JUDY MEYERS SUCHEY,

having first been duly sworn, was called as a witness and testified as follows:

THE BAILIFF: Be seated in the witness stand.

State your complete name and spell your last.

THE WITNESS: Judy Meyers Suchey, S-u-c-h-e-y.

DIRECT EXAMINATION

BY MR. BROWN: Q. Is it Dr. Suchey?

A. Yes.

Q. What is your occupation at this time, Doctor?

A. I am a forensic anthropologist.

Q. Would you tell us the education that you have had that qualifies you for that position at this point in time?

A. Well, I have studied skeletal remains for about 20 years. I have been involved with cases, forensic cases for 14 years. Actually back further than that, I have had educational experiences in the classroom and workshops. I have received grants and worked in the autopsy room. I have been certified by the board, taken tests by my peers.

Q. What formal education do you have with respect to anthropology?

A. I have a Bachelor's, a Master's and a PhD. Some of the courses relating to skeletal analysis.

Q. What experience do you have, if any, relating to forensic anthropology?

A. In terms of formal education or in general?

Q. In general.

A. Well, I have been actively involved with consulting in Southern California, I am deputized by one county and on the staff of several others.

Q. Have you testified in court with respect to forensic anthropology?

A. Yes, I have.

Q. On how many occasions approximately?

A. Ten to 15.

Q. At sometime in the area of October, latter part of October, 1975, and the early part of November 1975, did you have occasion to receive a series of human bones from the Orange County Sheriff's Office?

A. Yes, I did.

Q. And were those bones that were subsequently identified as coming from Keith Crotwell?

A. Those were the bones, yes.

Q. Now, did you have occasion to examine those bones on November 4th, 1975?

A. Yes, I did.

Q. What was the purpose of your examination?

A. This was a basic identification. I was interested in determining age, sex, stature, body build.

Q. What bones did you have at that time that you examined on November 4th, 1975?

A. Do you want a complete inventory or basic

guidelines?

Q. Can you give us basic guidelines. We will probably take complete inventory on cross examination.

A. Well, the remains, most if not all the long bones of the extremities and most of the ribs, most of the vertebrae, foot bones. Specifically, there were various bones missing which might be better to point out.

Q. That was my next question. Would it be easier to talk about the bones that you were missing at that time?

A. Yes. The bones that I was missing would be the skull, the mandible, the first five cervical vertebrae, the two innominates, all hand and wrist bones.

Q. From your examination of the bones that you did have, did you form an opinion as to the sex of the individual that was represented by the bones?

A. Yes, I determined the individual to be male.

Q. Did you determine a probable age of that individual?

A. Yes, I did.

Q. What was that?

A. From 17 to 22 years.

Q. Did you determine the probable stature or size of the individual?

A. Yes. The range -- I worked with different ranges for different races but an overall one would be -- I better refer to my notes.

Q.— Certainly. Did you make notes during this process of your examination?

A. Yes.

Five feet nine and one-half inches to six foot one-half inch.

Q. Did you form an opinion as to the build of the individual represented by the bones?

A. Yes. Very heavy.

Q. At the time that you examined the bones on November 4th, 1975, did you notice any defects or marks on the scapula?

A. Yes, I did.

Q. Would you explain to the Court what those marks appeared to be or what you observed about the marks? Could you describe the marks, please.

A. There were defects or holes on the scapula which were not consisting with animal gnaw, so at that time I pursued the matter further but I did not make any conclusion at that particular date.

Q. At some later time, did you observe marks on the vertebrae of those bones?

A. I did.

Q. And what type of marks did you see on the vertebrae?

A. Tool marks.

Q. Was there a particular vertebra that you observed these tool marks on?

A. On the 6th cervical.
Q. The 6th cervical vertebra?
A. Yes.
Q. That would be right under the 5th cervical vertebra, wouldn't it?
A. Right.
Q. Now, on August 30th, 1983, did you have occasion to further examine the same bones?
A. Yes, I did.
Q. At that time, did you determine whether or not you had present in those bones the first, second, third, fourth and fifth cervical vertebrae?
A. Yes, I did. I examined the vertebral column and determined that the first, second, third, fourth, fifth were missing and I had the sixth and seventh.
Q. Did you have occasion at that time to examine the ulna or both ulna of the bones that you had?
A. Yes, I did.
Q. What is the ulna?
A. The ulna is one of the bones of the lower arm.
Q. Did you examine the distal ends or the furthest ends of the both left and right ulna?
A. Yes, I did.
Q. What did you observe in your examination of those distal ends of those ulna?
A. They were unusual in both cases.

Q. Would you describe those to us, please.

A. On the left, the styloid process of the distal ulna had been cut off and was missing. On the right, it was missing an ante mortem, the same styloid process of the distal ante mortem and the surface was glossed over.

Q. What is the styloid process on the ulna?

A. It is a very tiny projection at the end of the bone.

Q. That would be kind of like a little bump at the end of the bone?

A. Right.

Q. Now, with respect to the left ulna, you are indicating that that styloid process was cut off?

A. Yes.

Q. Did you determine whether that was done postmortem or ante mortem?

A. Well, no, I didn't. Postmortem. It would have been done -- actually, I don't believe I made a determination.

Q. Did it appear to you that the styloid process on the left ulna, distal end, had been cut off postmortem?

A. Yes. The reason I am hesitating here is problem with definition. It definitely had not disappeared early in the life of the individual, so --

Q. Is that in contrast with the right ulna?

A. Correct.

Q. What did you observe about the right ulna with

respect to the distal process being absent?

A. Okay. It was absent before death and this was clear from the glossed-over nature of that area.

Q. What is that consistent with?

A. That it occurred earlier and prior to the death.

Q. Pursuant to your opinion, and your opinions with respect to these bones, have you consulted and analyzed x-rays of the right ulna of Keith Crotwell?

A. Yes. I examined x-rays and the x-ray reports also.

Q. And was your examination of the right ulna on the distal ends of the bones that were presented to you consistent with the report of the radiologists concerning Keith Crotwell's right ulna?

A. Yes. The observations of the bone were consistent with the earlier report.

Q. Was your observation also consistent with a broken right distal ulna at sometime earlier in Keith Crotwell's life?

A. Yes. That was part of the feature being described.

Q. In the radiologist's report?

A. Right, uh-huh.

Q. How many different tool marks did you observe in the sixth cervical vertebra?

A. There were 20 distinct tool marks.

MR. BROWN: I have nothing further, your Honor.

THE COURT: Cross examination?

MR. McBRIDE: Thank you.

CROSS EXAMINATION

BY MR. McBRIDE: Q. Dr. Suchey, you received these bones originally in '75, November of '75?

A. Right.

Q. What was the condition of those bones when you first received them?

A. Well, they were smelly. Some of the tissue still remained on them. The bones were sturdy, they had not disintegrated. They were obviously relatively fresh inasmuch as the soft tissues were still there, some of them in a mushy form.

Q. Were they stained?

A. The bones?

Q. Yes.

A. Not that I recall in terms of any obvious staining. I am not sure what you mean by staining.

Q. Were they white?

A. No, they were not bleached.

Q. Did you make an effort to determine whether these bones had been buried at some point in time postmortemly?

A. No, I did not.

Q. Did you make an effort to determine or did you form an opinion as to whether these bones had been exposed to the elements?

