^{Solutrean work} ~~certain work~~..... And you will see that some were made by ^{pressure, no question.} ~~percussion~~, points and leaves. ^{points and Willow Leaves}
Most of the ^{Willow Leaves} we made by percussion, no question. But on some ^{Laurel leaf} ~~willow leaves~~ ^{who knows.}

(Stone chipping and babbling in Freeh- French) ~~But you see....~~

Crabtree Yes, that's good

Bordes: When ^{you have a good hammer, it works good,} ~~it's good...~~ This one will be a little more. You can ^{take} ~~make~~..... ^{clear across}

I am fairly sure that most of the *Solutrean Laurel Leaves* were begun like that. But not too much of a shock .

Tipier (french)
Crabtree Hummmmm... good.

Bordes; The thing you have to do is each time to *strike correctly* I don't do it any more, ^{and} but you see ^{that's} the general idea..

Crabtree: That's a good thing to bring out here.

Bordes: Let's see always when you want to demonstrate something you miss it. And *perhaps with* this trial *stick technique* ~~you do it like that you weren't looking.~~ *make it look like that but you are doing like that* And at the time you were

looking ~~it didn't work.~~ ^{there} *God damn!* If you pick up a *lump of flint* flake and you try to work it ~~and~~ ^{first}

^{can't} you work it well and then, if you work *flint* by *percussion with your* ~~hand~~ ^{hand} ~~core.~~

hand cut
That's bad..

Alan Smith Then there is a little difference then, whether it has moisture or ~~it~~ not?

Bordes Pardon me.

Alan Smith There is a little difference whether it has moisture or not.

Bordes Yes, there is a small difference. This one crushed much more than *the other*

Tipier May I see the bottom *seat?*

Crabtree; Just a minute, and see whether we get a different flake ~~here~~ character here.

Epstein You use hard wood , you mean ~~to wear down here.~~ *it is worn down here*

Crabtree Yes, *it needs to be a little softer,* ~~each would be a little softer.~~

Dougherty; Are you going to file it down a little.?

Cumtue Well it needs to be bruised ~~is~~ so ~~it hangs...~~ *it will hang on.*

Daugherty I see, soft, huh?

Cumtue This is a hard piece here... ~~hard...~~

Alan Smith Can you do better work, Don, when you work fast.?

Cumtue No. I don't want to take ^{just} ~~the~~ time here. One should ^{take more time to each flake removal} study each thing, however, I'm feeling underneath ~~on here,~~ ^{to cover in just} but there is so much ^{that much} for four or five days ^{that I am} here that may

~~be not take so long.~~ *working fast,* This is flat, ^{and} it's going to be a little difficult to get a ridge ^{is there and it few} ~~started across~~ to guide the flakes. ~~This thickness of this flake,~~ ^{here} may have a little

internal strains, ~~in it here and it's~~ ^{Over} the cortex ~~that~~ there are little bruises ^{indicating} ~~little~~ movement ^{or where} ~~here,~~ where it has been pounded a little bit, ^{indicating internal strains.} ~~on here,~~ but I'd like to examine

the flakes, ^{removed by} from the billet. If I get the same ^{platform} characters ^{then when the edge of} some times that I have had ^{the artifact} with where it bites into the wood and ^{filled} ~~peels away~~ if we can just trying to get is this character will be identifiable. ^{that requires this much striking.} It's the length ~~here.~~ I'm afraid of this. ^{and} Can get these pulled loose here.

~~Wide enough.~~

Alan Smith You seem to hold your billet at quite a different angle, in relation to the piece
Cumtue *Dr. Bord* strikes ^{into the body of the artifact and has} ~~in and~~ much better control. I think there are a lot of advantages.

Because you'll get perfectly flat flakes with ^{is billet} ~~this~~ but I find that if I drag it ^{on} ~~down~~ ^{the edge of the artifact} I get better control + it lessens the shock. ^{at the same time rather than here} I'm not use to the shock that I will get from this ^{billet.}

Alan Smith I didn't mean to suggest that you change *of Don.*

The impact area is critical.

No, that's all right, ~~because my edge here is so critical on~~ I'm not

getting the ^{edge character} ~~effect~~ that I want of ~~the edge character, here of this.~~

I merely wanted to check my observation.

Oh, huh. What I really wanted to see, ^{your} ~~is this~~ The wood ^{as billet} pulls this edge away,

and leaves a little different flake character, ~~and~~ I'm not quite ^{doing it right for} ~~getting it to demonstrate~~

of the use of a ^{wood} ~~billet~~ ^{and show} will give you a little different edge ^{character than as harder} ~~character~~, ^{striking tool.} Here I've

~~got some bad ones on this side here but it will dig in,~~ ^{The stone} ~~digging~~ ^{slightly} into the wood and pull

the edge away and leave a sharp edge. ~~each time.~~ ^{This is just an example} And just as an example here of this

~~of an artifact produced with a wood billet,~~

~~billet sort of thing is what I am trying to show.~~ It's not a good flake; it's not quite

what I'd like to show ^{as billet struck} ~~as the wood.~~ ~~I~~ just ^{hit} ~~hit~~ in too far, ~~on it,~~ ^{the} because your

tolerance from this ^{distance} ~~far away~~ ^{he} ~~you~~ must ~~have it~~ just so accurate on the edge, but it ^{shows} ~~has~~

a little edge character, ~~here with this sort of flake.~~

Tipier: Your stick is too heavy.

Crabtree: Yes, This is not the best stick.

Tipier: This is good for ^{hand of} ~~hand of~~

Crabtree: ^{The billet needs to be shorter.} ~~You speak. There are shorter...~~ ^{I wonder if a piece of} ~~With a piece~~ I wonder whether this would

^{harder wood would work better on flint.} ~~work on the flint.~~ To bring out the character ~~is~~ a little better with the harder wood.

Bordes: You won't get this corner like that. Oh, you ^{can} ~~would~~ with wood, but with a different

angle.

Crabtree: No, you see, it's too hard on my ^{thumb} ~~thumb~~

~~Ah there is... like that.~~

~~Little fellow.~~

Bordes Like that. So you shall try with ~~the~~ stone here. ~~Well.~~

~~Crabtree~~ ^{not} Crushed ~~stone.~~ ^{on that side.}

~~Tipier~~ ^{Crabtree} Ah, there it is - blades, yes - that's good.

~~Crabtree~~ Flat side, ~~to~~ I just flaked this one out to a ridge

~~If you want~~

Bordes ^{Alan Smith} So you are the chairman?

^{Alan Smith} Ah, yes - I hope

^{Alan Smith} Yes, I think. Let's ^{have} ask Don ^{to} explain.

Bordes: So you direct the discussion.

^{Alan Smith} Well, tell us something about the thermal treatment.

Leahy, I will try to explain ~~some of the treatment~~ ^{something of my initial interest in} maybe you like a little facts on how ~~the treatment~~ ^{discusses} and it was like my discovery of this thing. As a boy I would find ~~these~~ flakes and it was like

~~... I believe he mentioned, that he would steal these flakes from the Indians~~

~~which was always~~ ^{and} I knew that their flint was a little with always the best flint, ~~and so I figured that he had arrived at that~~

~~better than any I could find, but I didn't know why.~~

~~that there flint was a little better and there was some reason that apparently he~~

~~didn't know why~~ ^{I noticed} but I would find these pot lids and overheated pieces of flint and ~~they~~

~~they would~~ ^{were} always ~~be~~ lustrous and shiny, ~~and one place where you find these chalcedony~~

~~flakes,~~ ^{that were waxy} if you ~~see~~ these beautiful flakes, ^{but} the material was right there in the ancient

~~lava rock and the best vesicules of the lava and even in this fortification which~~ ^{agate with banding}

~~is very tough~~ ^{and it was difficult to pressure flake.} with banding and so on ~~that they would make beautiful bifaces and~~ ^{yet, the Indian had made,}

~~arrow point out of that sort of material,~~ ^{this} and if couldn't have come from any place else

~~but yet you'll find all these beautiful flakes like that and of that material. Well,~~

~~earlier I had~~ ^{So I tried} ~~tried dropping water, making straw and so on and heating them, and I~~

