

State may bring forth their next witness, please.

MS. SMITH: Prior to doing that, there's a question whether or not State's Exhibit Numbers 32 and 33 was admitted yesterday, upon laying foundation. At this time, State would move to admit State's Exhibits 32 and 33.

THE COURT: Those the fingerprint cards?

MS. SMITH: No and for the defense's records, it's Property Receipt Numbers 10, 11, 12 and 13, the known blood, saliva, pubic and head hair samples.

THE COURT: 32 and 33?

MR. BENNETT: No objection.

THE COURT: They're admitted without objection. Thank you.

Next witness, please.

MS. SMITH: State would call Carol Cox to the stand.

THE COURT: Carol Cox, please come forth.

If you'll place your left hand on the Bible here and raise your right hand.

Do you solemnly swear the testimony you're about to give in the cause now on trial will be the truth, the whole truth and nothing but the whole truth, so help you God?

THE WITNESS: I do.

THE COURT: Have a seat, please.

CAROL ENGLISH COX,  
after first being duly sworn, testified as follows, to-wit:

Q What items, can you tell the ladies and gentlemen of the jury what type of items do you analyze? Can you be specific?

A Hairs, fibers, various types of debris, glass, paints.

Q What is your educational background?

A I have my bachelor's of science degree from Oklahoma State University in microbiology and I attended St. John's Medical Technology School and I'm a certified medical technologist and microbiologist and I also have my master's degree from OU.

Q Now prior to the 8 years service that you have with Tulsa Police Department, where did you work?

A For 17 years, I was employed by Hillcrest Medical Center and then also a couple years at Saint Francis and Hisson.

Q What did you do at those locations?

A I was a medical technologist and microbiologist.

Q Have you kept abreast of current innovations and changings in the field, in the field of analysis or trace evidence?

A Yes. I attempt to attend all of the meetings that the Southwest Association Forensic Chemists have. They have usually 2 of them a year. I have attended one FBI school in Quantico.

Q Now when you began to examine trace evidence in this particular case, it was vacuumings; is that correct?

A That's correct.

Q Do you -- how do you initially begin to go through the

# DIRECT EXAMINATION

BY Ms. SMITH:

Q Would you please state your name and spell your last name for the record?

A Carol English Cox, C-O-X.

Q Where are you presently employed?

A By the City of Tulsa.

Q And the length of time that you've been so employed?

A I have worked for the City of Tulsa for 8 years.

Q Will you tell the ladies and gentlemen of the jury if you have a particular assignment or duty at the present time?

A Yes. I'm a forensic chemist.

Q Where do you work?

A I work for the -- in the Tulsa police station laboratory.

Q So you work for the Tulsa Police Department?

A Yes.

Q What particular area do you deal in in forensic chemistry?

A I'm a trace analyst.

Q Will you tell the ladies and gentlemen of the jury what a trace analyst is or what do you do?

A I look for very common things that are easily overlooked, such as particles that can be transferred by air currents or transferred on contact, things that normally people would overlook and leave at the scene.

vacuuming?

A Vacuumings usually take a considerable amount of time, because there are so many different types of materials available. But because I laid out a very large piece of light paper and I cut down all the air currents in the room, so nothing is going to be moving so that nothing can be contaminated or lost.

And then using rubber gloves and magnification of about 2 to 3 times, I search through the vacuuming and sort out the hairs and the fibers and the various types of debris and put those in small Petri dishes and seal them tightly, so that they can't be contaminated in anyway.

Q When you look at the trace evidence after you begin to sort it out -- strike that.

Do you mount it or what do you do with it?

A With the hairs and fibers, I mounted them on slides and I use the semi-permanent mounting so that they are affixed to the slide and won't be moving so that I can examine them further.

Q What -- how do you examine them? When you say examine them, do you look at them with the naked eye or do you use some sort of instrument or procedure to examine them?

A As I said before when I'm sorting through them, I am examining them. When I start to mount them, I look at them individually to get all of the visual characteristics that I can get, the actual color, if it's a hair, the way it twists

and turns, if it's curly or if it's crimp or very straight.

And I record all that information down and then when I put it on a slide, I also examine it under a stereo microscope which will give me a picture of the hair in its entirety and its actual cross-sectioning.

We do what we call a visual cross-sectioning of the entire hair and the stereo microscope goes from approximately 5 times magnification up to 60 times. And then I take it to a compound microscope and it will magnify up to 500 times magnification.

Q When you look at a hair, there are particular areas of the hair that you go through and look at in making your comparisons; is that correct?

A Yes. I actually look at the entire hair. But since a hair is an individual item, it does have its various characteristics and different locations and I have to compare that particular location on the questioned hair with that on the known hairs.

Q Did you bring with you -- or strike that.

I asked you to bring with you a film which would show a blowup of just a general hair or a cross-section of a hair; is that correct?

A Yes, I did.

Q Is that it that's --

A Yes.

Q -- laid on the screen today? Could you pick up that pointer behind you, please, and come down here and it looks like part of one word up there. Can you come down and stand where I'm standing and explain just briefly to the ladies and gentlemen of the jury what you're looking at when you're comparing hairs?

A In hair, it's an elongated rope. It comes from specialized cells in the skin called a follicle. That's what the hair here is, follicle.

As you can see, the entire bulb of the hair and the root is contained in the follicle and then the skin would be approximately at this end. Each hair is an individual hair. When it starts growing from the root, a new one will come and start growing here, will actually have a point just like this one. All hair, when they start growing, do have a point.

Q Let me stop you right there for just a minute. I need you to speak a little louder and a little slower, if you can.

A Okay. Sorry. These hairs have a definite growing stage. Head hair will grow from 1 to 6 years, depending on the individual, and then it will go through kind of a quiescent stage where nothing really happens inside the hair. And this usually lasts about 3 months. And then after that, the enzymes in follicles will start causing the hair to disintegrate and getting softer so that the new hairs come in and just push the

old ones out.

And as I said, the root has very important characteristics to study as does the entire hair shaft and then the tip. This one down here is just a cross-sectioning of the small piece of hair which shows essentially what I'm looking into the hair to see.

Now a normal hair's about 1/250th of an inch in width, but when I'm looking at it 500 times magnification, it appears to be about 2 inches in width. So I can look in there and see all the various characteristics very easily.

Q Let me stop you right there. When you say that you can look in there and see the characteristics very easily, what are you looking for at that point in time? What characteristics are you looking for?

A I start out by looking at the external part of the hair which is the cuticle and it is composed of scales. These scales are various shapes, sizes, colors and I can use all of that as a descriptive way to describe that particular characteristic of the cuticle.

Sometimes the scales will be damaged by abrasions and things like that and that's an important characteristic, also. And as I said, the coloring is very unusual. Most cuticle is white but times it is yellowish-gray colored and sometimes the pigmentation that is normally found in the cortex can also be found in the cuticle. And this is a very important

characteristic that I'm looking for.

Also this particular margin here can be straight and very distinct as it is in this picture or it can be undulating in various shapes and everything. And sometimes, it's very blurred, particularly if your hair is dyed or bleached. This particular margin becomes a distinct characteristic to see.

And you know, the largest part of your hair is the cortex. And inside the cortex, you have your pigments that you find in the hair. This particular drawing --

Q Let me ask you to stop right there for just a minute.

A Surely.

Q You're talking about the pigment inside the hair now; is that correct?

A Yes.

Q Is that what gives the hair its color?

A Yes. It gives it its color. Whether it's black, brown, red or yellow. This particular kind of pigment is what you see in black and brown-headed people and it is very distinct pigment granules and they come to the granular size that are present in the bottom of the hair follicle.

However, red and yellow pigments are not granular, but a liquid color and you do not see the individual pigments when you have the red and yellow pigmentation in the hair.

Q You're saying that red and yellow are -- are hues of red and yellow liquid in color; is that correct?

A Yes.

Q So you normally do not have granular color also?

A You can have a mixture in hair of actually all 3 types of pigmentation.

Q Is this something that you look for in your examination?

A Yes. And with the actual granule, you have shape, size, color distribution and all this that you can record. Actually with the yellow and the red pigmentation, you don't have that type of different association that you can make, just various hues of coloration.

The very center of the hair is called the medulla and not all hairs have this. Usually with larger and thicker the hair, you will have medullas in them. And they can be solid like this is and called a continuous medulla or you can have skips in it and this is discontinuous or you can have just spots.

And these are characteristics that we look for. Also it can be dark like it is here indicating that the liquid that was in the medulla has dried out and that now the media has filled this in. Whereas if the media inside the medulla is still there, it will be clear.

Q All right. Thank you. If you'll take a seat back up here on the stand.

Let me ask you to explain to the ladies and gentlemen of the jury a little bit about hair analysis. For instance, Ms. Cox, if I were to pull 2 hairs out of my head, if you saw me

378

pull 2 hairs out of my head, I assume you could say both those hairs come from [REDACTED] head, could you not?

A Yes, that's right.

Q But if they were placed in an envelope and brought to you with 26 of my known hairs, could you absolutely positively say that those were my hairs?

A With forensic characterizations, you cannot do that. You can say that all the characteristics are consistent, if they are.

Q If the hair characteristics are consistent, excuse me.

A Sorry.

Q So hair analysis is not or hasn't advanced to the point where you can absolutely say 2 hairs come from a common source; is that correct?

A That's correct.

Q Now you indicated you use the term consistent?

A Yes.

Q What do you mean in hair analysis when you're talking about consistent?

A I have a questioned hair that has all of the characteristics that's found in the known hair and this is very important, because you have not only 20 to 25 large characteristics but each one of those have very subtle differences.

But also I must find among the known hairs 1 hair that

looks exactly like the questioned hair from the tip to the root end and that all of the various changes that go on in the hair occur at the same place in each one of those hairs and the arrangement of all the characteristics are the same.

Q What do you mean in your field when you use the term similar?

A Hair that is similar -- questioned hair that is similar to the known hairs means that all of the characteristics are there in the same places. But instead of having 1 hair that is a match to the questioned hair, I had to use 2 or more hairs to find all of the characteristics in the locations where they need to be.

Q What does the term wild hair mean?

A Wild hair or atypical hair means that the characteristics that are found in that hair do not normally fit within the range that you see in all of the other known hairs.

Q But is it possible for a wild hair to come from an individual's head?

A Yes, it is.

Q Isn't that what wild hair means?

A Yes, it is.

Q Now did you have an occasion to check out some evidence from the police department property room for your examination?

A Yes, I did.

Q Can you advise the ladies and gentlemen of the jury what

380

you checked out from the property room and from what property receipt you checked it?

A Yes, just a minute.

On 10-04-91, I checked out Item Number 1 -- I mean Number 8 and on 2-20-92, I checked out Items 1, 6, 7, 9, 10, 11 and 3.

Q What what property receipt number did you check those items?

A AB-0758.

Q Were they still in a sealed condition when you received those items?

A Yes, they were.

Q Now from those items, did you locate known samples of a suspect?

A Yes, I did.

Q What known samples did you use in your testing?

A Item Number 10 contained pubic hairs from Timothy Edward Durham. And Item Number 11 contained head hairs from Timothy Edward Durham and 8C contained pulled head hair from Jennifer Copple.

Q Did you have pubic hair from [REDACTED]?

A No, I did not.

Q Did you have an envelope that was labeled pubic hair?

A Yes, I did.

Q And what was the contents?

A It was labeled too sparse and too short to pull. All it had in it was 1 paper bindle which appeared empty.

Q Now would I be correct in referring to these as your knowns?

A Yes.

Q Did you label those with regard to report as K-1, K-2, K-3 and K-4?

A I do not do that. I actually label them with the names of the individual.

Q So you refer to these as the known head hairs of Timothy Durham, the known pubic hairs of Timothy Durham and the known head hairs of [REDACTED] is that correct?

A That's correct.

Q Now you indicated that you use the vacuuming that you checked out from this property receipt also; is that correct?

A That's correct.

Q Now where did the vacuuming come from? What item numbers, if you know?

A Item Number 6 was vacuumings from a couch and Item 7 was vacuuming from the floor from the day room. Q Did you proceed with your examination according to recognized procedures?

A Yes, I did.

Q And pursuant to your examination, did you prepare a report?

A Yes, I did.

Q Directing your attention to Item Number 6, can you tell us what that -- under Item Number 6, did you find an item that you can tell the ladies and gentlemen of the jury about a specific item?

A I believe you're speaking of the head hair that was 4 inches in length, light brown to blonde to reddish blonde. It was a Caucasoid head hair and it has microscopic similarities and unaccountable differences to the known head hairs from Timothy E. Durham. This hair is microscopically not consistent with the known head hairs from [REDACTED] and could not have a common source.

Q When you say could not a common source with [REDACTED] is that correct?

A That's correct.

Q All right. Now when you began to look at this hair that you say had microscopic similarities and unaccountable differences with the known head hairs of Tim Durham, I want you to tell the ladies and gentlemen of the jury, did you look at it under the microscope like you talked about when you showed them this blowup of a hair?

A That's correct.

Q And when you began to look at that, can you explain to the ladies and gentlemen what similarities you observed between the questioned head hairs that you found from the vacuuming and

the known head hairs of Tim Durham?

A 20 of the 25 characteristics that I normally look for were a match or similar to those found in known head hairs from Timothy Durham. They consisted of the relative length, the fact that it was a Caucasoid head hair, that it had the light brown to red to yellow pigmentation in it, that fit the same width.

Q Let me stop you right there for just a second.

A All right.

Q You said 20 of the 25 characteristics that you looked at where present?

A That's correct.

Q If you can speak a little slower and a little louder so that the ladies and gentlemen can understand what you're saying. The length was similar; is that correct?

A Yes.

Q Caucasoid?

A Yes.

Q What else?

A Just a minute. Everything I normally look for. The cortical fusi in the hair were the same. The pigmentation was the same. In fact as I said, it not only had the brown pigmentation with the granules in it, but there was also the yellow and red pigmentation which was present.

The medulla was the same. The scales were the same and

the margin between the cuticle and the cortical material was the same.

Q Did you look at the shafts?

A Yes.

Q Were they similar?

A Yes. The shaft on this particular hair was oval to round. And most Caucasoid people, their hair is mainly oval. So therefore, it's fairly easy mount because when you twist it around, it stays mounted fairly easy.