A. No. I did not.

Q. So, do you have an opinion today as to whether they had been exposed to the elements?

A. No, I never dealt with this question myself.
Q. When you say the bones were dirty, what was the color of the bones?
A. (No audible response.)
Q. A layman thinks of bones as white; were they white?
A. Off white.
Q. And was the off white nature of these bones the result of staining, a staining in the surface of the bones as opposed to just dirt lying on top of it?
A. (No audible response.)
Q. If you recall?
A. I do not recall any type of highly obvious staining.
Q. All right. Now, while we are talking about staining, there came a time when you looked at and observed some marks on the scapula of the skeleton?
A. Right.
Q. Now, as I understand your direct testimony, your first observations in '75 were somewhat gross in nature and you to make a more specific examination of those markings at a later time; is that correct?
A. Right.
Q. Was there a reason that you waited a period of time before examining the scapula more closely and these marks in particular more closely?
A. Well, that -- it is my job as a forensic

anthropologist to note obvious defects but not to analyze any such defects, but instead to call them -- call their attention to the other forensic personnel such as the pathologist. So, I was merely noting something that was important and felt some type of responsibility to get it to another source for analysis.

Q. All right. Now, referring to the time when you looked at these bones for the first time in 1975, and there was some flesh still in proximity to these bones; is that correct?

A. Right.

Q. When you looked at them at a later time, had the flesh disintegrated to some degree, from the time you looked at them from the first time?

A. At the early examination, I cleaned the remains.

Q. All of them?

A. Only the ones which -- I did not boil them, what I did was to take mild soap and water to get the bulk of the soft tissue that was smelly and, you know, keeping us from looking at the bones, and obstructing detail.

Q. All right. And you did that with soap and water and scrubbed them externally rather than chemically?

A. Right. In fact, I did not take all the soft tissue off, only gross amounts that were obstructing my examination.

Q. Did you make any effort to preserve any of the tissue that you found attached to the bone?

A. I did not myself, no.

Q. And let's talk about the scapula and these marks on

the scapula. Did you make an opinion, did you form an opinion in 1975 that these were tool marks of some kind?

A. No, I did not form an opinion. I was extremely interested in it and did talk to various people and kept my eyes open on other cases. But I never formed an opinion.

Q. Even to the present date?

A. Right, because that's not in my domain.

Q. But you have looked at them closely with an interest as to what may have caused them?

A. Right, because they did not appear to be natural or due to animal gnawing.

Q. Would you describe for us, if you might -- could we do this. May I ask you to approach the diagram, and just roughly, give us a diagram of the right and left scapula, and when we are talking scapula, what we are talking about?

A. Shoulder blades.

Q. Would it be convenient for to you approach the diagram and describe roughly where you found the marks?

A. If I could use my notes, I could diagram them in detail.

Q. Feel free to use your notes at any time.

A. Did you want the view from the outside or the view from the inside?

Q. Do the view that best shows us where these marks are.

A. (Witness complies.)

MR. McBRIDE: If we could mark this, it will be Defendant's V.

THE COURT: May I have a moment, please?

MR. McBRIDE: Sure.

BY MR. McBRIDE: Q. Dr. Suchey, we have labeled this diagram Defendant's V and it appears that you have diagrammed both the left and right scapula and this is the posterior. And you have also labeled the three areas, one area on the left Scapula A, the area in the right Scapula C, and one B. That's all correct, isn't it?

A. Yes.

Q. Now, let's refer our attention to A. How would you describe that mark to us if you are talking to someone who doesn't know a lot about these matters?

A. My only descriptions of these marks would be in terms of the exact location on the bone itself. I would not attempt to make a more detailed description because in fact that would get into the area of analysis and me making conclusions which I must refrain from being only trained in forensic anthropology.

Q. But did you make some observations, though?

A. Right, right. I know what is normal and abnormal and I can see that abnormal features are brought to the attention of other workers.

Q. And you in fact in this case did correspond with other people in the field regarding these marks?

A. Right, I discussed with a number of people.

Q. Did you ever supply these people with the actual bones themselves?

A. I did.

Q. Just referring to your observations, not that they are expert opinions, just your observations of No. A, how long of a mark was it?

A. Well, defect A is located 41 millimeters left of the glenoid bosa. I have got extending 49 millimeters below the scapula notch and beginning 25 millimeters below. So, by subtracting, I get approximately 24 millimeters by inference for the length of that particular defect.

Q. And do you have a memory as to how deep that defect is?

A. Well, it went through the bone.

Q. Went completely through?

A. Right.

Q. So, a portion of it at least being visible from the other side?

A. Correct. I could draw an interior view of both scapula.

Q. Let me ask you this: Was the width or the length, rather, the length of defect A the same on the posterior side as it was on the anterior side?

A. I can't answer that, not having analyzed them in that fashion. I do not know the answer.

Q. Do you know how long defect A was in appearance on the anterior portion of the scapula?

A. No.

Q. Did you make notations of that?

A. No. That is outside of what I should be doing really. It falls into analysis again. I was merely using anthropometric measurements to clock it properly as to their place on the scapula but not to go beyond that.

Q. As a result of your correspondence with your colleagues regarding these marks on both the left and right scapula, do you today have an opinion as to the causation of those marks?

A. At first I discussed this with two fellow anthropologists and in the current months, when I have looked at these bones, I have on occasion discussed it with the pathologist on the case. But, I can't relay the information. I mean, I have not been intimately concerned with these defects. My attention was directed elsewhere.

Q. I understand that. We will get to that in a minute. What I am getting at is right now it is permissible for an expert to use some other expert help in the field in forming an opinion and I would like to know as you sit here today do you have an opinion as to the source or cause of these marks on both the left and right scapula?

A. I do have a general opinion and that is that it would appear that a knife was used but I am not certain whether

this would apply to all three or simply one or two. And this is the furthest that I can go because again, I have not been at all concerned with this particular matter since it was taken care of elsewhere.

Q. As I understand it, you feel very hesitant in giving us an opinion as to the causation of these marks.

A. It would be unprofessional for me to do so.

Q. How about mark number B as it appears on the right. Can you describe that for us?

A. Well, defect B did differ from A and C in that a larger area was missing; instead of a line effect you had a hole.

Q. Did you have a hole?

A. It was -- do you define hole round necessarily?

Q. Well, more round than a line?

A. No, it was not round.

Q. Let's talk about the diagram. We have got B here. We have two circles.

A. It was quite irregular.

Q. We have two circles and what appears to be a line between two rough circles and a line between them.

A. Yes.

Q. Could you see all the way through the scapula as you looked through these circular areas?

A. Yes.

Q. Do you have an estimation as to the circumference

in those two areas?

A. They are not round. It is not circumference. They are irregular. If they look round in that diagram, it is because I did not, you know, draw it to scale or precise because again, this was not my concern.

Q. I would like to know how big they are. Were they big, little, tiny?

MR. BROWN: Objection, calls for a conclusion.

THE COURT: Sustained.

THE WITNESS: All my job --

THE COURT: You don't have to answer the question. I sustained the objection.

BY MR. McBRIDE: Q. Could you put your finger through those marks on B or do you know?

MR. BROWN: I object. It calls for a conclusion.

THE COURT: Lack of foundation. It is an opinion even maybe I could form.

BY MR. McBRIDE: Q. I see you looking at your various fingers. Would any of your fingers fit through?

A. Again, I would try to answer the question, but I cannot. I do not know.

Q. Do you have any opinion about the causation or source of the defect B?

A. No.

Q. Do you have an opinion as to any of these marks, A, B, or C, as to whether they were postmortemly or ante-mortemly

induced?

A. That again is beyond my area and it would be unprofessional for me to hazard a guess.

Q. So, you have no opinion?

A. Correct.

Q. Let me ask you about -- did you scrub with your soap and water the left posterior scapula?

A. I was very careful with these remains. I didn't really scrub in any cases. I was very delicate because of certain features that came to my attention immediately. I did treat them with a great deal --

Q. Let me give you what I am interested in, Dr. Suchey. Was the inside of defect A the same color as the outside of the scapula? Do you understand what I mean?