~~get~~ a change of color, ^{and I got} then I'd get these pot lids, ^{from overheating} and I found out that when I ~~But I discovered that the heated material worked easier and~~ would pound on them why I would always have a much ^{better after the treatment and} easier-work-material-than

workable material and it would change in texture ^{in it} and usually become ^{and color.} prettier, you'll find that the yellows will change reds where oxygen is present, and there are some

color changes now all together, ^{it} Now either your yellows are either under the surface Sometimes there is no color change there will be no color change of that, ^{it} but there is the texture change and the re-

fracting ^{index} ~~of that~~ seems to have changed as well, with this material. In 1939

we had some ^{tests run at} ~~from~~ ^{from} ~~Batelle~~ ^{Instiute} and these two fellows used an

^{the} electronic microscope ^{was used and we} ~~and had checked some altered material from~~ Flint ridge,

Ohio, ^{it was some material that} ~~and some that I happened to have on hand,~~ ^{they} ~~and they~~ found that molecularly,

~~said that word right~~ that there is a nuclei and around this radiating crystals, after

the heat treatment, these are reduced which is against most of the laws of ~~atomic~~

~~When~~ molecular theories, ^{When metals are cooled or annealed} ~~Because with metal you will find that when you cool or~~

... ~~a metal very slowly or heat it slowly~~ ^{or heat it slowly} ~~without~~ ^{it} ~~filling it suddenly.~~

^{the crystals will increase in size & length and we get} ~~it will become big long crystals and you'll have the flexibility like you will~~

the ... in a file, you'll have it extremely hard, I mean almost glassy but with

^{With stone} ~~this sort of material by the slow heating and cooling,~~ ^{we have a similar change,} ~~like you arrive at the same thing.~~

^{but} ~~Which is a little~~ ^{reverse of the metallic,} ~~But with certain quartz family minerals,~~

^{will alter} ~~not all of them are altered by this heat treatment. Now this first one here, is of~~

^{Phis is} Harrison County, Indiana flint and ^{it} ~~this is~~ shows an over-heating and this is ^{the} ~~the~~

^{resulting pot lid.} ~~pot lid of this. This one happens to be one of the~~ ^{Phis is an} Indian flake from Montana

picked up on the surface, ^{showing} but with the altering, ~~you'll see~~, ^{notice that I removed} I just took a little

flake on this side, ^{and it shows the change} that there has been a reverse. What the age of this is I don't

know. ^{for it is on loan to me by Lou Rafter from Missoula.} The technology from this area seems to be unique in our part of the country. ^{The technique shown on this flake is unique because of the very tiny striking platforms.} ~~one~~ from the series of flakes, but I hope Lou won't mind that I took an extra

flake off the side here to show the change back of the color. This was the original texture after it was heated. This was the ^{surface} texture prior to heating, ~~on the surface here.~~

~~And then~~ ^{perhaps because of this} this was apparently a discard that was thrown away may be a hinge fracture

~~on the surface where they had more around then they knew what to do with but I'm~~
~~I'll pass this around to show the~~
~~passing this around in the determination of a flake in seeing the difference in texture~~

~~between the~~ ^{and the worked side.} where you have original facets ~~on that~~ and there hasn't been any work. ^{it shows} Then a reverted ~~a reversion back.~~

..... ^{of reversion is, I don't know.} What the rate of speed ~~of what the change is probably many hundreds of~~

~~years it takes to do that because some pieces that I had for years haven't changed~~
~~to any noticeable degree, but yet the workability is.~~ However the hardness ~~is~~

of this material is still the same, ~~and~~ ^{heated} because they ~~needed~~ some pieces for pressure work ^{doesn't mean they heated all of them.} ~~just just as we heated all because~~ most of the drills are ^{not} heated. They wanted

^{to retain the} the toughness ~~and~~ ^{and drills they are generally} when you find these awls and long narrow things on there they left ~~untreated~~ them as they were like that and this one here will show this, but I'll pass ^{around} another

one in association. This was unheated material of ^{showing} the same sort thing ~~that~~ it can

be worked but it's much easier to work after it ^{is} ~~has been~~ altered. This ~~is~~ unaltered

Harrison County flint, ^T the artifact with it has not been altered. But you can see

a slight change, I think there are two flakes on one edge, this edge, ~~Maris~~, right here, shows a slight change after it was heated ~~right there~~. But if your material

is of good enough quality there is no necessity ^{to alter} Well, this was ~~in~~ 1940 when Dr.

~~Shetrone~~ ^{Shetrone} came to France ^{and sent} ~~back~~ several tons of material, ^{similar to the flint} like Dr. Tixier brought ~~here,~~ ^{here,}

~~down. This type over here.~~ This is some material done by pressure, and this was about

as good as I could do with pressure work at that time. This is an old point of that

material and this is unaltered French flint, ~~from~~ ^{of the site.}

Tixier: Without treating?

~~Croft~~ ^{Croft} Without treating.

~~Croft~~ ^{Croft}: Yes, this one is without treating. These pieces are ^{treated!} with treating ^{on one} ~~on the one~~

side you can see the extent of a flake by just hand held pressure. This one here was ^{from}

^{a sawn blank}

~~soft but just for the thickness to demonstrate, how long flakes and control, you can have~~ ^{the thickness and what can be} gained by altering.

~~and here you'll get~~ ^{material, you get} with untreated ~~flakes~~ ^{blades} little micro ~~blades~~ ^{blades} in here because it

hasn't the strength.....

(working)

Reel 3

T26

Bordes: When we come, sometimes, some slight similarities with the technique used on the other side. It's striking. This also it's retouch. I wonder if that is a pot sherd or if it is trying

to make a longitudinal burin. I am not sure. But if it were to make a burin, it is difficult to tell.

With the technique... striking using a striking platform, a thing which is

and perhaps polished. I am not sure. I would need a better glass than we have here.

If it is a burin, it could be a fracture.

And perhaps you strike the...

So, the transversal burins, they look very much like some of the material. I am not sure you need ///.....

Like some from the ... in France. What we call transverse burin and natural retouch.

They made re touch more or less abrupt and took one or two burin blows on the edge

it and gave some these burins which are quite normal, this one is slightly on more or less. Slightly, I said.

a notch, not quite. No. Slightly I can. Now this one also you lose one in them

in a lower Magdalenean site in France, except for the nature of the material, you could

not take them out after. The end scraper seems short, one of them is even

of the thumb nail variety, like in AZALIAN, of the late Magdalenean. There is nothing special

to them, they are, good, nice, small scrapers. Some, it seems from the picture burin short blades

This These could be a burin spall but I am not sure, they could be, also, a small blade.

Driving: These are thought to be burin spalls.

Bordes: These are, these are burin spalls and short ones. Since they are coming from... transverse burins, most of them. So they can be longer... than the width of a blade, of course.

It's an interesting thing. I guess I have said all I have to say of this small amount of material and I believe to say more about the cores. leave to Tavier

platform is different

Tipier

after all,

~~In all~~ I think it would be very interesting to try to get the relation between raw materials and tools. Perhaps ~~old~~^{all} end scrapers or thumb nail scrapers would be made in obsidian and all ~~transverse~~^{transverse} burins blades in another raw material. ~~that~~

Inving

I believe that is almost the case. ~~That is almost~~^{But not exactly} exactly true. This is ~~pretty~~^{very} nearly true, if not exactly true. ~~All most~~^{Almost} all of the end scrapers are made of obsidian,

~~and~~ I believe ~~that~~ very few of the transverse burins, if any, are made of obsidian

Tipier

I ~~try~~^{tried} to make such a work ~~in~~^{for} Neolithic sites ~~in~~^{of Southwest} Sahara with Sahara

All ~~bifacial~~^{bifacial} retouch was made in green jasper. All ~~microblades~~^{microblades} blades

and ~~all~~^{all geometric microlith} ~~Neolithic~~^{microburins} and all ~~burins~~^{flint or} were made in chalcedony, you see.

You see, ~~And~~ all polished material ~~and other materials~~^{in another raw material which is a volcanic one - I think} ~~basalt or something like this.~~

I think it is very interesting.

Inving

It is, ~~Especially~~^{AAANGOLA} when you contrast ~~Angolan~~^{Angolan} material with that from the ~~Punja~~^{PUNUK} complex in which end scrapers are never made of obsidian.