However, this one was fairly hard to mount, because instead of just being oval, it had a slight roundish character to it. So it tended to straighten out a little bit more and this was found in the known hairs.

Q Let me ask you this: When you say that the hairs tended to straighten out, is that a common occurrence in your business?

A Not in Caucasoid hairs. Typically in Mongoloid hairs, their hairs are typically very round and extremely difficult to mount. But hairs do vary in their special configuration and this particular -- these particular hairs were oval to round and that's what caused this problem with the being hard to mount.

Q Was it the same for the known head hairs of Timothy Durham and the questioned hair?

A Yes, I found it in both.

Q When you say they were particularly hard to mount, because normally hairs curl up and these straightened out, have you ever had that occurrence occur before in known Caucasoid hair?

A No, I haven't.

Q Never?

A Not yet.

Q Then let me ask you this: When you are talking about pigmentation, you're talking about -- I heard you use the words some brown and a reddish-yellow hue?

A Yes.

Q Tell us about that.

A The pigmentation was a light brown and these granules were medium sized and fairly round. And in the known hairs, they were a medium to heavy in distribution, whereas in the questioned hair it was a lighter to medium. So there was a slight differentiation in that pigmentation.

Q Was -- what can you tell me about the color itself? Is that reddish-yellow hue a common color for you to see in red hair?

A You see it in about 5 percent of the population. And sometimes you'll have a red and yellow mix and we called it a strawberry blonde or depending on which is actually the heaviest, the red or the yellow.

Q Is this an unusual hair color?

A As I said, probably within the redhead population, maybe a third of the people would have that.

Q Now what else? Are there other similarities about these -- this head hair and the questioned hair, the known and the questioned, that you can tell the ladies and gentlemen of the jury about?

A As I said, they were similar in all of the characteristics that I normally study except for a few. Do you want me to name those also?

Q Yes, please. What were the differences that you observed?

A The tip was split in the questioned hair and it was not in any of the known hairs that I found. Quite often hairs split. You used to call them split ends. The way you comb or brush your hair or sometimes actually your nutrition your general health, this type of thing, will cause split ends.

Q What else did you see that would be a distinction or a difference?

A As I mentioned before, the pigmentation was slightly different being a little bit lighter in the questioned hair than it was in the known hair. The known hairs were all chemically treated from about 1 to 2 inches from the root.

Q Let me stop you there for just a minute. What do you mean by chemically treated?

A It was a dark brownish-red stain on the hairs.

Q Were the known hairs dyed?

A Yes.

Q Would that affect your comparison of the hairs?

A In this particular case, it was a very heavy dye and it did obliterate all of the characteristics from about 2 inches on up to the tip of the hair.

Q So in other words because the hair is dyed, you can't tell anything about the dyed portion of the hair, is that correct?

A In this case, that's true because of the density of the pigmentation that was put on the hair.

Q What other distinctions did you notice between the known head hair of Timothy Durham and the questioned head hair?

A The only other -- the cortical cells in the cortex were fibrous in texture in the unknown hair. And in the known hairs, they were only striated which means there was a -- the cells themselves looked rounder and more distinct in the questioned hair than in the known hairs.

Q Now did you look at the ovoid bodies?

A Yes, I did.

Q Were they similar or different in the known and the questioned hairs?

A In the head hair that I examined, they were the same. Now --

Q We'll get to the rest of it in just a minute. Let me ask

you as far as the general treatment of the head hairs, the known and the unknown, well cared for, hard treatment, could you tell?

A It was a fairly typical hair. There wasn't anything adhering to it. I didn't see any hair spray or anything like that. As I said, the end was split and since it was only a 4-inch long hair, this is fairly unusual. Usually, the split ends come from when you have longer hairs.

Q When you talk about the coloring or the coloration, could you tell the natural color of the dyed head hair?

A Yes. Because as I said, 1 to 2 inches of the hair was undyed.

Q What was the natural color?

A It was the light brown with the yellow and the reddish pigmentation or hue.

Q And when you said it had the yellow and reddish pigmentation or hue, as a layman, would we call that a redhead, strawberry blonde, brunette or do you know?

A Well usually when I'm looking at hairs under the microscope, they look somewhat lighter. They have the same color but somewhat lighter than what I see when I look at a person's head hair. And I would say a strawberry blonde with a little more red in it than the yellow.

Q You mentioned something about reddish-yellow, reddish-yellow hues being liquid; is that correct?

A That's correct.

Q But you said something about these hairs and if I understood you correctly, it was in both the known and the questioned hairs that the pigmentation, there was some fine granular pigmentation; is that correct?

A That's correct, light brown.

Q Light brown. Was that in the questioned hair and the known hair?

A That's correct.

Q In this particular case, you have record and you are reporting to the ladies and gentlemen of the jury today that the head hairs from Tim Durham and the questioned head hair from the scene were similar with unaccountable differences; is that correct?

A That's correct.

Q Explain to the ladies and gentlemen of the jury what can affect hairs to cause unaccountable differences?

A One of the biggest things that can make a difference is the length of time from when you have collected the questioned hair to when you get the known hairs.

Actually anywhere -- the closer to the time that you collected the questioned hair that you get the known hairs, these hairs will be the most similar. And as time progresses, they will change.

This change's because of, as I said, your nutrition, your

general health, your hormones, what you actually do to your hair, the cosmetics, changes that you make, even the different shampoos that you use, the way you comb your hair, brush your hair, this sort of thing make considerable differences.

In fact usually after about 2 years, it's difficult to actually do a hair comparison because of these subtle changes that take place.

Q Isn't it true that the F.B.I. normally does not even recommend a hair comparison after 2 years?

A That's correct.

Q It's not because they can't come from the same people it's because --

MR. BENNETT: Judge, I OBJECT to her testifying.

THE COURT: I'll sustain that OBJECTION.

Q (By Ms. Smith) Why do they recommend that you don't do hair comparison when the samples are more than 2 years old or when there're more than 2 years time difference? A Because of the subtle differences that can take place. Q Now when you were talking about things that could cause the subtle differences, do your records reflect the date that the questioned hairs were recovered from the scene? A Yes, I'm sure they do, just a minute.

Q The date of the offense?

A I have 5-31-91.

Q Do your reports reflect or were you aware that the known

hairs of Timothy Durham were recovered from him on or about December 20th, 1991?

A I do have that, yes.

Q So that would be at least a 6-months time span, would it not?

A That's correct.

Q Does stress affect your hair? Can stress change your hair?

A Yes, it does.

Q You said what you eat changes your hair?

A Yes.

Q How you take care of your hair?

A Yes, it does.

Q What you put on your hair?

A Just --

Q All these things affect it; is that correct?

A Yes.

Q Now did you have an occasion to -- strike that.

Directing your attention back to your report, I would ask you at this time if you would look at Item Number 7. Within Item Number 7, did you find some similar hairs with unaccountable differences?

A To that of Timothy Durham?

Q Yes, ma'am.

A Yes. 2 light brown to reddish-blond Caucasoid pubic

hairs were found which had microscopic similarities and unaccountable differences to the known pubic hairs from Tim E. Durham.

Q What was similar about the -- strike that.

How many known pubic hairs of Timothy Durham's did you have?

A 24.

Q Okay. And how many questioned hairs, pubic hairs, that you found similar with unaccountable differences did you have to compare?

A 2.

Q What was similar about those hairs?

A They were many similarities, as I said before. The fact that they were Caucasoid, they had the same coloration, the same general width, the same cross-section, they had the same type of pigmentation, the oval bodies, the cortical fusi. All these were very, very similar in both of these hairs.

Q Now when you talk about the coloring, what about the coloring? How was it the same?

A Here again, I did have some light brown pigmentation along with the red and blonde pigmentation.

Q And you have said that there are other people with reddish-blond hair; is that correct? It's not -- it's not impossible to find a person with reddish-blond hair; is that correct?

- A That's correct.
- Q But would you go so far as to say it's unusual to find those hues?
- A I have seen it in less than 5 percent of the hairs that I examined. These particular hairs were especially light. I have not found any pubic hairs as light as these before.
- Q Now the known samples you were looking at, you knew these were male pubic hairs; is that correct?
- A That's correct.
- Q Is your area of scientific investigation so perfect that you can now tell whether you're looking at male or female unknown pubic hairs?
- A No, I cannot.
- Q Now when you look at male pubic hairs, what can you tell us generally about male Caucasoid pubic hairs?
- A In general, if you have Caucasoid female and Caucasoid male, the male pubic hairs will be wider and typically the tips of them will be tapered and pointed.
- Q When you looked at the male pubic hairs of Timothy Durham, what did you find?
- A Most of them had been cut at an acute angle and they were -- they were much finer than normal. And as I said a much lighter color than normal. Also instead of being stiff, like most pubic hairs are, they were very flexible.
- Q Let me ask you this: Most of the pubic hairs had been

- cut. You mean they were cut when they were recovered?
- A They were cut on the tip end, not the root end.
- Q So you had roots?
- A Yes.
- Q And the other end of the pubic hair was cut?
- A That's correct.
- Q At what type of an angle?
- A Most were cut at an acute angle. A few were cut at a right angle.
- Q Do you associate that with scissor cut, razor cut, could you tell?
- A Most of the time when you have a scissor cut, it is at a 90 degree angle. And most of the time when you have a razor cut, it's cut at an acute angle.
- Apparently these were quite worn, so it's very difficult to actually tell, but as I said since most of them were at an acute angle.
- Q How many of the known pubic hairs of Timothy Durham were at that acute angle or were cut hairs on the ends?
- A Definitely the majority. Just a minute, I'll get those numbers.
- 16 out of the 24.
- Q 16 out of 24 were cut on the end; is that correct?
- A That's correct.
- Q How many times in your training and experience have you

- received male pubic hair that's been cut on the end?
- A This was the first time.
- Q How many of the questioned pubic hairs that you're testifying about of the questioned pubic hairs were similar with unaccountable differences to Timothy Durham had cuts on the ends?
- A Both of them had acute angle cuts with a moderate amount of wearing.
- Q So both the questioned hairs are cut and 16 of 24 known hairs are cut; is that correct?
- A That's correct.
- Q What else can you tell me about the similarities between the unknown or the questioned pubic hairs and the known pubic hairs that you compared in this item?
- A Actually I had 2 different ones and they had slight differences between them.
- The first one I called 7-1. The pigment was slightly darker in 7-1 than I found in any of the known hairs. The medulla was all clear and all of the known medulla were -- had at least some darkness to them. Approximately, it was about 80 percent light to 20 percent dark on that.
- There were a few more ovoid bodies in the questioned hair than in the known hairs. In the known hairs, there were approximately what I call rare, that you might find 5 or 10 per hair. Whereas in the questioned hair, there was about 12 to 15

- of them in there.
- And there was slightly more striations near the root of the hair on the questioned hair than in the known hairs.
- In 7-2, which was the second unknown pubic hair, there were a few striations in the root end only. Whereas all of the known hairs had a few striations throughout their body.
- The tip end was slightly darker in this particular hair and the cuticle was more damaged towards the root -- towards the tip end of that hair.
- Q Now you indicated about 20 to 25, you normally look for about 25 similarities; is that correct?
- A That's correct.
- Q In these hairs, can you tell approximately how many similarities you could readily ascertain between the known and unknown pubic hairs?
- A Well as I said, I have 4 differences in the first hair and 3 in the second, so that's about more than 20 in both hairs were similar to the known hairs.
- Q I need you to educate us just a little bit on the coloration of pubic hairs. Is there a difference in the coloration of pubic hairs on one particular individual?
- A You cannot compare say head hairs with pubic hairs, because the color can be considerably different.
- However, the pubic hairs of an individual will vary within that particular area. If -- the outer most parts of the

periphery will be usually lighter in the male and quite often the vulvar hair in the female will be lighter.

So you will a definite difference in coloration throughout that area.

Q Let me ask you this: Was Tim Durham's pubic hair coloring fairly consistent with his head hair coloring?

A It was lighter.

Q Okay. What, did it have the same reddish-blond hue?

A Yes, it did.

Q The liquid reddish-blond?

A Yes.

Q Let me ask you this: Would where those pubic hairs were pulled there, and you do request that they be pulled; is that correct?

A That's correct.

Q Where were -- would where they were pulled from, whether it was from the center or around the edges, possibly affect the lightness or the darkness of the hair?

A Yes, it does.

Q You told the ladies and gentlemen of the jury that unaccountable differences may be explained by certain things?

A Yes.

Q Would those things affect pubic hair in the same way that it would affect head hair?

A Yes, it does.

Q So what are we talking about here with regard to unaccountable difference in the pubic hair? What could account for that?

A Well of course, as I said before, the length of time between the getting of the questioned hair and the known hairs is very important. And that's, as I said, the location of these particular hairs comes from is a very important variable.

But also where -- what type of clothing a person wears will indicate whether or not you have more wearing on the tips of the pubic hairs or not. If you have tight jeans, for instance, you will have -- the cuticle will be more frayed than you have if you were wearing loose clothes.

Q Would what you eat affect your pubic hairs, also?

MR. BENNETT: Your Honor --

A Yes. The same as for the head hairs, yes.

Q (By Ms. Smith) Now the known and the unknown weren't dyed as far as the pubic hairs, were they?

A No, they were not.

Q Would stress?

A Yes. Anything that affects your general health, your general nutrition, your hormones, anything like that will affect what is going on in your hairs.

Q Would even hygiene affect your hair?

A Yes, of course.

Q Why doesn't pubic hair just keep growing and growing?

A All hairs have limitations to their length and this is genetically determined by each individual. The average head hair on a person will only grow to a maximum of 40 inches.

Now there are some people whose hair will just seem to grow on forever, but that means that in their genes they do have a tendency for the hair to grow longer.

However, no hair will grow forever. Typically, a head hair will grow at approximately one half an inch a month. So you can kind of figure out how long a head hair has been in the body.

And pubic hairs are the same. Typically, pubic hairs are no longer than 3 to 3 1/2 inches in length and they will grow at about a third of an inch per month. So typically a pubic hair will last between 6 and 8 months and this is typical for most hairs the body, except for the head hairs.

Q So the pubic hairs, for lack of a better word, after 6 or 8 months, do you have a whole new set or a whole new crop of pubic hair?