A. Yes, but I do not recall.

Q. And that has to do with the staining. Did you make an observation as to whether there was some staining?

A. I did not make these observations concerning any type of staining when I processed the remains. Had there been highly notable stains, I would have reported it in my report. But I found nothing that I considered significant enough to note.

Q. Now, assume that these bones in the scapula had been exposed to the elements for some period of time. And always assume that defect No. A was inflicted on that scapula some considerable period of time postmortemly. Would you not

expect a difference in the coloration of the exterior of that scapula from the interior of the scapula that was exposed by defect A?

MR. BROWN: Objection, it calls for a conclusion.

THE COURT: Sustained.

BY MR. McBRIDE: Q. Isn't it true, Dr. Suchey, that forensic anthropologists do on occasion examine skeletal remains with the eye to form an opinion as to where those skeletal remains have been prior to their observation? Isn't that true?

A. Yes.

Q. Have you done that occasion?

A. I do it on many cases, right.

Q. And frequently forensic anthropologists are concerned whether a body or skeletal remain has been buried or exposed to the elements?

A. Correct.

Q. And one of the factors that you look at in that sort of an analysis is the staining or coloration of the bones; isn't that correct?

A. Correct.

Q. And forensic anthropologists are also on occasion called upon to make determinations regarding the ante-mortem or postmortem nature of defects in those skeletons, aren't they?

A. As a general rule, no. Those forensic anthropologists who do this have been criticized.

Q. Have you done it before?

A. No.

Q. Did you in this case make any effort to determine whether defect A was inflicted sometime after death?

A. No. I did not attempt to analyze the defects.

Q. And in your memory of the skeletal remains as you sit here today, do you remember any coloration differentiation between the scapula bone that was exposed by defect A and the exterior surface of the left posterior scapula?

A. I have no recollection of any color similarity or difference in these bones.

Q. And is that also true as to defect C and B as they appear on your diagram of the right scapula?

A. Yes. Color never came into this case. I never concerned myself with the color of the remains for any particular purpose.

Q. Do you still have these scapulas in your possession?

A. The remains are at the Orange County Coroner's Office.

Q. Defect No. A, can you give us an approximation how wide that was in relation to say a standard kitchen knife?

A. No, I cannot, because again, I did not make notes of this type of thing. It is considered outside my area of expertise.

Q. And you didn't do that at the request of any of your fellow anthropologists that you consulted in this case?

A. No. In fact, all the anthropologists agreed it was outside our provenience and it should be left to --

Q. A pathologist?

A. Correct.

Q. So, as to the marks that you described as being on the sixth cervical vertebra?

A. Yes.

Q. You say there was approximately 20 of them?

A. Correct.

Q. I wonder if you could draw us another diagram with that cervical vertebra and give us the general location of those marks if you can on that cervical vertebra.

A. (Witness complies.)

MR. McBRIDE: Now, this will be W.

THE COURT: Yes.

BY MR. McBRIDE: Q. Okay. Now, we have Defendant's W which is a rough diagram of the sixth cervical vertebra; is that correct?

A. Yes.

Q. How are these numbered. 5, 4, 3, 2, 1 would be toward the head of the man, wouldn't it?

A. Pardon me? I don't understand the question.

Q. Where does No. 6 come --

A. Right here.

Q. And where is No. 5?

THE COURT: Right above it.

BY MR. McBRIDE: Q. We are talking above, talking toward the skull?

A. Right.

Q. We didn't have one through five; is that correct?

A. Correct.

Q. Have you ever seen one through five?

A. No.

Q. Have you ever seen the skull in this case?

A. No.

Q. Now, I assume that the top of your diagram would be --

A. Superior.

Q. Toward the top of the skull; is that correct?

A. Yes.

Q. Now, you made several notations on your diagram, 3 plus gap. What does that stand for?

A. Three marks plus a gap.

Q. What does -- also lower down you have 4 plus 2, what does that mean?

A. Four marks clustered together plus two marks clustered together.

Q. And then we have four more marks, two more marks and another four marks as we move down the back?

A. Correct.

Q. Will you describe these marks for us.

A. They are cuts but beyond that, I cannot be helpful.

Q. You have described them as tool marks?
A. Yes, tool marks is okay.
Q. Tool marks would seem to indicate --
A. That he had a great deal --
Q. A human endeavor, a human use. Given, some chimpanzees use tools, but usually tools is something that men use or women, don't we?
A. Correct.
Q. So, when you say tool marks, you mean these were marks caused by a human agency?
A. Yes.
Q. What is it about these marks as opposed to the marks on the scapula that can cause you to make that determination here and not on the scapula?
A. In this case, the marks are highly uniformed and I had the occasion to look at them through a disecting microscope.
Q. Can you give us the power you were looking through?
A. No, I cannot. I was with the pathologist who was doing the examination.
Q. And you looked at them yourself?
A. Yes.
Q. Forming your opinions through your observations?
A. Correct. No, he pointed out these things to me.
Q. Did he tell you that they were tool marks?
A. Yes.
Q. Were you able to determine that from the basis of

your own observations that these were tool marks?

A. I am not sure, because I don't know the exact procedure that, you know -- we were together looking at the marks under the microscope and I am not sure as to what opinion I might have had before or after. So, I can't answer the question.

Q. When was it that you personally looked at these marks through the microscope?

A. Recently.

Q. 1983?

A. Yes.

Q. And where did you get the vertebra when you did that? Where did it come from when you were looking at it on that occasion?

A. They were at the Orange County Coroner's Office.

Q. Who was the pathologist you were looking at these with?

A. Doctor Fisher.

Q. And when you were looking at this vertebra through the microscope, had you on that occasion taken any of the other remains for microscopic analysis with Dr. Fisher?

A. I don't believe so.

Q. But you may have?

A. Right. Our examination was concentrated here because I felt it was part of my job to do a count, enumeration, I felt was part of forensic anthropology so we were looking at

them together with different views in mind.

Q. Now, you say these marks are uniformed.

A. They have a uniform consistency about them. But they are not uniformed.

Q. Would you explain your answer, please.

A. They are not all the same size. However, there is a certain similarity about them.

Q. Is it a similarity of the width of the marks or their relationship with the other marks or their length? What is it that is similar?

A. I found similarities with the width.

Q. And I take it that that was a relatively narrow width?

A. Well, you had to look under the microscope to really get a good look.

Q. Well, that was perhaps a vague question. Were these cuts or were they gouges?

MR. BROWN: Objection, it calls for a conclusion. And it is vague and ambiguous.

THE COURT: Sustained.

BY MR. McBRIDE: Q. Do you know the difference between a cut and a gouge?

A. No, this is not my area of expertise.

Q. Just as a person, do you know the difference between a cut and a gouge?

A. No, I don't. A gouge is different than a cut; is

that what you mean?

Q. I refer to a cut -- in my judgment this is a cut and this is more of a gouge (indicating). Do you see what I am getting at? It is probably not relevant. I don't mean to testify.

THE COURT: The record is perfectly clear as to what you meant.

BY MR. McBRIDE: Q. What I am trying to get to, Dr. Suchey, is if I had a bone sitting here on the podium and I took a Phillips head screwdriver, smacked it into that bone and pulled it across that bone, I would have a different sort of mark than if I took a kitchen knife, smacked it into that bone and pulled it, wouldn't I?