Tipier

It's a different ~~region~~^{regions I think}. All these cores and ~~blades~~^{blades} -

they are very familiar .. it's very funny for me because it's ~~small cores~~^{small cores}.

Inving

Small cores.

Tipier

Small cores, ~~ah~~^{but}, Exactly, exactly the ~~upper~~^{upper} Caspian technique from North Africa.

They prepare their core. The preparation is like ~~hand on an axe~~^{hand on an axe} ~~on axe~~^{on axe} you see, ~~the hand of~~^{the hand of}

We call this core ~~like~~^{Abone Eviguel van} like the hat of a Bishop ~~core~~^{core}.

~~Like~~

And then, they prepare their striking ~~their~~ platform

with only with little ^{little} flakes, but ~~this~~^{these} little flakes have ~~a~~^{the} hollow ^{bulb} .. you see

by pressure, 3 perhaps

They pushed out bladelets perhaps, ¹ by punch and ~~then~~ they were always refreshing their striking platform, always, always, ^{always,} ~~etc.~~ ⁺ They were turning all around their

core. It's something different like this core. They were turning ~~to~~ all around and

they proceed here and here ^{and here,} I think these cores were ^{held} bound in wood ^{or some other} ^{wise} ~~means~~ ^{like obsidian cores,}

~~like a sheeting course.~~ It's very interesting. And the characteristic of

this bladelet is they have edge, very regular edge, ^{now} straight edge and little ^a ~~bulb,~~

a short ~~bulb~~ but. ^{well marked, you see,} ~~well, uh, you see.~~

Warrington

~~Marie Worthington~~-- Bill, have you by any change had a chance to compare these

cores with the pictures of the Siberian cores that I sent ~~you?~~ ^{to M^cCartney?}

I have not.

elving

They seem extraordinarily

Warrington

The ~~scene~~ are like the material ^{from} the ^{Lake} ~~late~~ ^{BAIKAL} area, and I have sent M^cCartney

a whole series of photographs of the Siberian cores. I think you'll find they are very similar.

alving!

I've not compared the pictures, ^{that} you sent ~~from~~ ^{M^cCartney} ^{with these, myself.} myself. I'm not surprised

to hear this however. At the same time, there are many rather trivial variations in core technique which show up between Alaska and the Far East. ^A And the taxonomy of these

things ~~is~~ something that mystifies me at this point. Beyond saying that they have

similarity, I can't carry it much farther now. I can recognize certain differences

between, for instance, the ^{Siberian} micro ^{blade} blade cores ~~and~~ in Japan and any that we see

here on the table. But I don't know how significant these differences are.

Epstein

I went to the Museum of Natural History and looked at the material Nelson

American
from Tibet.
And for

had brought back. As to what these comment are worth, I could see no difference in

the blades themselves, they had minute platforms ^{small at the tip} at the point of percussion ^{that} ~~then~~

~~they~~ could possible be. But ~~these~~ ^{the} cores. ^{front} ^{ibet} ^{in the American} ^{Museum} ^{Collection} ~~were~~ very very strong ^{small and very narrow}

whereas these are quite wide ~~very narrow~~. and perhaps ^{because they were so} very small, the faceting on the platforms

~~platform~~ was much more delicate ^{and perhaps} ~~and~~ much more precise. But other than in terms of the ^{width} of the core, ~~they~~ ^{with the cores.} ~~The~~ techniques were very, very ^{similar} simple.

Very similar.

If you'll pass me down the drawing of the ^{CAMPUS material} CAMPUS, the other ones at the

Diving

far end of the table. These are drawings of the cores from the ^{CAMPUS} CAMPUS site made

by ^{YOSHITZAKI} and you'll notice ^{too} that these are very narrow and they contrast

to a certain extent with these, both in the platform preparation and ⁱⁿ the preparation of

leading edge

this ~~distal~~ ^{leading} edge of the core. They are perfectly consistent. I think these

are different from the Arctic ^{small tool} ~~spall~~ tradition ^{cores} because they may have something ⁱⁿ

Alaskan

common with some of these ~~Eurasian~~ cores but look much more like Nelson and ^{Barringer}

cores from central Asia, to me, than do either of these. But this is just an impression,

and it may not be very significant because I still don't understand the ^{permutation} of all these features that go into cores, that go into the feature of cores. They are very difficult for me to figure out.

Tipier
Phil
Smith

think the first one who spoke about ^{transverse burin} VIGNARD ^{The} ^{problem is purely in Egypt} ^{Did you try} No, I ~~didn't~~ I went to ~~Tibet~~ Valley but we could never find any burins. ^{no Africa} ^{no Africa} ^{no Africa} Yes, they look very much like some that ^{McBurney had at Dava} They also reflect the burin of Surananga in ^{no Africa} I think we found some ^{platforms}

Dava

^{now, find that} ^{No} ^{Schmerling} has reported, in Poland, that they also occurred

^{in the upper Volta} ^{Lebanon} ^{a wider} ^{than VIGNARD} ^{they thought} ^{originally} up in Volta so possibly they have quite a distribution, they thought. ^{originally}

Do you think so
Phil Smith: Definitely Tipier did what about your collection?
I don't know

Technologically,
But... they appear to be the ~~same~~ same

Answer: ^{may I} You interpolate that these transverse burins are, ^{while} ~~not~~ ^{identical} ~~to~~ like the burins

from the ^{SHIRATAKI} ~~Surataki~~ site and ^{SUKOLKSO} Sukolkso site in Japan, they approach those Japanese burins

more closely than any others ^{that} ~~than~~ we have found in Alaska. Somewhat similar burins,

different in detail, but still somewhat similar ^{to}....

Those that I spoke of just a moment ago

But these were recognize by ~~Nosadaki~~ just recently

~~XOSHIZAKI~~

Bordes ^{let's say, for instance,} The burin spall is not at all the same. It looks very much more like, lower Magdalen

and..... than the material from ^{Serenansac} Serenansac.

^{the Serenansac burins were produced by a twisting technique}

Phil Smith Yes! ^{Schmiedofski} Schmiedofski has recently suggested that to

Yes, tested a technique. rather than a burin blow and

he says that he has done this by himself.

Bordes I would like to see that.

Phil Smith So would I.

Bordes After seeing what ^{Creatrice} is doing I will never say again that something is impossible.

But I would love to see that ^{this is twisting business.} Because I have made Serenansac burins and they are not difficult to make but they are quite a different technique than this.

Creatrice: Ah, Thanks, doctor Bordes

There seems to be a little different ^{preparation} technique in ^{a few} view of ^{these flakes} this flakes ~~of this type~~

~~of a preparation~~ ^{shaving} and your flats where the burins have been detached. Of this type

here, I think two are the flats and other others have slightly different end preparations.

This is remarkable work with the ~~soil~~ ^{basalt} ~~stone~~ ^T ~~is~~ the end character ~~that~~ has disappeared,

but it's extremely tough material, awfully hard to work ~~with~~, ^{but this particular} but a great deal of ~~control~~ ^{piece shows a great deal of control} was demonstrated in that particular piece. But back to the core, ~~that~~ This one

is a very interesting ~~thing here~~ ^{because of the} edge preparation ~~to come up with~~ ^{is similar to} a polyhedral. However ~~you~~ ^{he} lost this angle on this side here ~~to keep~~ ^{preventing it from being} from being a perfectly round

polyhedral ~~cores~~ ^{one} and each one has, as Dr. Tixier said, the individual platform preparation.

But the remarkable thing is this feathering out to ~~edge~~ ^{the} without undercutting ~~it~~ ^{the} too ~~badly~~ ^{the} ~~it~~ ^{flakes of the}. ~~The~~ ^{slight} hinge fracture on this side. This one is a single ~~but~~ ^{and surface} but it

certainly appears to demonstrate the heating technique, ~~of~~ ^{here} this is one facet untreated and you see the joining flakes after they were detached ~~since~~ ^{showing} the heating of this side ~~and~~ the change in texture ~~of that particular one~~.

sliving: This is the ^{most regular of the} small ~~Angula~~ ^{ANANGULA} cores

Crabtree I think it is quite ~~evius~~ obvious the change in texture of this ~~facet~~ ^{unmarked} that was ~~unmarked~~ ^{to the worked material} in relation ~~to this~~.

Bordes { Yes, Ya
Do you think that these blades have been pushed out by pressure?