A Well they don't fall out all at once, because each one is independent to the root follicle that it's growing out of.

But it's true that you -- as you're losing them, probably within 6 or 8 months, you won't have the same, as you say, crop.

If they had been all dyed at one time, you would definitely notice that you have lost all your dyed pubic hairs.

Q Now you're saying to these ladies and gentlemen with regard to the head hair that you found that was similar with unaccountable differences, there were more than 20 similarities?

A That's correct.

Q And you're saying to the ladies and gentlemen of the jury that there were more than 21 similarities, I believe, in 1 pubic hair and more than 22 similarities in the other pubic hair; is that correct?

A That's correct.

Q Now you indicated specifically that the cut edge of the known pubic hairs and the uncut, I'm sorry, and the cut edge of the questioned pubic hairs were both at an acute angle. You've never seen that before; is that correct?

A Not in males, I have seen it in females.

Q Okay. Now with regard to the flexible and straightening nature of the pubic hairs, you indicated that there was something odd or unusual about all of the known pubic hairs of Tim Durham and the head hairs and about all of the questioned pubic hairs, the 2 questioned pubic hairs, and the 1 head hair that were similar with unaccountable differences to Tim Durham; is that correct?

A Yes, that's correct.

Q What was it? What was unique about those?

A With the head hair, it was the fact that the hair was



very difficult to mount and this is because of the fact that instead of just being oval like most Caucasoid hair, it was oval to round and this caused -- when I put in the mounting media for the straightened mount, instead to being able to curve, this is the head hair.

In the pubic hairs, they were flexible. Whereas when I took them in the mounting media and actually laid them down, they stayed exactly where I put them. Normally, with pubic hairs, they are what you call stiff or rigid and you cannot do that with them.

You have to take them as they are and lay them out, attempt to get them on the slide. You cannot pick up one end and put it down. It will actually revert to the actual shape that it was originally in.

Q And this was exactly the same in the questioned and known hairs; is that correct?

A That's correct.

Q And have you ever had that happen before with Caucasoid hair?

A I have seen it one time when I was doing a post-pubescent girl. She had very fine ones, but that's the only time.

Q In this particular case, Tim Durham's hair and the questioned hair both reacted the same way; is that correct?

A That's correct.

Q After you completed your examination of this hair, did

you maintain custody and control of these items until they were checked out from you by another lab technician?

A No. The 2 known pubic hairs, I sent to GeneScreen.

Q All right. What date did you do that, do you recall?

A 4-21-92.

Q And were they packaged according to recommended procedure?

A Yes, they were.

Q And how were they sent?

A They were sent by Federal Express and I'm sure there's a date there. It was on the same day. It was sent by Federal Express.

Q Let me ask you this: Did you maintain custody and control of the other items that you checked out from the property room until Ann Morris or someone else from your office checked some of those things out from you?

A Either that or I checked them back in the property room.

Q Do your records reflect that Ann checked some of those items from you for testing and then returned items to you?

A Yes, she did.

MS. SMITH: If I may have a minute, please, Judge?

THE COURT: Okay.

Q (By Ms. Smith) Thank you.

MS. SMITH: Pass the witness.

THE COURT: Mr. Bennett, you say you want to take

your mid-morning recess now?

MR. BENNETT: Yes, sir.

THE COURT: All right. Ladies and gentlemen, we'll take our mid-morning recess. Same admonishment's in effect. Keep the conversation down, if you would. 15 to 11 by the clock on the wall.

And you need to come back then.

THE WITNESS: Okay.

THE COURT: Court's in recess.

(A recess was taken.)

THE COURT: The record reflect that the parties are present and you're still under oath.

All right. We'll have cross-examination now, Mr. Price.

MR. PRICE: Thank you, Your Honor.

#### CROSS-EXAMINATION

BY MR. PRICE:

Q Ms. Cox, I believe that you testified that you spread out the vacuum sweepings on a large piece of paper in your room and then sorted that material; is that correct?

A That's correct.

Q And then that material reflects material that was left there by a person, drifted in on the air and settled at the surface that was vacuumed?

A That's correct.

Q And what do you do to insure that things from your

laboratory do not settle on that piece of paper while you sort?

A I turn off all the air vents so that there's no air movement in the air itself. And as I said, the paper is quite large. I wear a lab jacket and gloves so that I don't contaminate it and so that nothing is lost.

Q And I believe you're paid by the government; is that correct?

A By the City of Tulsa, yes.

Q Okay. And you're here on their behalf; is that correct?

A I am here to testify on my report.

Q And who asked you to be here?

MS. SMITH: Judge, I'll stipulate I have called Carol Cox --

A Sarah.

MS. SMITH: -- as a witness for the State of Oklahoma.

THE COURT: That's the answer to the question. All right.

Q (By Mr. Price) And the specimens that you evaluated in this case were in the custody of the government also; is that correct?

A Yes. I got them from the property room.

Q And I believe you testified that in your field of forensic specimen examination, you used the terms consistent with and similar; is that not correct?

A Yes, that's correct.

Q And that consistent with means that on a hair that it's like the known hair and that you have 1 hair that is identical to the other?

A That's correct.

Q From the known and the --

A The questioned hair, there is 1 known hair that is its match.

Q Okay. And that a similar hair has similar characteristics, but no one to one match?

A That's correct.

Q And unaccountable differences are differences that you cannot account for. Would that be a reasonable assumption?

A That's if I have any knowledge of, yes, that's correct. I have no knowledge of what caused the differences.

Q All right. And there were certainly unaccountable differences, according to your report, in the hairs that you discussed during the direct examination?

A That's correct.

Q All right. And you went on to testify as to what -- how you could account for those differences; is that correct?

A I gave some presumptions as to what things can influence hairs.

Q All right. But you can't use that to account for the differences. Is that what you're testifying to?

A That's true. They're just things that they know will affect and cause differences.

Now for the dying, of course, that is something that is definitely accountable. I can say that the known head hairs were dyed and that is an accountable difference.

Q Okay. Ms. Cox, did you issue a laboratory report on 6-30-1992 as to your findings --

A Yes, I did.

Q -- on these hairs? And did you mention that dye that you can account for in that report?

A No, I did not.

Q Okay. And in that multi-page report, there's no mention of dye?

A I did not mention it there. I just told the color of the hair.

Q Okay.

A I believe on his knowns.

Q You sorted out a great many things other than just hair from those 2 vacuum specimens, did you not?

A That's correct.

Q And the vacuum specimens were identified to you as a couch?

A Yes. Number 6 was from a couch, it said.

Q Do you know if the entire couch was sampled?

A No, I don't. It just said -- it was labeled as vacuum

from couch.

Q From your analysis, can you tell me what color the couch was?

A Possibly. I might give you a good idea, let's see, depending on what I saw in it.

No, I don't have any -- I did not report that; on 6, soil, botanical, insect parts.

Q In your report, there's no mention that there was a single fiber that you could identify?

A I do not have fibers listed here and I did on everything else.

Q All right. What is botanical material?

A Leaves, grass, limbs, whatever, some sort of plant material.

Q Pollen?

A Sometimes I find pollen.

Q Did you make any findings as to whether the pollen were consistent with this part of the country?

A I would if I were asked to do so, yes.

Q But you were not asked to do it?

A No, I was just asked to do the hairs.

Q Identify insect parts. Can you tell the jury what insect parts you found?

A Most of the time I find such small parts, it's fairly difficult to tell. But if asked to do so, I would probably

take it to the entomologist at TU and he would attempt to do that.

Q Okay. Now on Item Number 6, your testimony was concerning a single pubic hair; is that not correct?

A On Number 6, I believe it was a single 4-inch head hair.

Q Okay.

A Yes, that's correct.

Q I apologize. Your testimony involved a single 4-inch head hair?

A Yes.

Q And you did find on Item Number 6 also pubic hair, did you not?

A Yes, I did.

Q And you have not testified as to the identity of those; is that correct?

A I can only state that they were not consistent with Timothy Durham's pubic hairs.

Q You do not know where they came from, do you?

A No, I do not.

Q You don't know if it was a member of the family, do you?

A No, I don't.

Q You don't know whether it was somebody else that came in and the jury does not know about, do you?

A I have no idea whose hair it was or when it was placed there, no.

Q Now let me go to Item Number 7 which I believe you've testified to were the vacuuming from the day room; is that not correct?

A From the floor of the day room, yes.

Q All right. And do you know what part of the day room was vacuumed?

A No, I do not.

Q Okay. And you have identified in Item Number 7 that you discovered a moderate number of animal parts?

A I looked that up. That was brought to my attention. They were insect parts, sorry, was a typographical error on my part.

Q So those were insect parts?

A That's correct.

Q Okay. Do you know what type of insect?

A I did not examine them for that. As I said, they were fairly small pieces and probably would have been very difficult to actually identify.

Q And on your report in addition to animal parts on Item Number 8, you found 1 animal; is that correct?

A On which? Which, Number 7?

Q Number 8.

A Number 8?

Q In your report?

A 1 animal hair.

Q You see Number 8-D?

A Yes. 1 animal hair, that was from her --

Q Okay. And your report says 1 animal hair?

A It should say 1 animal hair, yes. That was from her pubic combings. But it was an animal hair, not a human hair.

Q Now when you mounted the hairs from Item Number 7 -- and I believe you testified that you mounted them on glass slides?

A That's correct.

Q And you testified to a mounting medium?

A That's correct.

Q Can you tell the jury what that mounting medium was?

A The name of it is called Permout. It's a synthetic residence.

Q Okay. And why is it used?

A Because it is not a permanent mounting medium. It can be removed and you can take the hair off of it and use it for other tests if you need to.

Also it's -- you can see through it and it is approximately the same refracted index that the hair is, so it makes the hair easier to see through.

Q And you tell us it's called Permout?

A That's the name of it, yes. But other synthetic residences can be used.

Q Is that water soluble?

A No, it is not.

Q Tell the jury what you have to do to dissolve it?

A Actually, the Permout comes ready-made, but it is made in a xylene-type of base to make it more fluid and you can dissolve it in xylene or toluene.

Q Will you tell the jury what xylene or toluene is?

A It's a hydro-carbon based type of liquid. Is that -- I'm sorry --

Q I just needed -- the jury doesn't know what xylene and toluene is probably, except for -- I believe we have some people that work in a petroleum industry.

A All right. It's non-water soluble type of compound that is hydro-carbon based and you can quite often find it in things like paint stripper and things like that.

Is that adequate for you?

Q Yes, ma'am. And were any of those specimens sent off for testing, for DNA testing?

A Yes, they were.

Q Okay. And in what state were they sent off?

A I sent them on the slides.

Q Okay.

A And they came back on the slides with roots missing.

Q Still mounted?

A They replaced them on the slides, so they wouldn't be

lost. But they had -- what they do is they come in and dissolve the mounting media and I don't know which they use the

xylene or the toluene, and remove it, wash it very carefully, cut the end off and then -- the actual root off and do the DNA and they replace it on to the slide itself.

Q And I believe that you had testified that some of the hairs that you examined were dyed; is that not correct?

A That's correct.

Q And do you know what the nature of that dye was?

A No. It was a very, very heavy reddish-brown dye.

Q Okay. And in your training, you've certainly worked with dyes; is that not correct?

A Yes. I've done some that are chromatopathy on dyes, but since the questioned hairs were not dyed, there was nothing to actually compare it with.

Q And then in fact all the internal structure of those hairs that have been dyed were obliterated?

A Yes. They were from about 1 to 2 inches from the root. But there was 1 to 2 inches on each hair that did not have any dye in them.

Q And you based your evaluation on those 1 to 2 inches only?

A That's correct.

Q Does pigment in hair change as the hair grows?

A Yes, it does.

Q What's the nature of that change?

A Typically -- well it's genetic, but quite often in pubic

hairs, their first growth is almost colorless and then it gets darker and then within the large area of the tip end, it becomes fairly heavy if it's going to be a heavy pigment of hair.

Then it gets somewhat lighter and then towards the root end, the pigmentation slowly goes -- gets lesser and lesser and particularly in those hairs that are no longer growing if the hair itself is still growing or the pigmentation is still fairly dark.

But if you have a hair that is no longer growing, then the pigmentation is quite light and if it is actually a dead hair, as we call it that's getting ready to drop out, typically you'll find very little pigmentation in the root itself.

Q Now of the hair that you recovered from the vacuum cleanings, can you tell me when those hairs were brought in by whoever?

A I can tell you whether or not it is -- was probably forcibly removed or not and possibly whether or not it was an actively growing hair. Just a moment.

Are you talking about the head hair now?

Q I'm asking you about any of those specimen hairs that you recovered that --

A Okay.

Q -- have what you claim to be some similarities with the defendant in this action?

A Yes.

Q Can you tell me when those hairs were left at the scene?

A When they are actually left at the scene, no, I'm sorry, I cannot do that.

Q Can you tell me if they were left 20 years ago?

A It's very unlikely. Hairs typically can stay for any length of time if there's no disruption like if it was in a grave or something like that.

But typically after a week or so, there's a changeover, like people have cleaned and removed the hairs and fibers that have fallen. So you can't -- I mean the likelihood of it being there 20 years, unless it was a sealed room, is very unlikely. But I can't give you any specific time, no.

Q But you don't know when that sofa was cleaned or how it was cleaned?

A No, I don't.

Q And you don't know when the hair was left there or the mechanism by which it was left there?

A No, I don't.

Q You don't know if it blew in from outside, do you?

A No, I don't.

Q And you base your prior testimony on the vacuuming from a sofa and from the floor of that room on how many individual hairs?

A I actually found 3 of the questioned hairs that I

examined that had similarities and unaccountable differences with those known hairs from Timothy Durham.

Q And you compared, other than with [REDACTED] hair, no other hair of occupants of that house?

A Those were the only knowns I had, yes.

MR. PRICE: Pardon me just a minute.

THE COURT: Okay.

MR. PRICE: Pass the witness, Your Honor.

THE COURT: All right.

MS. SMITH: 1 question.

THE COURT: Okay.

#### REDIRECT EXAMINATION

BY MS. SMITH:

Q Have you testified today to the ladies and gentlemen of the jury as truthfully and accurately as possible?

A Yes, I have.

THE COURT: Is that it?