A. Yes.

Q. And one of the major differences would be the one mark would be wider from the Phillips head screwdriver than it would be from the knife?

A. Yes.

Q. Were these marks that you observed in the microscope more similar to marks made by a knife or those made by a screwdriver, Phillips head screwdriver?

A. They were more similar to those made by a knife.

Q. Do you have an opinion as to the -- strike that. You looked at these in a microscope. Were you looking for evidence of sawing motions?

A. I was looking merely to count them. Counting them

was very difficult.

Q. Did you look, have occasion while you were looking at them, to count, to make any observation regarding the existence of a sawing sort of mark on the vertebra?

A. No.

Q. Were there any of these marks on the left side of C-6?

A. None that I saw.

Q. But you looked?

A. Yes.

Q. What anatomically is between C-6 and C-5? C-5 being cervical vertebra No. 5.

A. Well, there would be soft tissue disc.

Q. A disc?

A. I must say that my specialty is skeletal analysis and I would really -- I must refrain from answering the question because I don't know precisely all the soft tissue structures which would go between the two. I work almost totally with hard tissues.

Q. Well, is a disc -- is that soft tissue or not?

A. I don't know that either; it is sort of like a gouge.

Q. Have you ever seen a disc in a --

A. No.

Q. Did you see any marks such as we described on the right side, did you see any such marks -- is it proper to call

this part of your diagram the anterior, the upper part?

A. See, that diagram, it is to say it is difficult to superior, interior, posterior, anterior because I didn't put anything on it, being unable to.

Q. Were there any marks on C-6 similar to what you observed on the right-hand side and some extent on the upper part of C-6 where you have the 3 plus gap? Did you see any other marks on the top of this vertebra?

A. No.

Q. Now, you saw 3 plus a gap. At this one location, that's a little bump on the vertebra there; is that right?

A. Right.

Q. So, there is three together and then there was a gap?

A. Right.

Q. A gap between them and what?

A. The purpose of my diaphragm was just to locate them and then if there is a need for looking at the nature of them, it should be done with photography. Photographs were taken and this diagram that I had was merely to locate and to count but not to provide details.

Q. What I am asking, I don't understand what plus gap means, there were three of them together and --

A. There was a wider type of defect or a gap in the area. I would myself have to refer back to a photograph, but I don't have the photographs.

Q. So, there were three of these cut marks plus another sort of mark?
A. Correct.
Q. And so the gap doesn't refer to a distance between some marks, it refers to a defect itself?
A. I believe so.
Q. I see. Did you see any of those sort of defects any place else on the vertebra other than the general areas that you have described already?
A. No, I did not.
Q. But you looked all around?
A. I examined them as thoroughly as I could, both visually and with the disecting microscope.
Q. For instance, did you take a look at the little bump or horn on the vertebra top left portion?
A. Yes, I thoroughly examined all of the bones present.
Q. Because if a knife were in fact the instrumentality and it were cut and cutting all the way through, you might see some marks on the left portion of the top of that vertebra?
A. I examined all of the remains and noted everything that I could see.
Q. Did you take some photographs of these marks, either on the vertebra or the scapula?
A. Some photographs were taken but there was a problem. The best equipment was not functioning at that time so

I don't know how they came out. I have never seen them.

Q. Is that -- are we talking about the vertebra now?

A. Yes.

Q. How about the scapula, were there photographs taken of the scapula marks?

A. Yes.

Q. Have you seen them since their development?

A. No, I haven't seen any.

Q. Who took those photographs of the scapula?

A. I do not know them personally and I don't remember who they were but they were from the facility.

Q. The coroner's office?

A. From the coroner's -- no, they probably came from the crime lab or wherever people who take photographs come from. I don't know their exact procedures, to tell you the truth.

Q. Okay, thank you.

Now, just a little bit more on the vertebra. You have indicated that these vertebrae were tools marks. What is it that causes you to form that opinion as opposed to animal marks?

A. Their similarity -- the regularity of size is the best way I can call it. Highly irregualr --

Q. Cuts?

A. Yeah.

Q. If we could also have a diagram, Dr. Suchey of the left and right ulnar area and the styloid process.

THE COURT: We are going to do that during 15-minute recess and I will give the reporter and staff a little break. We will resume at quarter to 4:00.

(Recess taken)

THE COURT: You may continue with your cross examination, Mr. McBride.

MR. McBRIDE: Thank you, your Honor. I think we are at Defendant's X.

BY MR. McBRIDE: Q. Dr. Suchey, you have drawn us a diagram we have marked Defendant's X and in that diagram it appears that you have diagrammed the human ulna and with a symbol indicating the location and the approximate size of the styloid process that you described earlier?

A. Right.

Q. You have also in this diagram given us a cross section of the right and left ulna that you examined in this case?

A. It is the end view, not the cross section, the view of the bone from the end.

Q. The distal end is the word you used, distal refers to this part of the bone as opposed to this bone?

THE COURT: The wrist portion as opposed to the elbow portion.

THE WITNESS: Thank you.

BY MR. McBRIDE: Q. Is the styloid process a name for a bony structure? It is a bony structure?

A.— A styloid process refers to a long, bony tubercle.

THE COURT: Can you see this diagram, Mr. Kraft?

MR. KRAFT: Yes.

THE COURT: I couldn't see it. That's why I asked. I can see it now. Thank you.

BY MR. McBRIDE: Q. So, the styloid process is a bony structure as opposed to a soft tissue structure and it is something that you would expect to last longer than a soft tissue like a disc?

A. The styloid process is a normal part of the bone that would generally last the length of the bone.

Q. Thank you.

Is the styloid process physically connected to the ulna?

A. Yes, it is an integral part of the ulna.

Q. So, there is no ligament or other substance necessary to attach the styloid process to the ulna, right?

Q. It is part of the ulna?

A. It is part of the ulna.

Q. Now, you have testified in this case that neither styloid process was present in the remains that you examined?

A. Correct.

Q. However, the ulna itself was present?

A. Both of the ulnas were present.

Q. Except for the styloid process?

A. Correct.

Q. Was any of the ulna medial, is that the right word? Was any of the ulna absent except for the styloid process?

A. The styloid process was the only absent portion of the bone.

Q. Did you have any bones in the collection of bones given to you that were toward the fingers from the styloid process?

A. No, all hand and wrist bones were missing.

Q. So, of the remains that you had, they ended or ceased to be in existence in your collection from the ulna or the hand?

A. Yes.

Q. And the styloid process was gone on both?

A. Yes.

Q. You stated an opinion on direct examination that on the left ulna in the vicinity where the styloid process should have been, there was what you termed a glossing over; is that correct?

A. No, not in the left.

Q. Which one was it, then?

A. Okay. In the right.

Q. In the right ulna, there was a glossing over?

A. Yes.

Q. In the vicinity where the styloid process should have been?

A. Correct.

Q. And you have given us a cross section of the right ulna, distal ends view and in that cross section, you have made some marks. What do those marks represent?

A. This is not a cross section. That would be a section of the bones. I did not section any of the bones. I merely am looking at it visually but everything else you see -- there you see the wrist view.

Q. You are talking about this is the end of the bone that you have shown us?

A. Correct.

Q. With the missing styloid process?

A. Correct.

Q. And in the area where the styloid process should have been you have given us some marks?

A. Yes.

Q. What do those marks represent?

A. Glossing over.

Q. And what is glossing over?

A. The area is rounded. That is the best way I can say it.

Q. As compared to the --

A. It is rounded and smooth.

Q. And is that of significance to you in the formation of your opinion as to whether the styloid process on the right ulna was removed postmortemly or ante-mortemly?