Crabtree ^{Yes and} Support ~~them~~ solidly here so that they will feather out. But you do have to ~~have~~ ^{unmarked}

~~have this support~~ ^{the support of} ~~Some sort of an angle~~ ^{Anvil} in order to ~~get~~ ^{let} this ~~clear~~ and get this shearing ~~in order to get this character to feather out~~ ^{and} with a straight sharp edge. If

you don't have ~~you are going to go over the top~~ ^{the support, the flakes will} ~~Whether an indirect punch was used~~ ^{each time} these bulbs of force are quite distinctive and it is difficult to tell if ~~these bulbs of force, however pressure of production was used~~ ^{or} ~~on here~~ ^{we} quite distinctive

But ~~perhaps if it was,~~ ^{But the} the straightness of the flakes ~~apparently had to have an anvil~~ ^{indicates support with} ~~support under that weight~~ ^{shown on this tool would indicate that} with the percussion, ~~and~~ ^{was used} percussion you would almost have ~~an~~ ^{to have}

That is one person pressing with a chest crutch and the second man striking the pressure tool simultaneously
 an indirect tool, however ~~it was so enlightening our experiments today~~ with the indirect tool

with
 and pressing a-fer and forcing the intermediate tool between these two points, *and the*
~~would have to do a lot more experimenting before I could~~
 character of the flake that it looks like a great deal more work should be done to
~~determine the difference in the fineness of work done by pressure~~
 determine the differences as to how fine it could be done, *in combination with percussion* pressure versus percussion.

Burdes I agree. Always, but to experiment.

Leadbetter Uh huh.

Burdes Any other question on this material?

(break in recording)

During These Points ., ~~they~~ are interesting., Oh, there are some technological features
 that are interesting but ~~there~~ they're mainly interesting because ~~would~~...

They probably come from the first occupation of the *barren* ~~Bering~~ grounds after glaciation

A and evidence now seems to indicate that the country was deglaciated ~~at~~ 8 or 9 thousand
 years ago which would bring them into line with their identification as *Agate Basin* points.

Burdes That's up to you. We have nothing to *say* about that *ya*. don't worry.

During: The only material *readily* available for use there of any, ~~the only material readily available~~
 is this quartzite which you see that most of them are made of. These things, I just

asked Prof. *Byers* ~~Byer~~ about and he agreed that they might well be comparable to the work-like
~~implements~~ *implements* that come from *DEBERT* ~~De Berk~~ site *and* an Bull Brook and one or two other sites. Am

I misrepresenting you?

Byers no.
 Not at all.

Crabtree

I am unfamiliar with ~~the material~~ quartzite and I have done very little work with ~~it~~,

show an extreme amount of control

~~the quartzite.~~ These ~~are extremely well controlled~~ and the cross section is very regular

and

~~double convex for the cross section.~~ They ~~are extremely well controlled.~~ The difficulty

of handling

this material in relation to the ~~others~~ ^{other material} is ^{because} the edge strength of ~~the~~ little granules

giving less edge strength and allowing platforms to crush.

of sand that have become cemented together. This appears outwardly ~~to have been~~

inspection

indicates this is up of

with the glass ~~to have been made of~~ a beach sand rather than ~~a~~ stream sand, ~~which is more~~

Stream Sand

of a breccia ^{more} and ^{angular} sort ~~of thing which fits more tightly together,~~ and I find

beach sand type

is

different

character

that ~~that sort of quartzite has~~ a little difference in working. However these are little

round grains that appear to be ~~a~~ ^{the type of} lake or beach sand, ~~there~~ but ~~for~~ ^{the} thinning of this

coarse ~~of~~ material ^{which} ~~this~~ is extremely rough ^{granular} shows a great deal of control. It's a ^{not shave}

much control to have thinned the artefact to this degree and leave

very remarkable thing to have retained this sharp of an edge with this thinness of

a sharp edge on this type material.
this material.

During

may I identify those? things that are

called something

~~These~~. May I tentatively identify these as ~~some things~~ like Plainview but it's

very hard to nail them down because the material is poor.

Crabtree

This material appeared almost impossible to ^{work into} produce an artifact ~~from it~~. I mean it's

certain, ^{it} takes a very expert person to handle material ^{as coarse & granular as this,} such as this and particularly as

~~granular~~ such as this. This is even ~~so~~ much worse than the quartzite; there is no com-

parison, ~~of this sort of thing here~~ there is just not sufficient edge strength. And ^{with} where

this coarse material which has

you get your intertwining grains ^{there is not the} you don't get the flexibility in this that you will

^{like in} with the fine grain flint. ^{The platform} It will collapse before you can carry them over ^{the flakes} however,

However, this shows the

it has ability to follow ^{carry the flakes} these over and to meet them, exactly ^{in the middle} with no step fractures ^{and}

hinge fractures. It's a remarkable piece of work and it is comparable to some of

the illustrations *I have seen of ~~these~~ jobs using ~~with~~ the same ~~sort of~~ type of*

technique and *leaving the same worked character* ~~the same sort of a work of the character.~~ *The character* ~~It's~~ seem to be the same

same as ~~the place~~ in South America *where* ~~that they did use quartzite,~~ *was used* ~~for these same sort~~ *this type*

of lancelet blades. *and* ~~That~~ if these were *mingled with the So American blades,* ~~among them~~ I don't think ~~that~~ one

would be able to tell the difference, ~~of this sort of thing.~~ Are they comparable, ~~and~~

~~they~~ in style *and* workmanship, Marie?

Wormington Somewhat similar, I think.

Cerattia ~~That sort of thing there.~~ *these pieces here are* Now ~~this~~ is decidedly different material. *Than the* ~~These pieces~~

~~here from this other~~ *granular* ~~granular quartz,~~ ~~and~~ *This* looks like a very fine material *which* ~~where they~~

would permit ~~would have~~ excellent control and it appears that they did have control, ~~However,~~ ~~the work~~

on a couple of the others is almost ~~others are almost,~~ *a couple of these nearly equal,* to this fine grain material, ~~It~~

shows a great deal of artistry and symmetry of *edge technique* ~~the edges and the edge technique~~ this sort of thing.

driving This is different in type from the lancelet point. *It's* ~~that~~ *it's* different in ~~the~~ technique, or can you tell from that material?

~~This one here, excuse me,~~

This and this *are* similar in shape at any rate.

Cerattia This one here has *pressure going in at a right angle.* ~~direct, I mean a right angle pressure going in,~~ ~~I mean there~~ slightly oblique. This one is slightly oblique and between the two, *here and here* ~~this was the last t~~

are ~~row, and this was the last row,~~ *of flakes* ~~which is usually a thing that you will~~ ~~one side on one~~ *indicates a technique of flaking* ~~in~~

one way ~~from~~ ^{for} a right handed man and a left handed man will turn ~~it~~ ^{the artifact} over. However, these ~~were~~ ^{removed}

~~both done~~ ^{removed} at the same time, and these were ~~both done~~ ^{removed} at the same time rather than

alternating. ~~With this one~~ it is hard to determine the difference ^B because of the

regularity of this one ~~here~~. ~~It's~~ ^T, the material is not ^{sufficiently} distinctive ~~sufficiently~~ to

define the flakes ~~to actually determine the characteristics of this, I mean the characteristic~~

of workmanship. ~~other than~~ ^{and} the smoothness and the regularity of flaking shows ~~a~~ ^{But}

little better flaking technique. They were held at different angles to produce this

thicker material, ~~as~~ ^T they had thinned this type of a side notch ^{ed} down, so they had a

routine, ~~I mean an angle of thinning that~~ which ~~is~~ ^{is} a little distinctive ~~is~~

~~there~~. The straighter your angle, the more ~~get~~ ^{risk of} to get step fractures. ~~than~~ ^{with} the steeper

angle on this side, ~~here~~ ^{the risk is less and it's easier to} and carrying ^{the flaking} it through. These will ~~go on out~~ ^{carry thru} and terminate

~~while~~ ^{But in thinning, the} the steeper your angle is from the edge ~~on here to thin the blade~~ the more

chances you ~~are to have these~~ ^{of} step fractures. ~~Through it like this in order to free~~