#### RECROSS-EXAMINATION

BY MR. PRICE:

Q Does your testimony today differ from the report that you issued on 2-18-92?

A No. I believe that what I said in my report is how I feel today. Is that the question?

Yes, it is as I feel -- as I believe today.

Q Is there anything in this that says cut hair?

A I did not describe the actual characteristics of the hair in my report.

Q Okay. Is there anything in here that says dyed hair in your report?

A I did not describe those characteristics, no. I have them in my notes.

MR. PRICE: Pass the witness.

THE COURT: Is that it?

Thank you, appreciate you coming to court.

MS. SMITH: State would call Ann Morris to the stand.

THE COURT: All right. Next witness is Ann Morris, please.

If you'll place your left hand here, please, and raise your right hand.

Do you solemnly swear the testimony you're about to give in the cause now on trial will be the truth, the whole truth and nothing but the whole truth, so help you God?

THE WITNESS: I do.

THE COURT: Have a seat, please.

ANN MICHELLE MORRIS,

after first being duly sworn, testified as follows, to-wit:

#### DIRECT EXAMINATION

BY MS. SMITH:

Q Would you please state your name and spell your last name for the record?

A Yes. Ann Michelle Morris, M-O-R-R-I-S.  
 Q Where are you presently employed?  
 A I'm employed by the City of Tulsa, assigned to the Tulsa Police Department Forensic Laboratory.  
 Q And the length of time you've been so employed?  
 A 6 years.  
 Q What is your area of expertise, if you will, or your area of specialization with the Tulsa Police Department?  
 A I work in the Department of Serology.  
 Q What is serology?  
 A Serology is basically the identification and characterization of body fluids that are usually found in a dried state form in any type of crime.  
 Q It's blood, isn't it; is that correct?  
 A Blood is one of the body fluids.  
 Q Also semen?  
 A Yes.  
 Q Did you have -- strike that.  
 What's your educational background?  
 A I have a Bachelor's of Arts degree in serology from Olivette Nazarene University with a minor in chemistry.  
 Q Prior to coming to work for the Tulsa Police Department, where did you work? What did you do?  
 A Straight out of college, I worked in a business in Indianapolis, Indiana called Graham Electronic's and then I

transferred down here and got the job at the Tulsa Police Department Forensic Laboratory.

Q Did you train under any particular individual or attend any particular classes or seminars in educating yourself specifically in serology area?

A Yes, I did. I was trained by forensic chemist Rebecca Rush for approximately 2 years and I am a member of the Southwest Association of Forensic Science.

I have attended several work shops and several seminars in this organization. I also have been to the F.B.I. school of serology and have been trained by the F.B.I.

Q Have you kept abreast of current developments in the field of serology?

A Yes, I have.

Q Let me ask you: Did you have an occasion to check out either from the property room or Carol Cox items used for your examination in this particular case?

A Yes.

Q Under what property receipt number were these items placed?

A AB-0758.

Q With regard to these particular items, what did you personally examine?

A I personally examined the whole blood samples from both the suspect and the victim, the saliva samples from the suspect

and the victim, items in the sexual assault kit which were the external genitalia swabs, the anal swabs, and also the control swabs and then a swimsuit that was collected from the victim, a pair of shorts and a T-shirt that were also collected from the victim.

Q When you received these, with the exception of Carol Cox breaking the seals of some of these items, were they sealed in an untainted condition?

A Yes, they were.

Q When you received these items, how did you go about preparing them for your analysis?

A I place my mark with -- on each piece of evidence with also the date of examination of the evidence.

Q And what is your mark?

A My initials.

Q And what are they?

A AMM.

Q In order for you to do a proper examination, do you take, for instance, the whole swimsuit and put it under the microscope?

A No, I do not.

Q What do you do?

A I examine the swimsuit for any types of stains that I can see with the eye and also seminal stains with fluorescence, so I use an UV light, if it's requested to look for seminal stains.

And then I will take a cutting from that particular item, in this case a swimsuit, and make a cutting of the stain that I have observed. And then do the testing from the cutting.

Q Do you also do a control cutting with that?

A Yes, I do.

Q What's the purpose of the control cutting?

A The purpose of the control is to show that the particular materials that I'm dealing with do not give any type of reaction to any of the tests that I run.

Q Now you indicated, excuse me, that in the evidence that you received from the property room and from Carol Cox that you had known samples from a suspect and from a victim; is that correct?

A Yes.

Q Did you identify those individuals by name?

A Yes, I did.

Q What -- who were -- who did the known suspect samples belong to?

A To Timothy Durham.

Q And what samples did you have that were his?

A 2 vials of whole blood and a saliva sample.

Q Now you also indicated you had known samples from a victim. Who did you identify the victim as being?

A [REDACTED]

Q What samples did you have from her?

A Again 2 vials of whole blood and a saliva sample.  
 Q Did you ascertain the blood type of Timothy Durham?  
 A Yes, I did.  
 Q And what is it?  
 A Blood Type O.  
 Q Did you ascertain the blood type of [REDACTED]?  
 A Yes, I did.  
 Q And what is her blood type?  
 A Blood Type O, also.  
 Q What questioned items did you look at?  
 A I looked at, from the sexual assault kit, the vaginal washing, the oral washing, the external genitalia swabs and smears, the anal swabs and smears and then the control swabs. And then the swimsuit and a pair of shorts and a T-shirt.  
 Q Directing your attention to Questioned Item Number 3, did you find anything?  
 A Yes. On Question Item Number 3, which is the external genital swabs and smears obtained from the victim, I obtained positive acid phosphatase.  
 Q What is acid phosphatase?  
 A Acid phosphatase is an enzyme that is found in seminal fluid. It is called a presumptive test for seminal fluid, because it indicates the presence of seminal fluid, but it's not conclusive for seminal fluid. It can be found in vaginal material, vaginal washings, et cetera.

Q What is Number 3?  
 A External genitalia swabs and smears.  
 Q Directing your attention to Questioned Item Number 4, what was that?  
 A That was the anal swabs and smears taken from the victim.  
 Q What did you find there?  
 A Again positive acid phosphatase.  
 Q What is Positive P30?  
 A Positive P30 -- P30 is an enzyme that is specific for seminal fluid. It is a conclusive test that says -- if it is positive, seminal fluid is present.  
 Q Did you find or did you have a result of Positive P30 for either of these swabs?  
 A Yes, I did.  
 Q Did you find anything else from those swabs pertinent to your testimony today?  
 A Yes. I found Antigen H activity which means that I found the presence Antigen H correlates with blood Type O, which means with the presence of Antigen H activity, most likely the seminal fluid and or vaginal washings or mixture, would be coming from a person with blood Type O.  
 Q That's consistent with [REDACTED] and with Timothy Durham; is that correct?  
 A Yes.  
 Q Now [REDACTED] doesn't produce seminal fluid; is

that correct?  
 A Right.  
 Q Did you find any genetic markers?  
 A I only found genetic markers in my known samples from the whole blood from both the victim and the suspect. The genetic markers in the questioned samples were inconclusive.  
 Q Can you explain that to the ladies and gentlemen of the jury?  
 A Being inconclusive either means that the results that I received were so weak that I could not interpret the results or there were no results. And there would be various reasons why this could happen. Most likely one of the main reasons is there's bacteria growth within the sample and that will degrade the enzymes.  
 Q Did you also have an occasion to look at Questioned Item Number 6?  
 A Yes, I did.  
 Q What was Questioned Item Number 6?  
 A There was -- this was the swimsuit that was obtained from the victim.  
 Q Did you have an occasion to make a cutting from that swimsuit?  
 A Yes, I did.  
 Q Did you examine that cutting?  
 A Yes.

Q What were the results of your findings from your examination of that cutting?  
 A Again positive acid phosphatase, Positive P30 and Antigen H activity was detected and the genetic markers were inconclusive.  
 Q In your report, you use the term, and forgive me if I mispronounce it I'd rather use the initials but I won't, phosphoglucomutase?  
 A Glucomutas.  
 Q Glucomutas. PGM?  
 A Uh-huh.  
 Q What is that?  
 A PGM is a genetic marker that is prominent in seminal fluid and that's a particular genetic marker we will look for in cases dealing with seminal fluid.  
 Q PGM 1-1 is detected in the known blood sample for whom?  
 A For the suspect Timothy Durham.  
 Q And PGM 2-1 is detected in the known blood sample for whom?  
 A For the victim [REDACTED]  
 Q Did you find this PGM, either of these PGM indicators in any of the samples that you looked at?  
 A No, I did not. Again the genetic markers were inconclusive.  
 Q Does everybody have some form of PGM?

A Yes, they do.

Q What does that indicate? What does the absence of the PGM -- I'm going to call them markers if it's all right.

A That's fine.

Q What does the absence of the PGM marker in all these samples, all the questioned samples, indicate to you?

A Well it indicates, again like I explained before, that there's some type of -- that's causing the degradation of the enzymes in the sample.

It could be that the sample is just too weak. There's not enough seminal fluid present, not enough vaginal washing present or, again, bacteria growth is present and it's degrading the enzyme.

Q Upon the completion of your examination or sometime during your examination, did you make dried blood slides samples?

A Yes, I did.

Q Why did you do that?

A I -- in obtaining the whole blood sample and I will do a blood typing of the whole blood sample and then I will immediately make a dried blood sample from that whole blood to preserve that for any further testing or comparison that is requested by the court system.

Q Did you package and maintain the slides that were the result of the known dried blood samples of the victim [REDACTED]

[REDACTED] and the suspect Timothy Durham upon your completion of your examination?

A Yes. Again, they are not slides. They're swatches. We make them on sterile swatches.

Q Did you also package and maintain the swimsuit cutting that was, I believe, Q-6; is that correct in this case?

A Yes.

Q Did you also maintain that in a protected environment?

A Yes. Again, the samples are stored in our serology freezer in the Tulsa Police Department Forensic Lab.

Q Now after you or while you were maintaining them in your protected custody, did you have an occasion to package those and send them somewhere else?

A Yes, I did.

Q What was packaged and sent?

A The known blood sample, dried blood sample swatch, from Timothy Durham, the known dried blood sample from [REDACTED] and the swimsuit cuttings.

Q Where did you send those?

A I sent them to GeneScreen in Dallas, Texas.

Q How did you package them and send them?

A Again, I packaged them with my initials and tape sealed and initials across the seal so that I would know if the seal was broken.

Q By what medium or method did you send them to GeneScreen

in Dallas?

A Federal Express.

Q Is that the common method of transportation when you are transporting evidence of this kind?

A Yes, it is.

Q Now when you packaged these and sent these to GeneScreen did you label and identify the items for GeneScreen's consideration?

A Yes, I did.

Q How did you label them?

A I labeled them on the front of each of the envelopes that were taped sealed and initialed exactly what each particular envelope contained. And each particular item I sent, I sent them in separate envelopes.

Q And in labeling them, did you identify by name the known samples from each individual?

A Yes, I did.

Q Did you also identify from origin the swatch that you sent regarding the swimsuit?

A Yes. I identified that it was a swimsuit cutting, a cutting from the swimsuit obtained from the victim.

Q Thank you.

MS. SMITH: If I may have a moment, Judge?

THE COURT: All right.

Q (By Ms. Smith) Did you maintain custody and control of

the other items that you examined in this case until they were either returned to Carol Cox or returned to the police property room under AB-758?

A Yes, 0758.

Q 0758. Thank you

A Yes.

MS. SMITH: Pass the witness.

THE COURT: All right. We'll have the cross-examination, Mr. Price.

MR. PRICE: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. PRICE:

Q Now on your PGM, or the phosphoglucomutase, you found no reportable evidence of any of the phosphoglucomutase from any of your Q-labeled specimens, did you?

A No, I did not.

Q And that includes all the washings, the swabs, the swimming suit; is that not correct?

A It does not include the washings. We do not run washings for genetic markers.

Q Right.

A Being that they're collected with saline and saline interferes with genetic markers.

Q So in your report you made, phosphoglucomutase played no role; is that correct?

A Correct. The genetic markers were all inconclusive for the questioned samples was examined.

Q And you're not here to testify that that has any relevance in this case, are you?

A Right.

Q Did you examine any of those specimens for sperm?

A Yes, I did.

Q And your findings?

A Spermatozoa's not detected in the external genitalia swabs, the smear made from those particular swabs, the anal swab and also the swimsuit.

Q Thank you. In reference to your swimsuit specimen, can you tell the jury what the nature of your cutting was from the swimsuit?

A I don't think I quite understand the question.

Q All right. Can you tell us how much material and from where in the swimsuit you did your analysis?

A I would need to look at the swimsuit again. I can't remember it from memory, but the cuttings are present. The swimsuit was, again, packaged as -- after I cut it, packaged and sealed and returned to the property room.

Q Okay.

MR. PRICE: Do we have --

MS. SMITH: Yes. It's into evidence. It's Number 1, State's Number 1.

MR. PRICE: May I approach the witness?

THE COURT: Sure, show it to her.

Q (By Mr. Price) I'm handing you an envelope and what's been identified as a swimsuit and labeled Exhibit Number 1. Does that refresh your recollection as far as the swimsuit is concerned?

A Yes, it does.

Q And you can identify that as the swimsuit that you examined?

A Yes, I can.

Q Okay. And there is a portion of a swimsuit that has been removed from the right upper front, I believe; is that correct?

A Yes.

Q And did you remove that portion of swimsuit?

A Yes.

Q And when did you remove that?

A I removed it on February 21st of 1992.

Q Okay. Do you see any other portions of that swimsuit that you removed?

A Yes. The crotch area of the swimsuit was the cutting that I obtained. The cutting up here, it is the control sample that I obtained.

Q And for the jury, can you tell them approximately how much tissue -- how much swimsuit and where you removed that piece of fabric from?

A It's approximately -- it's the crotch area of the swimsuit here. So I'd say that's approximately 4 inches in this area here and then the small sample here for my control sample approximately a couple inches across.

Q And if I may -- then you removed a piece of fabric that was more or less shaped kind of like that; is that correct?

A Yes.

Q Well this being the back, if you will, and that being the front, did you make any further cuts on that piece of tissue, on that piece of fabric?

A As far as for my testing, all testing, I'd have to cut samples out, yes.