A. Yes.

Q.— And what is the significance?

A. Okay. The glossing-over rounded feature is not consistent with postmortem trauma.

Q. Is that because glossing over has a relationship to the healing process?

A. I cannot answer the question.

Q. How do you know that this glossing over indicates an ante-mortem removal of the styloid process?

A. My opinion was made in the company of Dr. Fisher who is a pathologist and who is more qualified than I to do this type of thing.

Q. I see. So, Fisher looked at this as well?

A. Correct.

Q. And he told you that he thought it was ante-mortemly removed?

A. Correct.

Q. Are some persons born without styloid processes?

A. Not to my knowledge.

Q. Can you tell us anything about the manner --

A. May I correct that statement?

Q. Yes.

A. Well, at birth, no one has this because it is the end of the bone and it will be forming at a later stage and attaching at later stage in life.

Q. Do you know when, age wise, the styloid process is formed and then attaches to the ulna?

A.— No, but it would be sometime after eight or ten, I would suspect.

Q. This is not one of the factors you used in this case in aging the body, the skeletal remains?

A. No.

Q. And I take it you are not aware of what percentage of the population has a styloid process that does not form or connect to the ulna at age 20, let's say?

A. Every adult ulna that I have ever seen had a styloid process.

Q. An adult means from what, 18 on?

A. With an epiphyseal union, right. I have never seen an ulna that did not have a styloid process.

Q. You in your experience have examined the human ulna of persons -- strike that.

Do you have any other opinions regarding the time, how much ante-mortemly was the styloid process removed from the right ulna? Do you have an opinion in that regard?

A. No. May I ask a question there? Do you mean on the basis of the bone, bony examination alone?

Q. Yes.

A. On the right ulna?

Q. Yes.

A. No.

Q. Do you have an opinion based on anything else you have examined in this case as to the time prior to death that

the stylo~~id~~ process of the right ulna was removed?

A. When one examines the x-rays and x-ray reports at a prior date, then one would except that this did happen at age 13 where it is described in detail in the report of the radiologist.

Q. And you did examine these x-rays?

A. Yes, and the report.

Q. Are you --

A. Not the -- I examined x-rays taken at the current time but not in the past and I examined the past report.

Q. Past report?

A. The report from the past and current x-rays and the bones.

Q. Indicating a past fracture of that area of this man while he was living?

A. Correct.

Q. Did you examine x-rays themselves in relationship to the right ulna in the area of the styloid process or where it should have been?

A. That was taken concurrently, yes.

Q. Did you form an opinion as to -- strike that.

As I understand it, then, your opinion as to when the styloid process on the right ulna was removed is not based on any anatomical condition of the bones you examined but on the basis of the report that you read written by someone else?

A. That is correct.

Q. Now, on the left ulna, there is also an absense of the styloid process; is that correct?

A. Yes.

Q. You did, however, have the left ulna that was complete up to the point of the styloid process; is that correct?

A. Correct.

Q. And was there anything different about the area in which the styloid process should have been on the left ulna as opposed to that area on the right ulna?

A. Yes. They were quite different, the two.

Q. Would you describe for us, then, this distinction that you observed on the left ulna vis a vis the right ulna?

A. The left ulna, the area where the styloid process was missing, was scraped or cut or -- I don't want to be precise using these terms but there was some man-made object which had in fact been instrumental in the disappearance of the styloid process.

Q. So, we are talking about a tool?

A. Right, some type of a tool.

Q. You don't have in your experience or expertise the means by which to form an opinion as to how long in a living body it would take for this glossing-over to occur?

A. No.

Q. So, you have stated that you felt, somewhat hesitantly, I think you stated, that you felt the removal of the

left styloid process was postmortem?

A. Yes. Uh-huh.

Q. Are you able to make a distinction from the anatomical remains that you examined between whether that styloid process on the left was removed ante-mortemly or perhaps shortly after death?

A. I think that's why I was hedging in that question because I did consider in my mind that short duration of time. At or near the time of death, perhaps you like better than postmortem.

Q. If, for instance, we cut off my wrist right now at the location of the styloid process and I continued to live, you don't know how long it would take for the distal ends of the ulna to show this glossing-over phenomenon?

A. I am not even sure it would show glossing over. That would be under the domain of the pathologist but the two processes are quite distinct, the dislocation and the removal with a man-made object.

Q. But if we took a hatchet and removed it, it would be a man-made object?

A. But that's quite distinct from the earlier ex-ray record.

Q. Let's just refer to the anatomical remains, as far as your expertise is concerned, just from the bones, you can't tell if perhaps this styloid process on the left ulna was removed a month prior to that, can you?

A. I couldn't, but I would suspect that a pathologist could.

Q. But you are unable to do it on the basis of your expertise?

A. Right, I cannot.

Q. Did you examine the distal ends of both these ulnas you had for any tool marks other than what you described the position of the styloid process should have been on the left ulna?

A. Yes.

Q. Did you find any?

A. I did not find any other tool marks.

Q. So, the extreme distal end of the left human ulna, other than the area where the styloid process should have been, did not have any abnormalities?

A. No more tool marks.

Q. Did it have any abnormalities?

A. In terms of what type of abnormalities?

Q. Gouge marks or some other kind of mark?

A. Oh, okay. No, there was nothing to note which was irregular.

Q. That's fine. Going back to the scapula just briefly, in your examination of this scapula, did you observe any areas of either scapula which we have commonly referred to as the shoulder bone?

A. Shoulder blade.

Q. Shoulder blade, did you find any areas of either scapula that appeared to you to suffer a prior fracture?

A. Again, that is the area of the pathologist, not the forensic anthropologist.

Q. Did you observe on either scapula any of this glossing-over or healing in either of the scapulas that you observed in the right ulna?

A. No.

Q. Other than the marks that you identified on our diagram for the scapula, A B and C, did you see any evidence of any old wounds at all?

A. I didn't look.

Q. You have examined human remains, have you not, that have suffered fractures during life and then the individual lived sometime after that in a healing process being apparent on that bone, haven't you?

A. There were no gross abnormalities caused by miss-set fractures. I would have noticed those immediately. What I was thinking of is the possibility of, you know, if a fracture has been well set and you don't have an x-ray that you are looking at, some one such as myself might conceivably miss it. But no, there were no gross misshapen fractures.

Q. Did you examine at any time these x-rays of these shoulders blades that you received?

A. I don't recall doing such.

Q. At any rate you have no memory --

A. I have no memory of such.
Q. And of observing any evidence of a prior fracture?
A. I have no memory of that.
Q. When a layman uses the word shoulder bone, what is he usually referring to?
A. Shoulder bone as opposed to shoulder blade?
Q. Yes.
MR. BROWN: Objection, that calls for a conclusion.
MR. McBRIDE: I will rephrase it.
BY MR. McBRIDE: Q. What are the anatomical parts of a shoulder in bones?
A. Well, here we have the --
The shoulder area you are interested in, the clavicle, or the collar bone, the scapula or the shoulder blade, you could include the arm in there.
Q. Anything else?
A. I wouldn't include anything else in there.
Q. Did you examine -- you had those bones, didn't you?
A. Yes.
Q. Did you examine those bones both right and left that you just described for evidence of prior fractures?
A. I did not.
Q. Do you recall, even though you were not perhaps specifically looking for them, coming across examining anything that may have been evidence of a prior fracture?
A. I always examine all of the remains and if there is

anything grossly different, I would note it. But in terms of making a special examination for such, I did not and I did not make a detailed one through x-rays for that purpose.

Q. Assuming that one of those bones had been broken during his life and had been set in a medically -- reasonably medical fashion, would x-rays normally in your experience show some indication of that?