~~these~~, but this is very remarkable work in quartzite and this one ~~here~~ ^{is of Bull} quartz

as I call it ~~on here~~. It is just ~~impossible~~ impossible to thin, and of course ends up

^{quite thick} ~~quite~~ thick but the ~~work~~ ^{work} work is very good, and ^{these are} indications of basal thinning ~~of this~~

~~one here~~. Well these are very remarkable. ~~This one here~~ ^T in relation to ~~El Oboe~~ ^{El Oboe}

~~El Oboe on here~~ ^{this one} does have ~~the~~ hinge fractures and ~~the~~ step fractures and it is not

comparable, as I had thought, ^{and does not compare in} further in the regularity of flaking and ~~the~~ symmetry

~~on here~~. It's much coarser, however, the material may be coarser too, but outward

it appears to be somewhat of the same quality. That's all that I can determine from

this group ~~of these~~. The basal thinning ^{and} the basal grinding is ~~an~~ interesting ^{thing} ~~thing~~ ^{and} ~~here~~. The corner notching and the ^{meeting of the} collateral flakes, ~~in their meeting~~. This one also

has a slight basal thinning with well controlled flakes, ~~where they~~ type of material to get ^{these} long ~~and~~ narrow flakes ^{and at the same time bend} is ~~very difficult~~ and also bending them over the surface, ^{it is very difficult with this}

Some of these ^{flakes} do carry on over which would indicate the method of holding in the hands.

This one ^{is unique} ~~is a striking thing here~~, that ^{Philip shows} it is a reverse back ^{hand} instead of the natural shoulder pressure ~~on here~~ of some of these to ^{make the flakes} meet ^{on} the opposite side ^{indicating} ~~like~~ it was done

in a left-handed manner. ~~In this way~~, ² unless this was ^{done by a} particular left handed man,

that ~~did this one here~~. This one also is a left handed ~~back~~ technique which is unusual ~~to find it too unless we have the two men who had the~~ ~~the~~ same sort of thing.

This one is quite direct in towards the center, but these ^{back-handed techniques} ~~back~~ ones indicated that ^{on the left hand was used,} pressure was applied away from the worker. ^{Pushing away from the body lessens the} you would have to hold and push away in this manner, which you lose all leverage ^{when pressure is used}

with this type of material by pressure work and these do indicate that they were done ~~by~~ pressure and this is quite a distinctive thing of holding it against the thigh ^{it is difficult to hold the artifact} ~~press~~ ^{press} down ^{with} the shoulder ^{and catch} catching the flake between the fingers and ^{at the same time force the flake} ~~forcing it out~~ ^{out away from the body}

in that way with supporting the hand against the thigh rather than the usual method ^{is to} hold the artifact in the palm of the hand and press toward the body, or going in this manner which gives ~~you~~ a diagonal flake ^{going} towards the tip rather

than the base of the artifact. Yes, I think that's enough probably now, Dr. Tixier.

Tixier! I pick up a piece and I think this is a ^{bit of} lancelet point and now it is just like the so-called ^{Pièce esquillée} of France of Upper Paleolithic.

alving! Is it really?

I think so. I think so.

I don't know these.

I think Madame Boordes Madame Boordes

I would be very please to have ^{this} these identifications.

Have to see, and to say

Yes. On this side.

Both. sides

This.

There is one other example ^{so believe} handy.

How do you call this?

It's a new feature to us and we don't have a name unless Prof. Byers ^{Byers} wants

to suggest one, on the basis of his material. These things that are comparable to

your ^{Debert} ~~De Birch~~ and ^{Bullbrook} ~~Holbrook~~ wedges.

Well I think the word wedge is probably ^{useful}

..... in France is like this... you see.

It looks as though they will be called wedges.

..... ^{it look like} ~~Piece esquillee~~ ^{of} ~~pieces of steel~~ ^{of} the Upper Paleolithic ^{of} France.

A couple of years ago I saw those from ^{Bullbrook and last week} ~~Holbrook~~ and a couple of weeks ago I

saw those from ^{Debert} ~~De Birch~~ in Detroit. They look very much the same.

The kind you find in North Africa, as you say.

^{George} ~~term~~ ^{has used the} ~~lizerge~~ ^{for several} ~~years~~

This is something ^{of course} ~~that~~ ^{what} will have to be decided by you people, as you say.

Byers:

Yes, they function as wedges speaking and if they function as wedges ^{is} ~~and they are known to~~ ^{for the better} ~~and have been used as wedges,~~ I think wedges is ~~rather a bad~~ term to use from them.

A characteristic of bipolar flaking.

Phil Smith

Yes if we could be sure of that they were used as wedges

Byers

Oh, course that work with ^{SEMENOV} indicated that the similar forms can be

produced ⁱⁿ ~~and that's why~~ George ^{has} can produce ⁱⁿ that way, experimentally that is.

Not the one from ~~De Birch~~ ^{Debert}.

Tapien:

There is a ^{problem} program about ~~piex-escier~~ ^{Piex esquier's} ~~piex-escier~~ ^{Piex} because I know ~~piex~~ ^{Piex}

^{esquier} ~~escier~~ quartz and flint, and also ^{quartzite} ~~.....~~ ^{Saccharoline} quartz but it ^{the} doesn't matter ^{of the} utilization, I don't know you.....

Drwing

~~Dir~~... I've been ~~to~~ told, but I am sure that I remember myself, that similar things

STAR CARR

were found at ~~Star car~~ in pieces of antler that had been grooved. Does anyone recall

whether that's the case? George MacDonald mentioned this ^{as} ~~an~~ a European example

of this ^{technique} ~~striation~~

Tapien

A European one?

Drwing

STAR CARR

At ~~Star car~~ in England, Yorkshire, I guess. The Mesolithic site that Clark

is doing his report about.

Jelinek:

~~May I make one....~~ Jelinek's topic. Looking at the quartzite ~~quartzite~~ material

from Quiwate I'm very much struck by the similarity and control of the material

although ^{not} ~~no~~ doubt the specific forms with the material from the ^{George} ~~George~~ Lake ^{Colony} ~~Colony~~ from ^{well}

on the North shore of Lake Huron, that Greenman ^{excavated} ~~excavation~~ and with, in general, what Quimby calls the ^{Aqua Plano} ~~Aqua~~ ~~pedo~~ industry which recently shows up in the Great Lakes area as apparently an industry related to the late Plano industry of the northern plains. Frequently this material is done in quartzite and always I think shows the ^{same} ~~same~~ precision control of the material. That you see in the specimens here. This ~~material~~ I think would tend to link this material ~~and~~ in time to the horizon that ^{can be} postulated between 8 and 9 thousand, B.C. or perhaps a slight bit later, ^{for} ~~by~~ the specimens from Quiwat.

Irving Thank you, Arthur. I get the same impression from comparing this material with the material from Wisconsin. I'd like to ask Dr. ^{Wormington} ~~Wherlington~~ if this compares with any material that she has from Alberta.

Wormington Yes. ^{Quite closely} ~~Quartz~~ I would say. ~~...~~ ^{Not excavated - surface collection.}

~~relatively unexcavated...~~

Irving This is all from surface sites, as well.

Irving May I make a comment. ~~Irwin's~~ ^{on two of} speaking, Notice ~~two~~, these projectile points

bases ^{there} ~~there~~ are strokes that resemble burin strokes

Irving They look very much like that.

Irving I wonder how they were not created in ^{their} ~~their~~ beginning stages of use by the wedge or something. This is the type of fracture that ^{necessitated pounding down on} ~~found now~~

Irving I'd hesitate to say. There are several burin facets or burin-like facets but what they mean, I am not sure. It's hard, at least hard for me, to detect any wear patterns on this quartzite.

Bortas ~~word speaking.~~ It seems from the choice of material..that ~~this~~ ^{these poor people}...

had not much. And so I think it is quite natural that when they broke a point, ^{that} they should

make a burin on ^{it} that. It's ^{easy enough} ~~up and then~~ and also a lot of time in the ^{Solutrean}

Oma When ~~they~~ broke ^{as Laurel Leaf} they made a burin, or a double burin, or a burin and ^{a blow} ~~bow~~

^{here} and arrow or ^a burin and scraper ^{on a burin and so on,} point.