Q Do you remember how many samples you cut out?

A No, I do not, several.

Q More than 2?

A Yes.

Q Okay. Do you know -- do you have a standard protocol you follow in removing such fabric?

A A standard protocol -- I'm not quite understanding you.

Q In other words in your method of doing these studies, do you remove fabric from any particular portion on that piece of fabric that you remove?

A Yes, yes. The area where the stain is and that would be the area that I cut out would be where the particular stain is. So that whole area would have a stain on it.

Q Did you write a report concerning your evaluation of this piece of fabric?

A Yes, I did.

Q And in that report, does it tell us whether there was a stain or not?

A No, it does not.

Q Okay. As you sit here today, do you recall if there was a stain?

A Yes, there was.

Q Okay. And can you recall it sufficiently so that you can describe it to us?

A The stain, I did not make any cuttings unless there is a stain present. I would not just cut out a piece of material and do testing on it unless there is some type of stain present.

And again, this was a swimsuit material. I was looking for the presence of seminal fluid and when I collected that evidence, I immediately looked at it with an UV light and, again, seminal fluid does fluoresce.

If I have the presence of fluorescing, I will make a cutting. I also run what is called a presumptive test for acid phosphatase and that is telling me that there's -- if it's a positive test that it indicates that the presence of acid phosphatase is there.

And that is when I make the cutting on the material.



Q Okay. As you sit here today, do you have a visual recollection of what that stain looked like and it's location?

A I have a recollection of it was the crotch area. As far as visually seeing the exact stain, I know that I would have not cut out the whole crotch if it would not have been a stain for the whole crotch area.

Q Thank you. Do you believe you could fairly represent it by drawing on that piece of fabric?

A No, I could not.

Q Thank you. Do you remember the color of it?

A No, I do not.

Q Do you remember if you had to use a fluorescent light to find it all?

A Yes, I did use a fluorescent light.

Q Do you remember if you had to use a fluorescent light to find it?

A I don't understand the question, had to.

Q That you did not see the limits of the stain until you used the fluorescent light?

A No, I did not. I could still probably most likely see a stain. What I'm looking for with using the fluorescent light -- I mean the UV light is to see it fluoresces. That's the reason why I use the -- not to show me exactly where the stain is present, I can see that in most cases. You can see that with the eye. It is to see if the stain that I'm looking at

fluoresces or not.

Q Okay. Now I've asked you this but I want to ask it more carefully and I want you to listen to me carefully.

As you sit here today, do you recall anything unusual about the stain on that piece of fabric?

A No, I do not.

Q What does a usual stain then on your specimen, such as the fabric from the crotch of that swimsuit, look like? Describe to the jury it's physical appearance.

MS. SMITH: OBJECT to the form of the question, because it would be different for different types of stains, I would suspect.

THE COURT: Overruled. You can answer the question.

A It's different for each different material that the stain is present on. I've obtained stains present on hard objects like a knife, to cardboard, to material from --

Q (By Mr. Price) I'm sorry we're in reference --

A Clothing material.

Q -- to a piece of material like that.

A Right. But again, I'm not for sure exactly what this swimsuit is made of and there are all kinds of different, different kind of material, even in clothing material and the stain is going to look different.

I can give you what a basic seminal fluid stain might look like. But it's not -- I'm not going to guarantee you that

that is exactly what this stain looked like without the cutting here present.

Q Tell the jury of the usual ones on fabric, what the color is?

MS. SMITH: OBJECTION, relevance.

THE COURT: Overruled.

A Usually a color of a seminal stain will be anywhere from a yellow color to no color at all to having a crusty look to it.

Q (By Mr. Price) And you have no reason from your recollection and your report to believe that this would have been any different?

A No, I do not.

Q You evaluated this specimen both with your enzyme studies and your blood group studies, and did you find anything that would either include or exclude any individual?

A The only characteristic I found that are consistent is the Antigen H activity in the requested samples which again indicates a Type O person. Which in this particular case, both the victim and the suspect are Type O.

Q The answer, I believe, then to my question is you found nothing to include or exclude anyone; is that correct?

A I found evidence that is consistent with the known samples of both the suspect and the victim. But I cannot eliminate the suspect from this case.

Q And indeed because the victim is Type O, the Antigen H is going to be there anyway; is that correct?

A Yes.

Q So if we look Antigen H, if it's present, it's going to be present anyway?

A Yes. Because the victim is Type O and the suspect is also Type O.

Q Under -- you did not run your ABO on the fabric, did you?

A Yes, I did.

Q Okay. I didn't see it in the report.

A Yes, on -- are you talking about the swimsuit?

Q Yes, ma'am.

A Yes.

Q Okay. And your results were Type O?

A Where Antigen H activity was present.

Q Which the victim secretes?

A Yes. Both the victim and the suspected are secreters.

Q And indeed the only thing on your evaluation of that specimen that gives you any additional information is the fact that you do have acid phosphatase and P30?

A And P30, yes.

Q Okay. And negative sperm?

A Right.

MR. PRICE: Just a minute, Your Honor.

THE COURT: All right.

THE WITNESS: Could I correct my last answer as far as --

THE COURT: Sure.

A You said negative sperm. Sperm was not detected. That does not mean negative sperm, that does not mean that the sperm is not there. It's just that in the particular slides and smears that I looked at, I did not detect any sperm present.

Q (By Mr. Price) But you still base your sample upon your fluorescent studies? Did you --

A I didn't understand the question.

Q Did you select from the area for evaluation for sperm that area that you had noted fluorescence?

A Yes. They are either fluorescent in the area that was positive for my presumptive test for acid phosphatase.

Q And you performed a careful examination?

A Yes, I did.

Q You knew that examination was going to be very important to -- in a criminal case?

A All my examinations are important.

Q And performing such a careful examination, you found no sperm?

A In the -- in the samples that I made the smears on, I did not detect sperm. Does not mean that it is not there, it --

Q You have to answer my question.

THE COURT: Just answer his question.

438

A What is your question?

Q (By Mr. Price) The answer is knowing all that and performing your careful examination, you found no sperm; is that correct?

A Yes. The spermatozoa was not detected.

Q Do you engage in any proficiency testing as far as your laboratory is concerned?

A No, we do not.

Q Do you know if proficiency testing extramural from out of house is available for laboratories such as yours?

A Yes, I believe it is.

Q In other words, a third party would send your laboratory unknowns and rate on you on your performance. Is that what proficiency testing means to you?

A As far as I'm aware of, some laboratories throughout the United States are doing what is called proficiency testing, but our laboratory is not and I don't know exactly what is involved in the proficiency testing.

Q Do you have any extramural evaluation of your laboratory as far as accuracy of a result is concerned?

MS. SMITH: OBJECTION, asked and answered.

THE COURT: Overruled.

A No, we do not.

MR. PRICE: One more moment, Your Honor.  
Pass the witness, Your Honor.

439

THE COURT: All right.

MS. SMITH: Just briefly, Judge.

REDIRECT EXAMINATION

BY MS. SMITH:

Q Let me ask you something, Ms. Morris, you were trying to explain to Mr. Price when you talked to him that just because you didn't see spermatozoa did not mean it wasn't present; is that correct?

A Yes.

Q Have you seen the results from GeneScreen?

A Yes, I have.

Q Are you aware of whether or not they in fact found sperm?

A Yes, they did.

Q Do you disagree with that finding?

A No, I do not.

Q Can you explain why it is that you didn't find sperm?

A Again, the particular samples that I made soakings on and everything, the one explanation could be that the spermatozoa's there. There was not a lot of presence of spermatozoa and therefore I may or I may not see any sperm if it's not there in a great quantity.

Q Are the tests performed through DNA more specific or more intricate tests as opposed to the test performed in your lab looking for spermatozoa to the best of your knowledge?

MR. PRICE: Your Honor, I don't believe she's laid

440

foundation for that.

THE COURT: Do we have somebody coming in to tell us about that?

MS. SMITH: Um-hum.

THE COURT: I'll sustain the OBJECTION. They can testify what they did.

MS. SMITH: All right.

Q (By Ms. Smith) Mr. Price said that PGM wasn't relevant to this case, did he not?

A Yes, he did.

Q Would you agree with me or is it relevant to show that all of the samples you were looking at had degraded to the extent that you couldn't find PGM?

A It was -- as far as all my questioned samples, genetic markers were inconclusive. As far as finding PGM, I did find PGM in the known samples, the whole blood samples.

And if I do not find genetic markers in the questioned samples, I can't do any comparison whatsoever.

Q For every human being has PGM; is that correct?

A Yes, they do.

Q In the questioned samples, you couldn't find any PGM; is that correct?

A That's correct.

Q Let me ask you this: Mr. Price questioned you repeatedly about the color and the nature of the stain that was found in

the crotch area of this little swimsuit; is that correct?

A Yes.

Q Do you remember independently whether or not there was also blood present?

A I'd have to check my notes.

Q Please do.

A Blood testing was not requested and I do not know that there was any blood present.

Q You don't know one way or the other as to the color of the stain, the extent of the stain, other than you cut out the complete area where you found stain; is that correct?

A Yes.

Q Thank you.

MS. SMITH: Pass the witness.

THE COURT: Is that it?

MS. SMITH: I'm sorry, I apologize.

THE COURT: Go ahead.

Q (By Ms. Smith) You indicated that Antigen H means there's O type blood present or the O type is present; is that correct?

A Right.

Q Is there any indication that there's A-B type?

A No, there is not. I would find, if A or B were present, I would find the presence of Antigen A and B in the samples.

Q So you can say that all the samples are limited to Type O

people; is that correct?

A Yes.

Q Thank you.

MS. SMITH: Pass the witness.

THE COURT: Mr. Price.

#### RE-CROSS-EXAMINATION

BY MR. PRICE:

Q Does your report indicate that you did blood group testings on your samples labeled Q-1 through -- any of them labeled Q-1 through Q-8?

A Yes.

Q Okay. And can you tell me what that is?

A Yes. Q-3, Q-4 which is the external genitalia and anal swabs and Q-6, I found the presence of Antigen H activity.

Q Which was tested -- which you tested specifically for?

A I did not test specifically for Antigen H. I tested specifically for blood grouping.

Q Do you have any internal proficiency things that would tend to -- strike that. I apologize.

You, I believe, have testified that just because something wasn't -- just because you didn't find something, in reference to sperm, doesn't mean that it wasn't there; is that correct?

A Yes.

Q Okay. Could the same be true for your PGM enzymes?

A As far as PGM, their specific banding is there. I see it. I see the banding and I compare the banding. It's very similar to DNA testing.

Q Okay. Looking at the envelope in front of you, can you tell when that swimsuit first came into evidence?

A There's a date that it was collected by the nurse on May 31st of 1991.

Q All right. Do you -- and when was it that you did your testing on it?

A February 21st of 1992.

Q Do you believe that that specimen was then degraded between those 2 dates?

A It could have been.

Q Do you believe that it was degraded prior to that first date of 31, May?

A As far as knowing the process of when degradation starts and everything, I would not know. There are all kinds of variables, again, like I said.

Q Do you have any evidence in your report of bacteria degradation?

A I do not have the capability of testing for any type of bacteria.

Q Do you look at your washings microscopically?

A At the washing -- again, on the washings, I do the same testing as I did on the swimsuit cutting and the swabs. Run it

for acid phosphatase.

And if acid phosphatase is present, then I'd go ahead and run a confirmatory test which would be either the presence of sperm or the presence of P30. And then again, if that is present, then I can run A/B typing on it and then --

Q I apologize, you're going to have to listen to my question when I ask for a yes/no response.

MS. SMITH: Judge, **OBJECTION**, just because he doesn't like the answer.

THE COURT: Well I will -- if it's a yes/no question, just answer it, if you would, please.

THE WITNESS: Okay.

Q (By Mr. Price) My question was do you microscopically -- did you microscopically look at the washings from the swimsuit to detect sperm?

A No. On the swimsuit? Excuse me, I thought you said washings.

Q Yes, ma'am.

A I'm confused. Are you saying washing --

Q The swimsuit.

A -- or the swimsuit?

Q The swimsuit.

A Did I microscopically look for sperm on the swimsuit is your question?

Q Yes, ma'am.

A Yes, I did.

Q When you looked at that microscopically, did you see bacteria?

A No, I do not have any training as far as identifying bacteria. The specific stain that I use on the smears is a specific stain for spermatozoa.

Q Do you have any internal unknowns to determine -- so you can determine what your accuracy is?

A Internal unknowns? Can you -- I don't understand.

Q You testified that there are no extramurals that are sent in and arbitrated outside. Do you, within your department, have anyone that sends you unknowns and checks your accuracy?

A Yes. We use -- on what particular tests?

Q The accuracy of your laboratory?

A Yes. On all tests, I run known standards with it.

Q And that's a standard with each test?

A Yes.

Q And you measure your results against that standard; is that correct?

A Yes.

Q Okay. And that standard is known to you, is it not?

A Yes.

Q So that standard is not an unknown?

A Correct.

MR. PRICE: Pardon me a moment.

Q (By Mr. Price) Do you know what percentage of the population have blood Type O?

A Approximately 45 percent of the population.

MR. PRICE: I have nothing further, Your Honor.

THE COURT: All right.

MS. SMITH: No redirect.

THE COURT: Thank you. Appreciate you coming to court.

THE WITNESS: Thank you, Your Honor.

MS. SMITH: State would call Dr. Bob Giles to the stand.

THE COURT: Dr. Giles, please.

MS. SMITH: Judge, Ms. Morris and Ms. Cox have asked permission to sit in the courtroom to listen to Dr. Giles.

THE COURT: They're through testifying; is that correct?

MS. SMITH: Yes.

THE COURT: All right. Glad to have you in court if you want to watch.

Okay. I need you to -- you can set your items down if you want. You need to place your left hand on the Bible here and raise your right hand.

Do you solemnly swear the testimony you're about to give in the cause now on trial will be the truth, the whole truth and nothing but the whole truth, so help you God?

THE WITNESS: I do.

THE COURT: Have a seat, please.

ROBERT C. GILES,

after first being duly sworn, testified as follows, to-wit:

DIRECT EXAMINATION

BY MS. SMITH:

Q Would you please state your name and spell your last name for the record?

A Yes. It's Robert C. Giles, G-I-L-E-S.