A. Sometimes they do.

Q. Do sometimes they not?

A. I believe not. Again, this is the pathologist's area. It depends on the length of time since the break and probably the accuracy of the x-ray.

Q. And the skill with which the break was set?

A. Probably. And the skill of the observer of the x-ray.

Q. You haven't undertaken any examination in that regard in this case?

A. No. It is outside of my area.

Q. Now, you examined the skeletal remains with an eye toward determining the sex?

A. Yes.

Q. You did not have the innominates?

A. Yes.

Q. They are the bones of choice determining the sex, are they not?

A. Correct.

Q. You didn't even have a skull; is that correct?
A. Correct.
Q. The skull can sometimes be used for the purposes of determining sex, can it not?
A. Correct.
Q. In fact, would you say the skull is a more accurate determination of sex than would be the humerus or femur?
A. No. In this case, no.
Q. Why do you say that?
A. In this case, the head of the femur and humerus were extremely large. I have never seen larger in my practice. And 51 millimeters and 50 millimeters of the head and femur, the larger one being of the femur, extremely large. Pubic bone -- Now, if you get a smaller one, a smaller head of the humerus, it will be maybe less good than the skull. But in this case --
Q. You were so convinced by the massive size of the ends of these bones that you felt certain of your estimate that that this was a male?
A. Right. I did not hesitate to say definitively that it was male.
Q. So, you took a look at the head of the humerus?
A. Right.
Q. And the head of the femur?
A. Yes.
Q. Which are bones located rear?
A. This is the humerus this is femur.

Q. Humerus is that bone between the elbow and the shoulder?

A. Yes.

Q. And the femur is between the hip and knee?

A. Right.

This is the femur.

Q. Specifically, when you are examining these bones for the determination of sex, traditionally, you measure the head end of those bones, don't you?

A. That's one excellent measurement.

Q. And that's what you did in this case?

A. In this case, that's what I did.

Q. Prior to measuring the head of the femur and humerus, did you remove any cartilage that may have remained in there, in that area?

A. The measurement was on dry bone.

Q. Was there any cartilage there when you first observed it in 1975?

A. I do not -- my memory doesn't allow me to.

Q. In the ordinary course of events, did you remove cartilage prior to the measurement of the bone in that area?

A. Usually it is not there. I can't remember ever having done it. The remaining soft tissue, like I said, in this case was mushy and went over various bones but I can't recall any cartilage around the joint areas.

Q. Now, when you measure the end of the humerus and

the femur, do you measure those traversely or horizontally or how do you do that?

A. I do maximum diameter, different people do it different ways. I take the maximum, however it may be.

Q. Well, there are different statistics in reference books regarding vertically and horizontally, aren't there?

A. You are correct.

Q. So, you take whatever the maximum is and then you refer to your reference books for either horizontal or the vertical measurements in the studies that have been made; is that correct?

A. If one were to utilize those studies, you would have to take the measurement the same way.

Q. Now, when we said that the head of the humerus was 50 millimeters --

A. Yes.

Q. -- are we talking vertically, horizontally or what?

A. I do not use what most textbooks use.

Q. That puts me at a great disadvantage.

A. I use the maximum. If it is horizontal, fine; if it is vertical, fine; whatever is the maximum. This is what I have always used which means that I can employ discriminate function analysis that you are referring to.

Q. So, at this point, you can't tell me whether the 50 millimeters was vertical or horizontally. It was a maximum whatever you were measuring?

A.— No, I could do this again.
Q. At this point as you are sitting here?
A. No.
Q. And the same would be true of the femur?
A. Correct.
Q. What percent of the general population of women would you expect to have the head of a humerus of that size?
A. Very few. I have never seen one.
Q. Would that vary as to race?
A. Yes. I would say less than one percent.
Q. Is that a guesstimate on your part or is that a result of some research book that you looked at in this case?
A. It is a guesstimate but -- I have worked with one of my students on 300 humans in Central California and I don't recall such a measurement there.
Q. The same would be true --
A. And that's very --
Q. These are big bones for a man, then?
A. Yes. I have never seen -- I don't recall any other femur that I have ever seen in the past 20 years being 51 millimeters. I mean, I was always quite taken with these measurements.
Q. Does the fact that they were such extremely large measurements tell us anything else about the physical attributes about this man?
A. That he had a rugged build.

Q. Is he massive, is he muscular, do you know?

A. Rugged build, heavy skeletal structure. This does not necessarily relate to fat or fatty tissue or weight estimates.

Q. Does it relate to the, say, the thickness of his skull?

A. No, the thickness of his skull does not relate to this.

Q. Does it relate to the massive nature of any other bones in his body? Would you expect for instance his hands, any of the other bones to be extremely massive?

A. Not necessarily. There is not a one-to-one correlation to these types of things. I would not expect to find a very fragile bone amongst them.

Q. Are you able, now that I am thinking about it, in examination of the skeletal remains, to form an opinion as to whether this individual was more likely left handed or right handed?

A. No, I did not examine the remains with that in mind. There is information data available but I did not do this.

Q. And assuming that the bones are still available, though, that sort of analysis could be done by a forensic anthropologist, could it not?

A. Yes.

Q. It has been done in the past?

A.— It is in its exploratory stage, so I am not sure to what extent. But it is a proper endeavor.

Q. Of a forensic anthropologist?

A. Yes.

Q. Do you remember anything in you mind, in your memory, as to the condition of these bones that would leave you to believe that he was either left handed or right handed?

A. No. I did not dwell on this particular topic.

Q. Now, other bones that you had in your possession are sometimes used for purposes of sexes; is that correct?

A. Yes.

Q. Did you examine any other bones with an eye to sexing these other skeletal remains?

A. Well, given those remains, the head of the femur and head of the humerus were far better than anything else available and so, I refrained. I do not --

Q. You felt certain enough from what you did analyze that you didn't go to the other bones and cross check; is that correct?

A. I go to the most accurate indicator. By throwing in others less accurate, one will end up with a poor diagnosis.

Q. I don't know if I have got this pronounced right, a septal aperture on the distal end of the humerus is sometimes present; isn't that correct, that's a hole?

A. Yes.

Q. Was it present in this case?

A.— I don't recall it being present but I do not have it listed.

Q. Is that something you would have looked for?

A. No. There are probably about 45 such variations on the post cranial skeleton and I would not normally list them.

Q. But that is a sex link characteristic, is it not?

A. Yes, it is, but the linkage is not that great. I mean, it is more often found in females, but I think -- the percentage doesn't warrant its use as a sex indicator. It is used and listed in books such as Bask, but I could not use it. I would criticize Bask for that.

Q. Would you be surprised to find in these -- in the humerus in this case, a large septal aperture in the distal ends of the femur?

A. No. I think it is more a function of habit and individual traits, not sex. I am at odds with some of the professionals on that point who would include it.

Q. So, you think maybe it has something to do with the activities of the person during life?

A. I have never pursued that particular topic.

Q. You said habit?

A. Habit or muscular activity or -- yes. Total functional -- the way the skeleton functions together. That would be my guess.

Q. Well, would you expect a septal aperture to be present in an especially active person? Or are we talking

apples and oranges?

A. I have never done a study on this. I just know it's not that great a sex indicator so I refuse to use it.

Q. I understand that. I am curious about this habit you mentioned. How can that possibly relate to habit?

A. The reason I say this is because I studied distinct traits of the cranium for, say, three or four years, in terms of the genetic versus the environmental component and I found in the cranium traits of this nature have a far heavier environmental component; so putting the septal aperture in that category I would expect that argument would extend to this. But I did not pursue my research any further.