Wormington It's rather interesting I think that of the Alberta material all the points of

this shape are of quartzite whereas our finely parallel flake points of ... ^{Scotts Bluffs} ~~Edens etc~~

are done in very fine-grain ^{al} chalcedonies. But where ^{ever} ~~would~~ we get this particular

form it ~~has~~ always made of quartzite.

Living This is also true in Wisconsin where most of the lancelet points of this general form are made in quartzite whereas most of the archaic material is made in some sort of chert.

Wormington This is quite consistent in the Alberta material.

Crabtree ~~One thing on here, this is Don Crabtree, with~~ This shape of points is adaptable to this ~~type~~ of material in order to give it sufficient strength, to make it of sufficient thickness and a tapering edge, ^{with} ~~I~~ if you would try to thin this material down for a narrow point, it will fracture. And it hasn't the strength, ^{of chalcedony} because of the, ^{lack of} intertwining grains and so this shape is very good for this type of material, ~~that you will find in the chalcedonies and it would be an adaptable shape to use~~ with this sort of material.

Alan Smith Should we perhaps move to ^{another} ~~begin~~ the discussion.

Byers

^{collection} This material ~~Dr. Tivier and Dr. Bord~~, is from ^{Debert} ~~De Birk~~, Nova Scotia.

We have three radiocarbon dates of 9000 B. C. ^{± 50 years}. Other dates will follow and we can't tell how it will come out. It's a typical Eastern Paleo-Indian site with fluted points and non-fluted points of the same shape. The material is chalcedony of various colors and of various textures. It is faulted and faulted chalcedony and as a result there is no ^{prophesying} ~~prophesying~~ the form ^{that} the points will take, or the artifacts will take. One thing that is characteristic of it, is a great quantity of scrapers. I see that I did not bring any end scrapers with me, there are end scrapers with graving spurs. There are many of these ^{little} so-called gravers or perforators. We thought that we had exhausted cores but I think that those are wedges. They seem to be characterized by bi-polar flaking. Burin spalls, I think are simply spalls that came off of these wedges. Advanced publicity went out talking about micro-blade tradition, but I'm sure that this was completely erroneous / and these are simply these wedges. The great number of ~~the~~ flakes are all retouched for side scraping purposes. Almost no flake is unretouched ~~and~~ in some place. Some of the flakes look like blades, but we have found no cores, and there are no true blades, that we see. There are chance similarities to them. Anyone have any questions?

Bordes

Well, first question. Where is the dividing line between these two ^{sides} sites here?

Byers

Right here.

Bordes

Does this ^{belong} below to this? ^{ok.}

Byers

Ya.

Daugerrie Haute

Bordes, Well first of all the first thing I see here are beautiful *Picce squillee*

which ~~could be~~ which could come from any, let's say for instance, ~~the~~ lower Magdalen one

from Laugerie Haute, exactly the same kind. This also is beautiful. What was

the use of this thing, ~~when~~ as a wedge, it is quite possible. Another similarity with

lower Magdalen is this *multiple perforation* which is a character *are very common in Magdalen*

one also *its just a convergence*, no. I don't want to ~~work with~~ *have the*

~~Magdalen~~ *swimming thru the* from the Atlantic But it is interesting to see this convergents, and there

which looks to me a perfectly good blade *retouch on the* with two sides ~~with~~ in a way you can find in

the *Aurignacian* of the *Prot-* lower Magdalen or *even some* Mousterian, *Peurterian*. It's really a good

retouch blade. Side scrapers *on* and flakes which could very well be Mousterian, as well.

Or some in the Upper Paleolithic in the *Solutrean, too*.

I must say that with the materials *they had* there, they did a fairly good job, because the poor

guys were not troubled by *material* nature, you know. About this big — *oh*, that's a

beautiful *Poliate* point. *That could be Solutrean* too, but not quite, There

is a trace of polishing by use on some of the facets, it seems. Or perhaps this was

a little too out, *or they took* too much out for their taste and they tried to rub it out and were

not *patient enough* rushing dinner. This big fluted point on this side there is fluting, no question.

Ernst: What do you think Mr Crabtree?

Bordes But on the other side, I don't see any fluting.

Byers There is no fluting *on the other side*,

Bordes I see ~~that it is~~ just a flat faced flake. This is also, no question, not very

well. They should have taken a lesson from Crabtree, but well they did ~~as~~ they could, *what* *Don't give*

I could not do the same ~~so~~ I had better say nothing. They are nice, considering the materials. This one is good material over there. Don'tt you think so?

Corabue Very excellent.

Bordes Very good material.

Corabue It certainly is.

Bordes And they did, ^{not} much better with this very good material than they did with this coarse material. That was a ~~point~~ ^{fracture} and they did nothing. It could have been rather easy to take this imperfection out, but they ~~did~~ not seem to bother with it. It ~~is~~ serves ^{their} its purpose as it was. They were not perfectionists, your people.

Byers That fracture may have been made by the boy who found it.

Bordes No. No. I don't know. I'm sure not. That fracture is old, and you have some flakes coming out of it. It was ^{taken} ~~striken~~ as a pressure platform ^{from here} ~~only~~. So it's old, you see, this one. ^{No question} Ah, here is an ~~end~~ end scraper. You said you brought none, but here is one.

Byers Well.

Bordes Yes, no question. That's a nice end scraper with ^{retouch} all around with ^{but that's} an end scraper.

^{what else:}
~~What's that.~~

What, no It's not an end scraper. It's a kind of ^{Foliate} foliate or a ~~side~~ side scraper. That's also a kind of side scraper. You know, that is very funny, we could ^{select} collect some tools here and make some good Mousterian and some good, not complete but some good from the ^{lower} ^{Magdalenian} Magdalenian

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and little bit of Salatrana
~~Lower Magdalenean and some...~~

You know what is

striking in this American ^{culture} picture is that they ^{have} ~~are~~ characters ^{which are found} that you find scattered
in ^{old World culture} ~~open~~ and which you ^{have} got right here. Well, now that is probably also

Pièce Esquellée but ^{at the extreme end,} extremely

Tipier I didn't describe this in my thesis. All this group ~~of~~ of pieces is

from. *Pièce Esquellée* This is not a burin spall, I think. First of all there is no

burin and it is, I think, the last shape of the *Pièce Esquellée*
(French) *Tipier*

Phil Smith Yes. Yes. Yes.

Bordes When you strike too much on a *Pièce Esquellée* and use it ^{time} ~~it~~ ^{and again} at the end ~~it~~ fracture
not ~~really~~ like that but in an ^{octagon} ~~outward~~ way and gives you ^{this} ~~that~~ kind of *prison*

That I can do very easily for you to show you in two minutes if you want
~~For it is very easy to do~~

Byers: ~~By speaking,~~ I think these are the ^{ex} exhausted cores that John Whitoff ^{found}
~~at the Sharp's site~~

Bordes I think it is not a core, ~~not a core.~~ ^{it is not.}

Tipier No it is not a core.

Byers But this is what John Whitoff calls an exhausted core^s

Bordes But they are not.

Byers ^{They are}
These piex escquier.

Bordes Ya, they are, no question about it. Well what else is to be ~~is~~ said, not much.

except... ^{the rhyolite} ~~riolite.~~

Byers Yes they had ^{rhyolite} ~~riolite~~ the hammer stones^s

~~Riolite Riolite.~~

~~Riolite as hammer stone~~ but they did not use it for projectile points or tools.

Bordes Well, ~~that's a flake~~ ^{that's a flake} could have been used as a crude ~~flake to cut~~ ^{flake to cut}, you know.
Tilier ~~Scraper~~ ^{Scraper}, no I don't think so ~~what else~~ ^{what else}
Bordes You could make a scraper, but they didn't. And while there is not much, except in points

of techniques that I leave to Crabtree, if he likes.