Q What's your occupation?

A I'm a scientist. I'm the scientific director of a laboratory in Dallas known as GeneScreen.

Q How long have you been so employed?

A Since November of 1987.

Q Prior to that, what was your educational background?

A Okay. I received a Bachelor's of Science degree in the field of general science in 1974 from Mississippi State University.

I went on to receive a Masters of Science degree in the field of microbiology, also from Mississippi State University in 1976.

I then received my Ph.D from the University of Florida in 1982 in the field of medical microbiology and immunology. After that, I did a post-doctoral fellowship in the University of Texas, Southwest Medical Center in Dallas, Texas.

And following that, I became a faculty member of the Department of Internal Medicine where I did research and taught medical student classes.

Q Have you kept with up current developments?

A Current -- I'm sorry?

Q Current developments and innovations in your field?

A Certainly.

Q At the present time -- strike that.

Have you published?

A I have published articles in journals regarding my past research experiences both in my master's level and also my doctorate and post-doctorate. And I've published a few articles since being at GeneScreen.

Q What is GeneScreen?

A GeneScreen is a laboratory which does DNA testing. DNA is a molecule that's found inside of our cells, tells us who we are, basically, and gives us our physical characteristics.

One can test DNA to determine the source of a particular DNA specimen or in case of a paternity situation, you can determine if a child has been fathered by a potential, alleged father.

Q What does DNA stand for?

A DNA stands for deoxyribonucleic acid. Again, it's the genetic information that we have inside of ourselves.

Q I'll hand you what's been marked as State's Exhibit

Number 34 and ask you to look through that and identify that for the ladies and gentlemen of the jury, please.

A Yes. There are 2 documents here. Actually, I don't know if you want both of them.

Q I apologize.

A Do you need to remark this one?

Q Yes, I do. Thank you.

A This is a copy of what is known as a curriculum vitae. It's basically a resume, if you will, or a list of my educational experience and published papers and so forth.

MS. SMITH: State would move to admit State's Exhibit Number 34. I've previously provided defense with a copy.

MR. BENNETT: Judge, we have no OBJECTION -- excuse me, may we approach?

THE COURT: Sure.

(The following ensued out of the hearing of the jury.)

MR. BENNETT: Judge, we have no OBJECTION except you can't have it both ways. He doesn't testify to it and then you get it in on paper.

MS. SMITH: He hasn't testified to anything on there.

THE COURT: Are you OBJECTING or not OBJECTING?

MR. BENNETT: I OBJECT. He's testified to it.

THE COURT: If you put it in, you're not going to ask all this?

MS. SMITH: No, sir. I'm not going to ask any more.

THE COURT: Okay. Let's do it that way.

MR. BENNETT: Note my exception.

THE COURT: All right.

(The following ensued within the hearing of the jury.)

THE COURT: 34 is admitted exception is allowed.

Q (By Ms. Smith) Can you generally explain to the ladies and gentlemen how DNA testing is done?

A Yes, I can. There are -- first of all, there are 2 basic types of DNA testing that is available today. Our laboratory performs both types of testing, both for criminal case work and also in paternity test analysis.

The type -- the first type that I'll tell you about is something called DNA fingerprinting. It's also known as RFLP analysis. The other type of tests are called PCR. It's also known as gene amplification. And the PCR stands for a scientific term known as Preliminary Chain Reaction.

Basically, what the test will allow you to do is to take a sample or specimen, isolate the DNA from that specimen and determine some genetic information.

In the RFLP test, we're trying to determine a pattern that looks somewhat like a bar code, if you will, but it's a very simple bar code where we generate a pattern from one piece of evidence and compare that to blood specimens from known individuals, perhaps a suspect and a victim in a particular case

PCR, let me go ahead and state that that particular type of test has a lot of information. It gives you a very good sense of when you're able to make a pattern that matches a pattern from a blood specimen on a suspect, for example, that you have a lot of confidence in that because we're looking at many different genetic points from each individual being tested. So we get a lot of genetic information.

If there is a match, you might not find that particular genetic pattern in the population more than once out of every hundred thousand or million people, something of that type.

The other type of test called gene amplification or PCR is a test which allows us to look at a single genetic point at this point in time and that genetic information is from something known as DQ Alpha and I won't go into what that is, but it's a particular genetic piece of information that all of us have.

The way the test works is to, first of all, we isolate DNA from the evidence specimen. It may be a blood specimen, it might be any tissue specimen coming from a crime scene. We would isolate DNA from that particular specimen and either generate a DNA pattern by the RFLP test or generate a PCR result, a DQ Alpha typing of that particular specimen.

We would then also compare that particular DNA pattern of DQ Alpha type to a blood specimen taken from known individuals in a case, perhaps a suspect and a victim.

If those patterns are different than the suspect in the case and they're supposed to have come from that particular person if he committed the crime, then we would say that person is excluded, that he could not have given that particular specimen at the crime scene.

If there is a match between the evidence specimen and the blood specimens say of the suspect, then we would say we have made a match in that particular case and the frequency of that match then becomes important, how often we would expect to find that particular pattern in a population of individuals. That number may be for RFLP analysis may be as high as one in a million or one in ten million, something of that nature.

In PCR analysis, we're basically able to exclude a smaller percentage of the population. For example, if we made a match of a particular DQ Alpha type, we might say that we've excluded 95 percent of the population and the suspect is in that 5 percent of the population which cannot be excluded by that particular test.

Q Doctor, let me ask you this: Directing your attention to your records kept in the ordinary course of business and your report in the case at hand, did you have an occasion to receive some items for DNA analysis from Tulsa Police Department into your laboratory?

A Yes, we did.

Q Were the items received in an untampered, untainted

condition to the best of your records?

A Yes, they were.

Q Were the items particularly identified so that you could tell which sample came from whom or whether or not it was a known and a questioned sample?

A Yes, they were.

Q What samples were received by your lab?

A On March the 31st of 1992, we received 3 specimens. They would have been a blood specimen taken from — purportedly taken from Timothy Durham, a blood specimen taken from Jennifer Copple and a cutting in a swimsuit.

Later, on April 22nd, 1992, we received an additional specimen which contained 2 hairs which were mounted on slides.

Q What was the result of the hair examination or the hair analysis?

MR. BENNETT: OBJECTION, can we approach briefly?

THE COURT: All right.

(The following ensued out of the hearing of the jury.)

MR. BENNETT: Your Honor, at this time, the defendant would renew our motion in limine as to this testimony as the Doctor cannot give a scientific opinion as to this gentleman to either include or exclude him to this crime.

Secondly, at — further, our OBJECTION is to an opinion that he would give for the sole reason that there has been no evidence this is scientifically recognized as being admissible

into evidence into the criminal case. And we would state it is not and we move for a mistrial.

THE COURT: Well I'm going to overrule all that.

MR. BENNETT: May I have a continuing OBJECTION?

THE COURT: Well you can make an OBJECTION, but you

don't need to come up here every time. You just —

MR. BENNETT: To this field of questioning.

THE COURT: I'll give you a continuing OBJECTION.

The problem with that is if you get into a different area that I might sustain an OBJECTION to, but I'll give you one if you understand that.

MR. BENNETT: Yes, I understand.

THE COURT: Okay.

(The following ensued within the hearing of the jury.)

THE COURT: You may answer the question.

Q (By Ms. Smith) I'm sorry, go ahead.

A I'm going to have to have you repeat the question, I'm sorry.

Q What was the net results of the hair analysis?

A Basically, we do try to do gene amplification on the hairs and we received inconclusive results. We were not able to type the DQ Alpha typing on those hairs.

Q Let me ask you — strike that.

In what condition were the hairs received?

A They were received as mounted hairs on glass slides.

Typically, they're mounted in a solution and then covered with a coverslip so that an examiner can examine them under the microscope.

Q Typically, would this -- is this result unusual in hairs that are received by you that have been mounted in a medium?

A I would say that we have a success rate of about 50 percent. About half the time, the hairs will work when they're mounted and about half the time, we will receive inconclusive results.

Q With regard to the other items that you received, the known that was identified as Timothy Durham's, the blood sample, the known blood sample from [REDACTED] and the swimsuit cutting, were DNA tests performed on those items?

A Yes, they were.

Q Were you able to identify the DQ Alpha that you talked about previously, the known DQ Alpha for Timothy Durham?

A Yes, we were.

Q And what is his DQ Alpha?

A His DQ Alpha type, these are given in numbers, his DQ Alpha type would be what's known as a 1.1/1.2. We each have 2 different DQ Alpha types. So his 2 types are labeled at 1.1 and 1.2.

Q Was that determination made through recognized procedures in the performance of DNA testing?

A Yes, it was.

Q With regard to the known or identified blood sample of [REDACTED], what was her DQ Alpha type?

A Her typing was DQ Alpha 1.2/2.

Q Did you perform the RFLP test? Was the RFLP test performed on these samples?

A No, it was not.

Q Was the PCR test performed on these samples?

A Yes, it was.

Q With what results?

A Well we attempted typing on the cuttings from the swimsuit that had been sent to us from the police department. The — we tried this particular item 3 different occasions.

The first 2 occasions, we received a typing that was consistent with the victim's type. That is the DQ Alpha typing of the DNA isolated from the swimsuit gave us a typing of 1.2/2 which would be consistent with the victim's type.

On a third attempt, excuse me, on a third attempt of the same item, we also received a 1.2/2 typing, but in addition to that we had a fainter typing. And by fainter, I mean the intensity of the dot that we get on this type of test was fainter than the dots that we got for the 1.2/2 typing. And that particular fainter dot was a 1.1 typing.

Q Was that 1.1 typing or could the 1.1 typing be consistent with the known DQ Alpha type for Tim Durham?

MR. BENNETT: Excuse me Judge, we're going to OBJECT

to that. We're not here dealing with could be's.

THE COURT: I'll sustain that **OBJECTION**.

Q (By Ms. Smith) What -- if you have 2 people and they both have a portion of their DQ Alpha that matches, 1.2, would it overlap?

A If you had a specimen which contained DNA from both those individuals and you did a DQ Alpha typing, you would get a similar typing of 1.2 on each of those individuals and then whatever other type they happen to have.

Q So if I understand you correctly, the typing of -- if you were to mix the blood of Tim Durham and [REDACTED] and do DNA typing, what result would you see?

A Well it would be dependent upon at what concentrations you mix them. But assuming you mix them in an equal concentration, you would expect to receive a DQ Alpha typing which is consistent with all of their types.

That is if they had 1 type in common and then a type that was not in common, you'd expect to get 3 spots.

Q Which they do have; isn't that correct? They have one type in common and one that is not.

A That's correct.

Q Isn't that the results that you saw on the swimsuit cutting?

A I can say that I did get 3 typings. One typing was so stronger than the other and I had a fainter typing on the 1.1,

of fabric in your notes?

A I have a photograph of a piece of fabric; yes, sir.

Q If I may?

A You'd like to see it?

Q Okay. And that is a photograph that you showed me of the piece of fabric that you analyzed in this case?

A Yes, sir.

Q All right. And was any of the fabric missing?

A Yes, sir. This photograph was taken as we received it and there were, I believe, a couple of cuttings taken from that piece of fabric.

Q Now in your report, Doctor, you, I believe, address male and female portions of the sample; is that correct?

A Yes, sir, I did.

Q Okay. Can you tell this jury what male and female portions of the sample are?

A Yes, sir.

Q And if you would, earlier we'd kind of drawn a back and front representation of what we thought that piece of fabric would look like. Is that generally similar to the shape of that fabric?

A Yes, sir.

Q And can you, using that and a marker below it, show us how you divide that into male and female?

A Well, having the cutting will not help me show you how we

which in fact would be consistent with the defendant's DQ Alpha typing.

Q You indicated his DQ Alpha typing is 1.1/1.2; is that correct?

A That's correct.

Q What percentage of the population would have that typing?

A The DQ Alpha 1.1/1.2 type would be found in the Caucasian population at a frequency of about 5 percent

Q Thank you.

MS. SMITH: Pass the witness.

THE COURT: Cross-examination, Mr. Price.

MR. PRICE: Thank you, Your Honor.

#### CROSS-EXAMINATION

BY MR. PRICE:

Q Now Doctor, you received a specimen in this case that was a piece of fabric; is that correct?

A That's correct.

Q And do you -- and you issued a report based upon your analysis of that piece of fabric?

A Yes, sir, I did.

Q Okay. Does your report contain a description of that piece of fabric?

A I think only in the sense that it says it was a cutting from a swimsuit.

Q Okay. Do you have with you a description of that piece

of fabric in your notes?

Q In other words, female and male is not dependent upon the location geometrically on that piece of fabric?

A Absolutely, that's correct, it's not dependent on that.

Q What determines then in -- as you use it in your report, the female portion?

A Okay. Any time we receive a specimen in our laboratory which could be mixed in nature and what I mean by that is coming from 2 different individuals, that would be true if we were doing a case involving a sexual assault, there may have been a vaginal swab taken or there may be a semen stain on a piece of garment such as the swimsuit.

The thing we would do is try to separate the material in that stain into 2 different pots or 2 different portions. One of those portions is called the female fraction in the female and the other portion is called a male portion.

The way we do that is to remove all the cells from the garment or from the stain and then we take those cells through what is known as a differential lyses. And what that means is that we're breaking open the cells in a way that will release the DNA from the cells.

The way we do that first is we do what is known as a mild lyses or mild breaking open of the cells. What this does in

blood present?

A Well again, we did not examine microscopically the stain prior to lyses of the cells, so I have no way to know either yes or no whether blood was present.

If there had been blood present, it would have been lysed in the female lyses and would not have been seen under the microscope in most situations.

Q But Doctor, if you had blood cells present and you did your lyses, your solution would then have prehemoglobin and would be red; is that correct?

A If there was a sufficient amount of blood present, it should be, yes.

Q Would your laboratory have noted the red coloration?

A Not necessarily, no.

Q Okay. Now of the type of test that you did on these specimens, you called it, I believe an amplification test; is that correct?

A Yes, sir.

Q And is that because you can take a very small amount of DNA and replicate it over and over to get your sample much larger and more detectable?

A Yes, sir, that's correct.

Q So it's primarily a mechanism which allows you to increase the quantity of your sample?