Q. So, this is a postulation on your part rather than a result of any study that you have done that you are aware of, that it may have an environmental --

A. Right.

Q. You indicated this fellow was how old, approximately?

A. Seventeen to 22.

Q. And that was on the basis of your examination of a piece of clothing?

A. Epiphyseal closures.

Q. Say it one more time?

A. Epiphyseal.

Q. What is that?

A. During the growth process the bones have three

different segments, the shaft and then an end on each end. And at some point on the end unite on the shaft. It is different for every bone. In this case, all of the epiphyses had attached; that's why I gave the lower estimate of 17 plus.

Q. The medial clavical epiphyses?

A. No, the long bone epiphyses have attached. Medial clavicle attaches last and it had not yet attached. This is one of the main reasons that I put that upper range.

Q. The long bones then you would expect to have a complete closure at some time between 17 and what?

A. By 17, you would expect them to be completely closed. The long bones.

Q. And how much of a range of error would you give us there? Some individuals surely must take longer to have that happen?

A. Yes. Well, also there is different process of epiphyseal union.

Q. Let's talk about the one you are --

A. Complete. Well, it is quite possible that some people don't complete their closure until 18 or 19. You would have to take -- you can take each bone and to go a table and see just exactly when it starts and when it ends. What I did was to take the totality of the skeleton, plus in my mind I also saw these fully developed bones on the side and that does not occur at age 14 or 15. So, this is, you know, part of the art of the signs.

Q.— You are not just punching in a computer and coming out with an answer; is that right?

A. Right.

Q. You are looking at the whole thing?

A. Right, the totality of the case warranted a 17 to 22 estimate.

Q. In this case, you did though, in your analysis of the age of the man, look closely at the epiphyseal union of the long bones?

A. Right.

Q. Do you do that with all the long bones?

A. Yes, they were all completely united.

Q. That's what you mean in your report when you say there was no recent activity?

A. No sign of recent union. If he had been like 15 or 16, some of them might have been closed but not all and some of them would have shown lines of recent union. I could not find any on him.

Q. There are some experts in the field, are there not, and I am referring to Bask, who say that at least in the humerus on bone, there may not be a complete enclosure until age 24?

A. No. Which expert is this?

Q. I thought it was Bask. Maybe I am wrong.

A. Bask is not an expert of time in that field. He does compile data and put it together. But if you are really talking about epiphyseal union, you have to go to the primary

sources.--

Q. Is there a percentage of the population, a male population, that you would expect the epiphyseal closure to occur say as late as 20?

A. It is possible.

Q. Epiphyseal union also has an environmental effect and if you have malnurished children, their epiphyseal union is later.

What I am trying to get at is your examination of the epiphyseal union of the long bones are you giving us a range of 17 to 22 but do you feel statistically going back 22 would be inaccurate?

A. Twenty-two is based on the --

Q. Clavicle?

A. Clavicle, right.

Q. So, all you are going to tell us is that from the long bones he is over 17?

A. Now, it is possible if I were to do this case today I would give you a slightly different age estimate. For example, I might extend the clavicle up to 23 or such because I could go back to data that I have recently completed, you know, since the time of that case. And I could do a re-examination using the more recent data but it is not going to vary the age range much. It is not a procedure that I would normally do. It would have no value in my estimation. We must remember I did this age range eight years ago and developments have occurred

since then. You know, I haven't reexamined that particular thing.

Q. What I would like to know is from your examination of the skeletal remains in this case, could the man have been 25 years old?

A. I would be glad to answer the question but I would have to refer to data that I don't have with me.

Q. Now, as I understand the analysis that you have done today, the medial clavicle epiphyseal union was a strong tool in your mind in setting an upper limit on the age; is that correct?

A. Yes.

Q. And you have indicated that that epiphyseal closure had not occurred?

A. Correct.

Q. In this case. Now, there are degrees of union, are there not?

A. Correct.

Q. Because this takes place, this union takes place in a living person over a period of time?

A. Yes.

Q. It is a gradual process?

A. Yes.

Q. Can you give us an opinion as to whether the epiphyseal union and the medial clavicle was even partially united?

A. No, it was not partially united. I remember, because in fact, I thought it was. I looked at it when I first got the remains and the tiny epiphysis of the clavicle fell off and that's when I realized that these remains had to be cleaned very, very carefully to get all the existing data because I know precisely because I remember seeing it. Even though it was those many years ago. The epiphysis was present but not united.

Q. Was it connected physically with soft tissue to the clavicle --

A. No, it came right off as soon as you --

Q. Moved the bone?

A. Uh-huh.

Q. Could that injury to the epiphysis have occurred postmortemly to moving the body around?

A. No, once it is attached, it is attached.

Q. If it were only partially attached, could it have been knocked off in the process of moving around?

A. No, when it is partially attached it is very well attached; it is just that there is a line around it and you can see it is not complete. But it doesn't come off.

Q. Now, what is the latest that you could reasonably expect the epiphyseal union to occur to the clavicle?

A. This is my own personal research. I don't have the data with me. But I could very easily go to my office and myself have studied the world's largest study on the topic. I don't have it with me.

Q. You think you could be more accurate in your answer today than you were at the time --

A. Yeah, it is possible it might be different.

Q. When you were, at the time you studied this previously and before you had done these personal studies, you placed an upper probable limit as 22 years?

A. That is what I did at the time.

Q. Now, these statistics which cause you to be able to set a lower and upper term estimate often appeared to have been -- we get an upper range, a lower range, and we get a median; is that correct?

A. Yes.

Q. But that doesn't tell us how many people were up at upper range, lower range or at the median, does it?

A. No.

Q. In fact, you could have nobody at the median and a bunch of people at the upper and at the lower?

A. No, because of the human growth and development you would have your people clustering at the median although we don't probably know the exact percentages.

Q. So, are you able to give us percentages within this range of 17 to 22 in relationship to the epiphyseal closure that you observed in this body as to the percentage probability, if you will, whether the man was 17, 22, 19, 18, someplace in that range?

A. No, I could not.

Q. — Are those figures available?

A. No, they are not. I could do some work on the upper range because I have done the basic research on it. But not on the lower.

Q. So, you are not aware of any studies that have been done other than what you have done that would tell us the percentage of the population of each of those areas?

A. There are no such studies because it is very difficult to get samples to study this type with many skeletons of known age.

Q. You also gave some attention in your analysis to the possible race of these skeletal remains, did you not?

A. I do not believe -- we respect to perhaps a hair analysis which I sent to another individual. But that --

Q. Well, you considered race when you were talking about the man's stature based on his --

A. No, since I did not know the race, I gave various alternative statures which would be used. If someone said we think it might be this person and is Black, then he would have this stature range as opposed to someone who might be Oriental. From the remains itself, though, no racial indications were present.

Q. The skull would have been useful to you in that regard?

A. Yes, yes.

Q. Let me ask you this: Is there a distinction

racially about the shape of dental incisors?

A. Yes.

Q. And that distinction exists roughly between American Indians and the rest of the population, other races; is that correct?

A. Mongoloids the rest of the population. Orientals would be included in American Indians.

Q. So, you must have been able to tell something when you saw the incisors?

A. From the general skull configuration, I probably could have assesed a race.

Q. Could you tell us something about his age as well?

A. I couldn't have improved on the age I had already gotten. The skull would not have helped me for either age or sex.

Q. Well, if the skull had a complete absence of brow rings that would have been surprising in light of the massive nature of the end of the humerus, would it?