Crabtree ~~Well~~ ^{Well} This ~~goes over here on this side~~ ^{goes over here on this side}. This is a unique
 flake, ~~of the fluting flake~~ ^{of the fluting flake} ~~was removed from~~ ^{was removed from} this side here. And he was apparently successful
 on this side, ~~showing the position here of this flake that he had removed this~~ ^{showing the position here of this flake that he had removed this} ~~one first,~~ ^{one first,}
 But ~~on the edge,~~ ^{on the edge,} and he made a miscalculation ~~on this~~ ^{on this} and ~~proke the~~ ^{proke the} leading edge ~~from~~ ^{from} that
 side ~~and an on and discard,~~ ^{and apparently discarded it.} and This is quite obviously heat treated, ~~from this sort~~ ^{from this sort}
 of ~~thing here~~ ^{thing here} because this is the natural textures of ~~the~~ ^{the} agates and jaspers and, ~~retouching~~ ^{retouching}
 was, ~~before it had been altered.~~ ^{before it had been altered.} There is no ~~indication~~ ^{indication} indication of ~~retouching~~ ^{retouching}
 on this particular one ~~here,~~ ^{here,} but the natural form and texture is very ~~atypical~~ ^{atypical}
 of ~~the~~ ^{the} agates that ~~you will get before this is done,~~ ^{you will get before this is done,} however, ~~this particular~~ ^{this particular}
 one ~~here,~~ ^{here,} shows a sharp indication of this particular facet ~~was~~ ^{was} left on the edge ~~of~~ ^{of}
 this, ~~this was done after~~ ^{this was done after} ~~heat~~ ^{heat} treatment on ~~this side~~ ^{this side} which shows the same character
 that you will get in this texture of material of the one side facet left on this
 side, I don't know whether you can see this particular area here, ~~there is another~~ ^{there is another}
 one ~~here,~~ ^{here,} ~~this particular flake~~ ^{this particular flake} was taken ~~off next to this one.~~ ^{off at one retouch and this flake later.} This ~~was done prior~~ ^{was done prior}
 to heat treatment, this was done after, ~~showing the change of texture,~~ ^{showing the change of texture,} ~~indeed.~~ ^{indeed.} Some
 are a little hard to define ~~of these, it's a little hard to see,~~ ^{of these, it's a little hard to see,} but from the luster it appears that they certainly
 have been ~~altered.~~ ^{altered.} This ~~looks like~~ ^{looks like} a granular texture, ~~these have been removed after~~ ^{these have been removed after} in the
 one facet left on that particular one ~~there on that side~~ ^{there on that side} but with this type of

Here is ^{showing} another example, ^{original} some of the edge that was left on after the ^{heating} heating.

But apparently they were able to ^{control the heating very well} have well controlled heating for the size of these

at slabs and big tabular pieces of agate, ^{indicate were} that they ^{able to heat very} apparently had control to heat

large masses. ^{When large pieces of stone are altered it} ~~very large pieces~~, and so where the whole thing is done is not too common to find ^{even} ~~this~~

^{one small facet of the original texture adhering.} ~~much mass where it has all been removed except one portion here.~~ Sometimes

^{material secured from} ~~of this in your gravels~~ and ^{gets} this is a natural stream polishing, ~~of this~~. This

~~indicates a flake after this was heated on the one edge of this that has a little~~

~~different character. This has a polishing, however, this whole thing again was removed~~

~~even over to the top of that one again over to that part of that one there.~~

~~The old surface of this one but these are~~ ^{alteration is} a little hard ^{to pick up} to pick up. On fluted surface S,

~~on some of these, this one showed part of the original on this side a little new~~

~~flake was actually treated and of course this was all on this, but they were able to~~

~~handle fairly large blocks of agate and chalcedony and the different crystallin~~

~~quartz. To do the alteration of this which is I'm sure was done in this array of~~

~~material.~~ Some of these have no indications that you can be sure of but there are

a few pieces that most certainly indicate ^{alteration} they have been done. This one over here,

as Dr. Bordes suggested, ^{is} ~~from~~ a pressure flaked. It is quite heavy and quite large ~~from~~

^{and, no doubt, needed} ~~this sort of thing on here.~~ No doubt may be an intermediate tool ^{in the manufacture} ~~has been used in~~

~~order to do this~~ ^{by manual} because ~~if~~ angle pressure it would be very difficult to detach a

flake of this size. This one, as Dr. Bordes suggested, looks like one of the block

faults or shrinkage of the natural outside of the block of stone, ^{that they have just} ~~because it is~~ utilized

in the artifact.

Byers: ~~Byers speaking.~~ Don, I should tell you that all this stuff comes right out of the lava.

Crabtree Is that so.

Byers This is not gravel.

Crabtree I see.

Byers This is from ^{lava} ~~out of the~~ filling.

Bordes From what?

Byers: This quartzite, I mean, this chalcedony is filling in the lava, in Triassic lava and the direction of the ice flow would have carried any gravel from the ^{ice} ~~lava~~ in 150 to 200 feet of water, you-knew even at the time the ~~site~~ site was occupied.

Crabtree This one was the only indication that gave me the idea of gravel. ^{I was trying} ~~But this is one to get across the point that one can distinguish between origins of the things of the sources of the material of having no washing with this one here of material. The exterior surface can indicate whether the since this would bring up the point that from the cortex flakes or the outside flakes material was from alluvials, natural fault planes or casts of cavities, such as Dr Byers mentioned. By studying the outer surface, you can tell if you can see the bruising of this. You know whether it was a cobble rock or whether it was rolled, ^{in a stream bed and bruised,} and usually ~~from~~ ^{overhang} the distal ends, the ~~overhang~~ ^{small} and the cortex that you are able to ~~somewhat~~ determine the source, by ~~studying the edges, I mean, different ones~~ forms will have different character of their sources of materials like that. Does this array go with them as well? This felspar?~~

Byers: No.

~~That might be that's all~~

~~Good idea~~

Jelenik: Mr. Crabtree, ~~on~~ these fluted points here would your conclusion be that most of them were done by percussion

Crooker: I haven't examined the others ^{on both sides} ~~on this side~~ But these are not true fluting flakes. They are ^{more of a} ~~on the order of~~ a basal thinning and ^{they do not correspond with} the fluting techniques, ~~do not correspond with some.~~ However ^{they are} the art ~~of~~ characteristic of some Clovis, ~~And~~ later on today ~~I have about 4 different examples~~ ^{I will show you} examples of Clovis techniques. Some are true fluting that ^{very closely} resemble the Folsom ~~very much~~. But again you'll find even 2 or 3 flakes removed from the base ^{which} is more of a basal thinning technique ^{to} ~~provided~~ ^{no doubt} may be better clearance for the shaft ^{of this} ~~with adding to the strength in their hafting method~~

~~on here.~~ But ~~these~~ ^{the detachment of this} If you'll notice ~~of~~ the platform preparation on this one, ~~and we~~ have the one flake here ~~that was detached that~~ indicates a little ^{different} technique. ~~Instead~~ ^{the platform} of being polished ^{prior to striking} ~~and a distinctive platform on here,~~ they ~~do~~ appear to be ~~by~~ ^{made} ~~by direct~~ percussion ^{Percussion is indicated} because of the undulations on this particular one and they ~~haven't~~ ^{show lack of} the accuracy of the stroke ^{in percussion because the flake was not} in order to detach a regular ~~uniform~~ flake which is typical

of some Clovis, ~~and most all of the Folsoms.~~ But the basal thinning here is good ~~on here,~~ But it hasn't been done with ^{enough} regularity to clear this flake on ~~both~~ both sides, ^{the flute could} so ~~this whole thing can~~ be detached ^{and carried thru to} ~~and thinned down toward~~ ^{tip} the point of the artifact.

This one here is somewhat the ~~same~~ ^{same} slight basal thinning but they haven't ~~tried~~ ^{accomplished} to practice the fluting. This ~~one~~ ^{flake shows} has a feathering of the edges ~~of this one here,~~ which

indicates a sharp snap of ~~the~~ pressure ~~is~~ rather than ~~trying~~ to force the ~~flake~~ ^{ing flake} ~~thing~~ over the entire surface of the artifact. ~~They stopped the flake~~ ^{showed the flakes going} across stopping ~~it~~ like the one that Marie had ~~on here~~ that ~~indicate~~ ^{and the surface} up over, and meeting at the edge, ~~the flake from the opposite side~~ ^{of the far side} with a great deal of regularity. This is a ~~bit~~ ^{little} different

technique, ~~now again, this has~~ ^{Now this one,} instead of being straight in ~~lateral~~ ^{collateral} flakes, or going towards the ~~point,~~ ^{tip} the flakes are going in ~~which is to me~~

a rare thing in our Western U. S. You seldom ever see this back flaking ^{in our} ~~or this~~

~~Western U.S~~ reverse away from the strength of your hand and with this quartzite group that we just examined a few minutes ago

Aberrington From the view point of typology #6/ one of the particular ^{by} interesting things about this is the depth of the concavity of the base which is quite unlike our Western Clovis which have a very shallow concavity, ~~And~~ ^{and} this ~~does~~ seem quite distinctive.