A In a sense, yes. You're not increasing everything in the

sample, you're only increasing a particular genetic point in the sample. So you're not completely copying someone's DNA, but you're copying a particular point of that DNA.

Q You're copying for that part that you look for?

A Absolutely, yes.

Q Okay. Do you believe that there should be a standardized **OBJECTIVE** analysis in DNA typing so that you know when something is positive versus negative?

A I believe that there should be an attempt made to do that, yes. I'm not sure that in any kind of criminal case work that you can always be 100 percent positive or 100 percent negative.

Q But Doctor, you're here testifying as a scientist, do you think there should be — and an expert. As an expert, do you feel there should be **OBJECTIVE** criteria in DNA testing where you can say here's the line and the finding here is negative, the finding here is positive?

A Absolutely, I agree with that.

Q Where in the testing that you did on this case is that line, Doctor?

A If I understand your question correctly, we have incorporated into our test a control specimen that we run. It is meant to be a threshold control that is something that would be positive, but less than the control would not be a callable result.

Something that is as dark as our control or gives us the same intensity as the control or darker, would then be a positive signal.

Q And is that determination then made visually?

A Yes, sir, it is.

Q In other words, you don't do it mechanically, color or metrically or anything?

A No, sir. You do it with the eye.

Q And — it will take me just a minute, Doctor. I'm looking for —

You set up and ran this swimming suit specimen, I believe, first on the 15th day of April of 1992; is that correct?

A The actual end result or the typing of that specimen would have come out on the 15th of April, 1992; yes, sir.

Q And that was the first one that you ran on this case?

A Yes, sir, that's correct.

Q And you used your standard laboratory protocol when you ran that test?

A Yes, sir.

Q And you used your standard selection criteria?

A Yes.

Q Okay. And you used your standard methods of interpretation?

A Yes, sir.

Q And you have confidence in all of those?

A Yes, sir, I do.

Q Okay. And at the time you ran that, you didn't know what the DQ Alpha test results would be on either the suspect or the victim, did you?

A I did not, that's correct.

Q So you had no way of being biased at that time?

A Yes, that's correct.

Q All right. And when you ran that test, were your results at all equivocal?

A No, sir.

Q They were quite definite?

A Yes, sir.

Q Okay. And looking at that test as that test only as you would have looked at it on 4-15-1992, do you have any reason to suspect at that time that that test would have been in error?

A No, sir. I do not believe it was in error and I don't believe that today.

Q And that test was a test designed and used under your supervision in the laboratory with separation of male and female components?

A That's correct.

Q In the separation of male and female components, did it show any difference between the male and female components?

A Not on that particular test, no, it did not.



Q A test which you had confidence in?  
 A Yes, sir.  
 Q Did you elect to run that test again, Doctor?  
 A Yes, sir, we did.  
 Q Why?  
 A Anytime we have a female fraction and a male fraction typing the same, we will make an attempt to go back and take another specimen from that same garment or stain and attempt to do it again to see if we can get a differential separation of those 2 typings.

It's quite possible not having typed either the blood specimens, it's quite possible that the victim and the suspect would be the same type. We don't know at this point in time.

Q At that point in time, that would be your best answer?  
 A That would be a possibility. It's quite often that we find in PCR analysis, we find victim typing in both the female and the male fraction particularly when there are not many sperm present in the stain we're talking about.  
 Q But that wasn't the case here, was it, Doctor?  
 A Yes, sir, I believe it was.  
 Q Okay. Did you in your report say there was inadequate spermatozoa?  
 A I didn't say there was inadequate, I simply know from looking over our lab results that the rating which we gave the number of sperm in this particular specimen was a rating of 1.

We use a rating of 1 to 4 with 4 being the most and 1 not being very many.

And the first cutting that we did on this particular day that you're speaking of on 4-15-92, the rating that we gave that particular piece of evidence was a 1. A second cutting gave us a rating of 2, but we never received a rating higher than 2. In our past experience, that is not a lot of sperm.

Q All right. Now Doctor, did you write a letter to Sarah Smith or your office on May 27th, 1992?

A Yes, sir, I believe that is so.

Q And in that letter, did you tell Ms. Smith that although sufficient sperm were visualized to provide DNA for PCR amplifications? Is that phrase in there?

Second paragraph, although sufficient sperm were visualized to provide DNA --

A Yes, sir. And I don't doubt -- I'm not saying that we had insufficient sperm, I'm just saying we did not have a lot of sperm present.

Certainly you can have a rating of 1 or less than 1 and in some situations still be able to get that spermatozoa DNA to type if the separation is a clean separation.

Q Okay. But after 4-15, on 4-29, you determined that you were going to run the specimen again; is that correct?

A Some time prior to that, yes.

Q Okay. But the specimen was run on 4-29-1992?

A Yes. The actual typing was found on 4-29.

Q Using the best techniques you had available?

A Yes.

Q And Doctor, could you get results any different than your first test?

A We still received a similar typing on the male fraction of that material on that day, 1.2/2.

Q Doctor, you say similar. Wasn't it identical?

A Yes.

Q And it showed one point, what?

A 1.2/2.

Q 1.2/2?

A Yes, sir.

Q And at the time you ran that second sample, you did not know what the test results from the victim or the suspect were?

A That is correct.

Q And the term victim is subject to what you use your little annotations by the V and the S?

A Correct.

Q Now after the results of that second test which were absolutely the same as your first test; is that not correct?

A That's correct.

Q Then you ran the blood preparations from what you designated subject to victim?

A Correct.

Q Okay. And at that time, you knew what DNA types you were dealing with?

A That's correct.

Q Okay. And you knew quote, what you were going to be looking for?

A We knew what types would be found in both the victim and the suspect in this case, but we in no way assumed that the suspect was involved in the case.

Q Then the next thing, you ran the 2 hairs; is that correct?

A I believe so, yes.

Q For the results on 5-14-1992?

A Yes, sir.

Q Okay. And Doctor, on your little test which is positive with little dots along a strip; is that correct?

A Yes, sir.

Q On your hair specimen, how many of those dots were positive?

A I believe all the spots were positive except for 1 DQ Alpha type.

Q Does that mean that they had all those allowed for DNA?

A That's not possible.

Q Okay. So you had impossible test results?

A That's correct.

Q In fact, your test results told you that whoever grew

that hair must have been genetically unique?

A That would not have been my interpretation of those results. My interpretation would have been that there was either mixed specimens of DNA present with the hair and therefore gave us multiple typing or the test simply didn't work in that particular case and that's unlikely.

Q So you believe that hair was contaminated with DNA from something else?

A I believe there are other types of DNA present that we amplified at the same time we amplified the hair, yes.

Q And you believe that's all DQ Alpha locus?

A Yes, sir. I definitely do, that is DQ Alpha. That is the only thing that will type with that system.

Q What's the least number of separate individuals that would have to compute DNA for such a result?

A This particular typing, one could achieve with 2 people.

Q You've got a 1.1, 1.2?

A Yes.

Q A 2?

A Yes.

Q A 3?

A Well you don't know that you have a 1.2. You could have a 1.1 and a 2 and a 3 and a 4.

Q But you believe that it's because it was handled?

A It's possible. I don't know at which point, if you want

to call a contamination, I don't know at which point the contamination occurred.

Hair specimens are particularly frothed with those kinds of difficulties. Because they're usually laying around, people might accidentally touch them or whatever prior to actually being taken as evidence.

Q Okay. And then on 6-4-1992, you showed the results from the third attempt at the swimsuit?

A Yes, sir.

Q Okay. Now that third attempt, you've testified was different from the first attempt, different from the second attempt; is that not correct?

A That's correct.

Q Did that third attempt show any difference that crossed that threshold?

A Yes, sir.

Q And it crossed that threshold?

A Yes, sir. Just barely, but it was there.

Q And Doctor, what did you say about that in your report?

THE COURT: Counsel, this be a good time to recess for lunch?

MR. BENNETT: I think so.

MR. PRICE: Yes, Your Honor.

THE COURT: All right. Ladies and gentlemen, we'll recess for lunch at this time. Same admonishment's in effect.

These will be your instructions. I will ask that you come back up here, ~~everybody~~ come up here at 1:45 and we'll continue this case.

Doctor, I need you back then, 1:45 by that clock over there.

THE WITNESS: Okay.

THE COURT: Court's in recess.

(A noon recess was taken.)

THE COURT: Okay. We got somebody missing? All right. We'll wait a moment.

Show all the parties are present and the jury is here. As soon as the one remaining juror arrives, we'll continue with the testimony and you're still under oath?

THE WITNESS: Yes, sir.

THE COURT: Okay. The record reflect everyone is present and we'll continue on with the -- do you have some further cross-examination?

MR. PRICE: Yes, sir, Your Honor.

THE COURT: All right. You may continue on.

Q (By Mr. Price) Doctor, when we took our lunch break, we were talking about your third evaluation of the swimsuit specimen, do you recall?

A Yes, sir, I do.

Q And by the third one, we're talking about the test done June 4th of 1992?

A Yes, sir.

Q And we had established earlier a threshold where you called something positive versus negative. Do you recall that testimony?

A Yes, I do.

Q And I believe the last question I asked you as to whether the threshold was crossed on your finding of the 1.1 region on that third examination and I believe you were about ready to respond.

A Yes, sir. The threshold, being the control specimen, was either fainter or equal intensity to the 1.1, so we were allowed to call it. But as I stated in my report, we called it with a faint typing with the 1.1.

But it was above or equal to the concentration of the control in this particular case.

Q Doctor, then did you make a determination for the purpose of your report as to whether that was real and you were dedicated scientifically to calling it?

A Yes, sir. I called it in my report and I do believe it was a valid call. I would make the same call again today.

Q And Doctor, I believe you had testified earlier that that 1.1/1.2, and correct me if I'm wrong, characteristic represented 5 percent of the population?

A Yes, sir. Approximately 5 percent of the Caucasian population.

Q And the Caucasian population of the world, in the country, in the United States, which?

A It would be consistent with that found in every Caucasian in the world. But the numbers are actually determined from data basis done in the United States, both from the east coast and from the west coast.

Q Do you have any reason to say that Tulsa conforms to that population study?

A I would say I have reason to say that they would be consistent with that. There's lots of scientific data on HLA typing which doesn't show any variability from either DQ Alpha typings or HLA typings across the country. Those have been tested on thousands of individuals.

So it would be very unusual if a particular location deviated significantly from those numbers.

Q And is part of that experience on HLA typing, then Doctor, done for tissue transplant purposes?

A Absolutely.

Q Thank you. Now if we narrow your population to select from, is there any mechanism which a population is narrowed on those typings so that you become more probable of having a match than you would on the population as large? Are there sub-groups?

A There appear to be no sub-groupings with DQ Alpha that I'm aware of. I guess what I think you're asking is that are

there situations where one portion of the population may have an increase in a particular DQ Alpha type as opposed to another area of the population and therefore enhance those numbers or decrease those numbers depending on which population you're testing.

I am not aware of any such data for DQ Alpha.

Q That includes if that population sub-group is immediate family members?

A Certainly, immediate family members would make a difference. When you start talking about population genetics, we're not talking about 1st degree relatives and if you found a particular type in a 1st degree -- in an individual, you would expect to find that same typing at a higher frequency in that person's immediate family.

That is a father will pass along half of his DNA to each of his children. His children would expect to have that DQ Alpha at a little higher frequency than the general population.

Q Doctor, when you performed that first of those 3 tests on the swimsuit, what were your charges for that first test?

A Our charges?

Q Yes, sir.

A I don't have that with me. We typically charge, at this time, I believe we were charging 300 and something per specimen, \$375 per specimen.

Q Did the fact that you ran that 3 times increase the

charging?

A No, sir.

Q Okay. Now you issued a report on July 20th, 1992?

A Yes, sir.

Q And you issued that report to Tulsa Police Department?

A Yes, sir.

Q And that's the agency that you'd gotten that sample from?

A That's correct.

Q And that had had custody of that sample as far as you know?

A Yes.

Q All right. And by the time of July 20th, you had the results showing your questionable or faint, if you will and I believe you used the term faint?

A Yes, sir.

Q 1.1 positive?

A Right.

Q And you testified that that included the suspect and the population according to your test?

A Well I don't think I used those words. The words that I used was the 1.1 faint typing could be consistent with the defendant. But my report states that we can neither positively include nor exclude the defendant.

Q Now, Doctor --

A I think there's a difference there.

Q -- are you telling this jury that you can, as you sit here today, positively include or exclude him?

A Yeah. That is my testimony. I cannot positively include him or exclude him from having deposited that particular specimen at the crime scene.

Q And Doctor, your testimony -- in other words today we know as much today based upon that testimony as we did before the test was ever run?

A Well I guess -- well I see what you're saying. I guess that's partly true. I mean, what we can say is that if we take all the possible 1.1 types in the population that are 1.1/2 or 1.1/1.2, that would account for about 10 percent of the population.

So I do believe that we know at least the person who contributed the spermatozoa would fall within that group. Whether or not it's consistent with the person who's 1.1/1.2, I cannot say. But the 1.1 typing being a real typing, I would have to say that whoever contributed that sperm has at least a 1.1/1 typing and the additional typing of that individual might be also 1.1. It might be 1.2 or it might be 2.

But as I say, if you take all those together, that accounts for about 10 percent of the population. So we do know in fact, after having done the test, we can exclude about 90 percent of the population. We cannot exclude the defendant, but neither can we positively include.

That is the typing that we got doesn't necessarily match him, because we don't know what the other part of the typing would have been.

Q Now Doctor, let's go to your test results that we've been discussing of 6-4-92. You're familiar with those, are you not?

A Yes.

Q Do you have a copy of your test with you?

A I have a photograph of the results, yes, sir.

Q That's a black and white photograph?

A Actually it's a -- it's black -- it's colored but it really doesn't make a lot of difference. The dots are blue rather than black and white.

Q And your determination of -- if you were to make a determination and everything were to be perfect with this suspect and this victim, the differences would be that in the female portion, Number 2 would be dark and on the male portion, Number 2 would be light. 1.1 would be dark on the male and light on the female. Those are the only 2 differences, aren't they?

A In the best situation you're talking about or what I actually --

Q I'm talking about based upon what you know of the individual characteristics from their blood.