A. Skulls are notoriously puzzling when it comes to sexing. I only do it when I have the skull present. If the body is there, I almost totally disregard it because --

Q. That --

A. It is not a good sex indicator.

Q. Now, when you gave us possible stature of this man and you broke that down based on the long bone among the various races, you gave us a median and an upper and lower range, didn't

you?

A. Yes.

Q. Can you tell us anything about the percentage of the population that is at the mean, assuming an adult male?

A. I can't.

Q. Are those figures available?

A. They would be. No, you could go back to the original research and get the percentages from that study, but that is still not going to help us with the United States population today.

Q. Because it is a matter of logic, isn't it true, that you could have nobody at the mean?

A. No, everything about human growth and development would indicate that most of your people are going to cluster near the mean and then they will taper out. It is the old bell-shaped curve.

Q. How do we know it is the bell-shaped curve if we don't have percentages?

A. Almost everything with respect to human growth and development follows this bell-shape principle.

Q. Assuming adult persons who are already mature and their skeletal growth has ceased, you would still say that in your experience it would be a bell-shaped sort of curve dealing with the mean and lower and upper range?

A. For the stature?

Q. Yes.

A.— It would approximate a bell-shape curve.

Q. Let's assume this is a Caucasian man.

A. Okay.

Q. And you say that there is a mean of five foot ten almost five foot eleven. Would you like to find your place first?

A. All right.

Q. Is that right? If the man is a man -- if the man is white, there is a mean of five foot ten for stature, height?

A. Five-ten and nine-tenths.

Q. Almost five eleven?

A. Correct.

Q. And there is a range of from five nine and almost a half to six foot and a little bit.

A. Correct.

Q. Can you tell me what percentage of the population you would expect to be at the mean, five-ten and almost five eleven?

A. No, I can't. I can just say it is the bell-shape curve so a bulk would be. But I cannot give you statistics on this. Also, no one can because these statures are based on 1955, Trotter and Glasier which are the best we have. However, today, things are maybe slightly different. We can only use the best we have.

Q. Even if we know it is a bell-shape curve, we have tall, skinny bell-shape curves and broad, fat bell-shape curves.

A. — Okay.

Q. It doesn't tell us how many people, whether you have a broad --

A. You are correct.

Q. It doesn't tell us much about how many people you would expect to see at almost five-ten, five eleven?

A. No. We know the tendency is there.

Q. How many persons, assuming white, you would expect what percentage the population, would you expect a white man with the length of long bones that you measured in this case to be over six foot and three-tenths of an inch?

A. I can't tell you.

Q. That's the upper range, isn't it?

A. Uh-huh.

Q. When we say upper range are we talking about the absolute maximum?

A. No, we are not. Because, again, we are talking about studies by Trotter and Glasier. There are so many problems with the stature that people don't commonly think about, but we are working with a guideline. For example, a lot of people lie about their stature and we really don't know how tall most people are in this room. We don't know how tall the decedent was probably.

Q. Given all the uncertainties that you have been telling us --

A. That is, unless we measure. People list different

statures ~~on~~ different documents and they are widely different so how do we know, how can we check our standards.

Q. Are you willing to tell us anything about this man's height?

A. Yes, this is the guideline.

Q. But if I were to ask you where you would place your money on the height of this man, where would you place your money?

A. I wouldn't.

Q. All right, Thank you.

Now, there were studies -- did you do any microscopic studies or bone cross section?

A. No, I didn't.

Q. That sometimes is using for sexing; is that correct?

A. For aging.

Q. Is it also used for sexing?

A. No.

Q. Would a cross section microscopic study of one of these man's long bones be helpful to you in this case?

A. No, because this age range is very good based upon the epiphyseal union.

Q. If we weren't satisfied with a three- or four-year range, can we do better --

A. No, microscopic cannot do better.

Q. This fellow had something real unusual about him,

that is spina bifida?

A. Yes.

Q. What is spina bifida?

A. Spina bifida is when the bony neural arches which usually fit together and house the spinal column are open, thus exposing the spinal column and there are various degrees of this.

Q. Isn't that a condition you would expect to have been discovered in a 20-year old man's life?

A. Not necessarily. The people who have injury to the spinal cord, they will definitely have it diagnosed. Others do not. But this, again, is pathology and I do not -- I can't answer detailed questions in that area.

Q. Well, what was it about the skeletal remains that caused you to believe that this man suffered from spina bifida?

A. His neural arches on the sacrum were separate and so technically he had spina bifida as seen from the bones.

Q. Explain to me neural arches and how they would separate and how they normally are. Would you make a diagram?

THE COURT: Will you make that Y.

MR. McBRIDE: Please.

THE WITNESS: Do you want me to explain it?

BY MR. McBRIDE: Q. Yes, would you please.

A. This is a posterior view of the sacrum right back here. Generally speaking, the neural arches fuse together and the spinal column goes down here.

Q.— Neural arches are a bony structure?
A. Yes.
Q. In this case the neural arches are not fused together so they are separate. There is an area exposed that is generally not exposed.
Q. And if this is in a living person, you would see then what, being exposed? You would see what?
A. Well, the living person will have skin.
Q. Right.
A. Well, sometimes you can diagnosis it if there is injury to the spinal column, it will be diagnosed in the living people.
Q. Is there a nerve in that area?
A. The spinal cord itself comes right here so there can be injury to it. In other cases there is not.
Q. So, this sacrum, is that commonly referred to as the tailbone?
A. No.
Q. It is at the lower end of the --
A. Uh-huh.
Q. Did you see anything to indicate that that condition existed in any place other than on the sacrum or are you assuming that's true?
A. No. On the case in point. Spina bifida was confined to the sacrum area.
Q. Could you have seen it if it had been present in

the remains that you did have at some other point?

A. I would have seen it, yes.

Q. So, this spina bifida, above this portion of the body then there was a closure of these neural arches?

A. Uh-huh.

Q. Only being open at this one area?

A. Yes.

Q. Would that be apparent from an x-ray of a living person, this condition that you have described on this man's sacrum?

A. I don't know. I only work -- I can diagnosis it from bones and that's all I do.

Q. You don't know if this would show up on an x-ray that would occur ante-mortem?

A. I have been told you can look for it on an x-ray but I don't know if this is true or what view to be taken.

Q. Do you know what percentage of the population have this condition?

A. No. I could find that out. It is available but I don't happen to know it.

MR. McBRIDE: Thank you, Dr. Suchey, I have no further questions.

THE COURT: Mr. Brown.

MR. BROWN: Due to the lengthy cross examination I have one question.

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REDIRECT EXAMINATION

BY MR. BROWN: Q. Doctor, did you based upon all the information that you have collected in this case, form an opinion as to whether or not the bones that you examined were those of Keith Crotwell?

A. Yes. I believe that it is extremely certain that they were.

Q. What did you base that opinion on?

A. There were quite a number of points of biological consistency listed as the age, the sex, the cervical vertebrae number on the body compared with that of the head identified through dental x-rays. Hair color, body build and stature. These are all biological points of consistency.

Plus geographical location of the find and the timing of the two, the head and the bones. So, that is your basic picture. Now, you throw in that highly distinctive feature like the displaced process, the styloid process of the right ulna and it is extremely probable.

MR. BROWN: Thank you, Doctor. You are free to go.

THE COURT: Mr. McBride?

MR. McBRIDE: No further questions.

THE COURT: Mr. Otto?

Doctor, thank you very much. You are not supposed to talk to anybody about this case but if you did I don't think they would understand. You do understand that you can talk to the attorneys and the investigators.

— 10:00 Monday morning, gentlemen?

MR. McBRIDE: Yes.