Byers: ^{Debert} The ~~De Birch~~ points, ^{I think} are quite distinct from the others in that ~~they~~ some of them have a very deep concavity. ^{Some} ~~And~~ pieces that I didn't bring with me have ^{even} a deeper concavity than some of these. For this reason, they are very rarely found complete,

~~Most~~ ^{the} of them have ~~their~~ ears broken off ~~of them.~~

Byers Shall we go to the next one. [?]

Bordes Yea.

Byers This other collection here is from the ^{Quel Brook} ~~Hilbrook~~ site, in Ipswich, Mass. On which we have a radiocarbon date of 7000 B. C. ^{plus or minus} 250. ~~On~~ three samples, I am not at all sure in fact, I'm quite sure that this isn't the full date of the site. It was a big site like the ^{Debert} ~~De Birch~~ site ^{and} It must have been occupied for a long time. I think that

Bullbrook

perhaps this is the terminal date . Many elements in the ~~Holbrook~~ industry ~~seems~~
~~to suggest that~~ ~~that~~ there was a blade industry but on the other hand we find no
cores. And quite obviously ~~there~~ ^{it} was a flake industry. Again the flakes were utilized
for scrapers of all sorts. The fluted points, of which I have a few samples ^{that} were loaned
to me by collectors, ~~and~~ are different from the ~~De Birch~~ ^{Debert} points in many ways. The bases
are not nearly as deeply concave, the flutes sometimes run for long distances, sometimes
they don't. Sometimes there is multiple fluting and almost, I can't say statistically
the number of points, but I think the majority of points have multiple fluting.

There are those ^{Pièce Esquillée} ~~plex esquier~~ Again I seems to have left out
the end scrapers, except for a few. Many of them ~~have a~~ ^{perforator} perforated point on
the end ~~and end s--s~~ and the end scrapers from both sites characteristically have
these little perforators points on one corner in many cases, Not all of them do, but
a great many of them do. Broad flat flakes are retouched , many of them seem to have
been worked with a shearing technique as opposed to a retouch. This applies to both
sites . This one, ^{for instance,} And the use of both edges of a flake seems to be characteristic,

Bordes: Well, ~~Bordes~~ speaking. There is a thing on which I don't agree with Dr. Byers.

It is this business about no blades . I see several of them in our definition, which
is not as strict as an American one. But I am very sure that this can be classified as
a blade. And ~~it~~ ^{probably} also possible this. ^{That wide} ~~It's a~~ wide blade and ^{one also,} this is ~~is~~ wide. They
^{blades,} are wide of course, but they are blades anyway. But ~~then~~ you have a lot of flakes

that's true with beautiful *double* side scrapers which could be also quite Mousterian and with a good retouch ^{but} which could ~~well~~ *have been done by direct percussion* ~~by great compression~~

I don't see any thing impossible in that. Looks like... Yea. Even that.

And there are some end scrapers with this little point at the other end which I would hesitate to call a ~~burin~~ ^{borer} because it's so small. It's ^{rather} like a *saw (copied)*

~~in French.~~ I don't know how you say ^{it} in English Because we call

~~it's~~.. It's too small,; it's not even a micro ~~burin~~ ^{borer}, a micro ~~burin~~ ^{borer, the point} would be longer. It's something special ^{it's a saw!} Some end scrapers ^{Piece, Esquillee of course} and then the point which are ^{I think} ~~bit~~ *better made than the preceding ones* ^{of course}

Here there is a kind of fluting ^{I think!} But they were not very efficient and here it is double .. That looks like what I tried to do sometimes. Oh, those are better.

This one is good. ^{The other} ~~This is~~ a side they missed. They were experimenting with this ^{it} ~~is~~ seems. From time to time ^{they did one} ~~as they did with~~

Tipies ^{Perhaps because of} What happens ~~to~~ the raw material?

Bordes' Uh, I ~~wouldn't know~~ ^{I wonder}. I don't know. Ah. here is a try. ^{they even prepared for it.}

But probably ~~heavily~~ ^{either they} stopped ^{or} as the blow ~~went wild~~.

Now this one also is good. It looks ^{a little bit like} like a broken Folsom this one.

Leadbtree Very much.

Bordes. This one is good. ^{This is} ~~It's~~ not very ^{much like Folsom} good. ^{rather like} ~~Mezolithic~~ ~~but~~ Clovis fluting.

^{They had} They were certainly not very good with fluting but they knew how to do it, the general idea, ^{no question} of ~~percussion~~.

Byers I should say that you do not see the best pieces from this site . The best pieces are either on exhibit in the Museum or either in the hands of private collectors and I couldn't get them.

Bordes: ^{ah,} It's a pity.
You have this problem too.

Byers Yes.
The fluted points from this site include pieces ~~from~~ of the equivalent of those from the ~~Nacoma~~ ^{Naco Mammoth and Delano Mammoth} ~~mouth and Delanemouth~~ site and also some from the Lindenmyer site but not the long ones with long pointed ears , they're from my site.

Crabtree: There is one ~~of~~ ^{the edges} here that shows indications of ~~heat~~ ^{the} treatment ~~here~~ on the other side, ^{it shows} ~~of~~ the original surface.

Bordes It could be burin, ~~too~~ ^{and}
~~of that side~~
Ya. it could be a burin, ya, not a good one ~~but~~ ^{and} on one such piece ~~and~~ ^{only} only one,
I would not say that this ~~piece~~ ^{culture} has ~~any~~ burins .. But watch out for ~~it~~ ^{that}, it could be.

Because that's a burin blow, no question. ^{Is it intentional?} ~~That's~~ ^{another} ~~is~~ no question.

Crabtree Well, ^{with all this} ~~out of this array of material,~~ ~~on here,~~ we are not sure of the heat treatment, But ~~with~~ this one ~~is~~ ^{of it.} certainly indicative, ~~that it was,~~ if you'd ~~notice,~~ Cynthia here ~~that here on~~ ^{indicate that it} both edges of ~~this that it~~ had been altered ~~here~~ from its original state . This flake is quite a distinctive ^{method of} thing in the detachment ~~of that~~ It's like some ⁱⁿ ~~of~~ Marie Worrington's ^{Worrington's collection} ~~collection~~ , ^{technique} almost getting into a side struck blade ~~use the long narrow~~

They use the lateral surface of the distal end of the flake, instead of the single ^{blade} ~~spall~~ down the side of ^{a core} ~~this one~~ on a tabular piece. to follow

This technique allows removing a ^{piece} ~~through~~ in getting this sort of a piece of straight material to work with on, ~~has~~ of

almost ~~side struck~~. It's moving back towards that edge of that sort of thing there

~~and the fluting of the Holbrook is certainly a refinement of the Nova Scotia material~~ ^{Paul Cook}

in ~~their~~ techniques, of ~~removing~~. There has been much better techniques in Holbrook

than apparently Nova Scotia's

I think that this probably reflects the stone.

It could very well be; it could very well.

About this flake I wonder. I ~~wonder~~ wonder if they ^{did} ~~didn't~~ not intend to take

a very wide flake and it broke. It is quite possible. Because, you know, ^{if} there are

^{many flakes like that all right - that an indication of a technique like that on a core}
~~..... that we all devise. But you can make a flake, just like that in the old~~

~~the core~~ and one can well go like that ^{without any purpose} ~~..... it's a matter ..~~

A-matter-of-semblage If you had an assemblage of this stuff, it would be better.

But this one here is something that is a little different, of striking down here ^{mean} ~~of~~ ^{addition} ~~moving back~~

rather than turning it up on edge to follow this ridge to guide the next one, ~~on here,~~

And it could have been an accidental thing ~~like that~~.

Byers: Ya, ya - could well be

If we could get the entire collection and analyze it then perhaps we could

say something about the industry, but when I ~~he~~ say ^{it is a} ~~the~~ blade industry I ^{didn't} ~~mean~~ to say

there are flakes ^{like we get in blades} and occasionally

(end of tape)