A In the -- in a perfect world, if we had tested a swab from an individual who's a 1.1/1.2 and a victim who was 1.2/2,

we would expect to see in the female fraction her typing that is the 1.1/1.2 -- I'm sorry.

The 1.2/2 in the female fraction. In the male fraction, we would expect to see, if the defendant had actually committed the crime, a 1.1/1.2 without her typing being present. That would be the best situation.

That is not in fact what we always get.

Q Now Doctor, referring to your 6-4-92, can you tell me what your 6-4-92 male and female portions specimens differences are on that test?

A The only difference between the female and the male portion is that the female typing is stronger than the male typing. That is, we're seeing darker spots on the female portion than on the male portion, but we're seeing basically the same typing.

I believe on the female fraction, the 1.1 that's coming up is fainter than the control and therefore I would not call it as a positive sample, positive typing on the female fraction.

However on the male fraction, all of the specimens are fainter. That is, all the dots are fainter but the same typings still come up. In this particular case, the 1.1 is equal to intensity or a little darker than the control specimen.

Q But you can't put numbers on the degrees of intensity?

A No, I don't tried to do that, no.

Q That would be strictly arbitrary?

A Yes, sir.

Q But certainly in today's wonderful technology world where we're doing DNA replications, we're left to I think that one looks darker than the other one?

A Absolutely.

Q That's kind of measuring it with a micrometer and cutting it with an axe, isn't it?

A Well not really. When you look at some of the machines that are capable of measuring the intensity of spots, your eye actually does a better job than most of the machines that are available. So it's really not a method or mode available for specifically counting these kinds of dots in a much more accurate way than your eye can do it.

Certainly you can put a quantitative number on it, but the qualitative analysis is still as good as with your eye as with anything else.

Q But on separating those specimens from the June test, June 4, '92, and telling the difference between your male and female assay, it has to be strictly I think that one may be darker than the other?

A Yes, sir. I would agree with that.

Q And indeed on -- if that was the only test that you had that you had never done any of your previous tests, what would

it tell you?

A I would report in the same fashion I reported as I have a typing in the female of a 1.2/2 and in the male of a 1.2/2 plus a faint 1.1.

Q Do you see a 1.1 on your female?

A Yes, sir. But again, its intensity is lighter than that of the control and the control is the threshold level. It has to be darker than that for me to be able to call it.

Q Doctor, is your laboratory a participant in any extramural testing?

A Yes, sir.

Q Okay. Tell the jury what type of extramural testing it's involved in.

A In the past -- by extramural testing, he means do we participate in what's called a proficiency testing program where outside agencies would send us specimens and we would do typing on those specimens and send our results back to that agency or in some way have them blind, so that no one knows what they are until the results are completed.

In the past, there haven't been any government agencies that have been involved in proficiency testing. Our laboratory has exchanged specimens, both in our paternity laboratory and forensics lab with other labs in the State of Texas, namely Baylor College of Medicine out of Houston.

More recently, we have participated in a proficiency

testing program that was initiated by a group in Texas called TWGDAM, Technical Working Group on DNA Analysis and Methodology.

And we've also purchased specimens from a company in California called SERI Lab, S-E-R-I. It's a laboratory that does DNA testing, but they also provide a service where they send out unknown specimens to labs doing the same type of testing that we're doing. And the analyst, who is doing the testing, doesn't know what the results should be. When she's finished, we then break open the envelope to see if she's completely correct, if she was correct in her analysis on what she's completed.

Q In other words, you grade your own people?

A On the SERI test, that's true. But on the TWGDAM test, we do not.

Q Are you a member of the organization that makes the other test?

A Anyone who attends the meetings are considered members. I don't judge the other results. I mean all the laboratories in Texas that are doing DNA testing would be a member of the TWGDAM group if they choose to go to the meetings.

Q Do you believe extramural testing is important?

A Yes, sir.

Q What's your -- what's your batting average, Doctor?

A We have not been incorrect on any of our proficiency

testing to date.

Q All right. So you believe that the first, the very first specimen you ran in accordance with procedures that you'd set up that are reliable that it's reasonable to believe in showed 1.1/2 or is it 1.2/2?

A It was a 1.2/2.

Q 1.2/2?

A Correct.

Q And you, based upon your techniques, had no reason to doubt that that was a true result?

A I had no reason to doubt that, that's correct.

Q But you decided to run it again?

A Yes.

Q And the results were identical?

A Yes.

Q And it wasn't until you found out the results of the blood that had been submitted to you that you ran it a third time; is that correct?

A That's correct.

Q And by that time, you had an idea as to what the results could possibly have been?

A We certainly knew the typings of the individuals that were named in the case, yes.

Q And you end up with a weak, maybe across the line, maybe not, depending which line results?

A I have no doubt about the call. I mean you observing it may have a doubt about it. But in my experience, that is a valid call and I would make the same call again today.

Q And that call is that you can't exclude or include?

A Correct.

Q So as far as this defendant all this testimony has, as far as that man is concerned, has no value in making a decision?

A Well again I would reiterate what I said before.

Q We're not talking about everybody else in the world, we're talking about this man.

A What I would reiterate as I said before is that his typing is consistent with that found in the male fraction of the stain. I cannot positively include him, nor can I positively exclude him.

Q But certainly on the first 2 tests, you could have positively excluded him?

A No, sir, I could not. Anytime we get a typing between the female and male fraction which is the same typing, the result is ruled as inconclusive.

We cannot -- we cannot make any interpretation from that, because the typing is consistent with the victim. That is the DNA that may be present in the male fraction may be all of victim origin and we can't say anything about the perpetrator in that particular case.

Q Doctor, you knew you had spermatozoa?

A That's correct.

Q And I think you can tell the jury that the spermatozoa did not come out of an 11-year-old female?

A Absolutely.

Q Absolutely. And that's what you were, using methods you had selected, you had identified those spermatozoa, they had DNA in them, and you were going to get the results out of them?

A Right. That is correct. But what I need to impress upon you is just because there's spermatozoa present, just because we see some, doesn't mean we're always going to get a typing in the male fraction of the swab.

We need a sufficient amount of spermatozoa in a certain quantity away from the female DNA that we can get an accurate amplification of that DNA. If we have a lot of DNA present in the female fraction and some of that spills over into the male fraction, which is a possibility, even the small amounts of spermatozoa that are present may not give us a typing.

And the art to this or the -- what we would like to be able to do is to get enough of that female DNA away from the male fraction so that we can get an accurate typing on that male fraction in spite of the fact that there may not be very many sperm present.

Q Are you telling this jury, Doctor, that the female cellular presence contaminants, if you will, influences your

amplification of the male?

A Well what is happening in the assay when we're trying to amplify the DNA is that the target DNA, that is the DQ Alpha area of the chromosome, is going to associate with certain molecules that we have in our reaction.

The more you have of one type of DNA, the more amplification you're going to get of that DNA and an indifference to what else might be there in a smaller amount.

It may amplify as well as, but you wouldn't see it as well because there's so much of the other DNA.

Q Are you telling us there is not inhibition then?

A It's not inhibition, no. It's just a matter of quantity.

Q So Doctor, are you telling us then the science of it is running the amplification, doing the cell separation, the components separation. And the art is looking at the results and saying that doesn't look quite right, I need to run it again?

A We try to take as much of that out of the test as we possibly can. That's the reason we run controls and have a threshold. There are guidelines that we use to make minor interpretations in our calls and a lot is based on experience.

I can't say that someone could walk in and pick up this particular photograph and make the same call that I would make. I'm making that call based on the fact I've been doing this for several years. I have been involved with gene amplification

490

from its very beginning of its beginnings.

I have experience in knowing how to make these particular calls. There is some art involved in that, but that's why I'm trained as a scientist to do what I do.

Q Doctor, how often have you testified on these cases?

A I've testified on more than 50 occasions. Not necessarily on PCR cases per se, but on criminal cases of various types.

Q And the government has brought you in here today at government expense to testify; is that correct?

A Yes, sir, that's correct.

Q And what are you charging our government?

A Our company charges \$1,000 a day for expert testimony.

Q And is this your first day in town, Doctor?

A Yes, sir.

Q All right.

MR. PRICE: If I may have a moment, Your Honor?

THE COURT: All right.

Q (By Mr. Price) Doctor, I only have a few more things. If another person had scientifically examined this piece of material and had it all available to them and not found sperm, would you disagree with their finding of no sperm or their finding of absence of visual?

A Are you asking me if someone reviewed this same piece of material and found no sperm, would I agree with that?

Q Would you disagree with that?

A It depends on what portion of the stain they looked at. If they looked at the same portion of stain that we looked at in our facility, I would disagree with their finding, yes.

- They could have easily looked at another portion that did not contain spermatozoa.

Q And you selected your specimen in close proximity to the location where someone else had selected a specimen?

A That's correct.

Q And how many total specimens did you select, Doctor?

A There would have been a total of 3 specimens.

Q Total of 3 individual cuttings?

A That's correct.

Q All right. And Doctor, with equivocal results on your third or weak -- pardon me, faint results, why did you elect not to run a fourth?

A Well I'm not sure that we'd have gotten anything different than we had on the previous 3.

Our attempt on the third was to clean the male fraction as much as we possibly could. After having done that, still seeing the female typing still present, we felt that we had exhausted all possibilities.

Q And how did you clean it different from attempts Numbers 1 and 2?

A We did a slightly different protocol, one that's found in

492

a book that we use occasionally for our protocols called The Gene Amply-Type Kit book which I have with me in the courtroom today. It basically calls for washing the male pellet a number of times.

The previous protocol that we had run in our laboratory and were running at this time only call for washing the pellet a couple of times.

With the new one, we wash it up to 5 times with the hope of getting rid of more of the female DNA.

Q And in that pellet, you use to test only on the male portion on yours; is that correct?

A That's correct.

Q Where does the female portion come from in that wash in that preparation?

A It has already been removed at that point in time. It's no different at that stage where we separate the female out. What's different is once we've separated the female out, the number of times that we wash the residual pellet from that would be increased on that third opportunity that we had to run the test.

Q On that third opportunity and third procedure, is the female portion different as far as its processing than it was on attempts 1 and 2?

A I believe the protocol may be slightly different, but I don't think there's enough variation in it that would give us a

completely different result, no.

Q And looking at your individual strips there, do you feel that your female one is different from attempts 1 and 2?

A Again the only difference would be is that there is a very faint 1.1, but it is not more intense than our control spot. So by the way we set up our standards, I cannot call that as being a positive specimen or a positive typing.

Q You agree with me that it never appeared earlier?

A That is correct. It did not appear earlier.

Q And the process was the same?

A Process was the same, yes.

MR. PRICE: Pass the witness, Your Honor.

THE COURT: All right.

#### REDIRECT EXAMINATION

BY MS. SMITH:

Q We're not planning on you staying more than 1 day, are we?

A I don't think so.

Q With regard to the cost of this investigation that Mr. Price just had, can you tell me, Dr. Giles --

A Giles.

Q -- am I correct in understanding that you can exclude 90 percent of the population male Caucasian, but not Tim Durham?

A That's correct. If we take the fact that we have a typing of 1.1 and, not knowing who the perpetrator of the crime

would have been, knowing that that person had to have either a 1.1/1.1 typing or a 1.1/1.2 typing or a 1.1/2 typing, that would account for about 10 percent of the population.

Therefore, anyone else without those types would be excluded and that would amount to about 90 percent of the population.

Q Let me ask you in those typings that you're talking about, specifically Tim Durham's typing which is what, if you'll help me?

A 1.1/1.2, I believe.

Q Would necessarily everybody that had that 1.1/1.2 typing have red hair?

A There's no connection between what a person's DQ Alpha typing is and their hair color.

Q What about the height?

A There's no connection.

Q So those things might narrow down the percentage of people or the percentage of 1.1's that might show up in your DNA evaluation; is that correct?

A Certainly. There are always other circumstances in a case that are unrelated to the DNA typing which would further delineate who the perpetrator might be, such as physical identification or body size or whatever.

Q But we have in this case physical identification plus a 1.1 DNA consistency?

MR. PRICE: Your Honor, I OBJECT to that.

THE COURT: I'll sustain the OBJECTION. ---

Q (By Ms. Smith) The letter that Mr. Price was talking to you about where he pulled one portion of the paragraph out?

A Yes.

Q What was your recommendation? Your complete recommendation in that letter?

A Well the letter was written by the laboratory supervisor at GeneScreen who does the PCR typing.

MR. PRICE: I'm sorry, Doctor.

Unless he can have a foundation that he knew what her intention was, Your Honor, it's hearsay.

THE COURT: Well I would sustain that. If he has a recommendation or he can give his.

Q (By Ms. Smith) Let me rephrase this: Mr. Price advised you have something that was written in a report that came back to Tulsa Police Department and to me; is that correct?

A Correct.

Q And what he advised you of was just a portion of that paragraph; is that correct?

A That is correct.

Q Now what is masking?

A Well in masking in regard to this kind of testing would be that --

Q Yes?

A -- if we had a mixed specimen, that is from 2 different individuals and they shared a type, then you would say that one of the types is being masked by the presence of another type of the same type from the other -- of the same type from the other individual.

Q Is it based on your training and experience and your knowledge in this particular instance that that was -- there was a very strong potential for that in this case, was there not?

A I wouldn't say there was a strong potential. I would say there was certainly a possibility for that to occur, yes.

Q Both of these people show at least a DQ Alpha of 1.2, do they not?

A Yes, they do.

Q And do you agree with me that it's conceivable that the 1.2 that's showing up so strongly could be partly from the contributor [REDACTED] and also partly from the contributor Tim Durham?

A That is certainly a possibility that cannot be ruled out.

Q You've had a 100 percent accuracy as far as your proficiency testing; is that correct?

A Yes, we have.

Q And even though Mr. Price wants to call this a weak or equivocal result, is it my understanding that you are not equivocating, are you?

A I'm not equivocating at making the call at 1.1, no.  
 Q It's there?  
 A It's there.  
 Q You report it as faint; is that correct?  
 A Yes, that's correct.  
 Q And you report to the ladies and gentlemen of the jury that that in and of itself can be considered consistent with the defendant Tim Durham; is that correct?  
 A Yes. It is consistent with the defendant.  
 Q You neither positively include him nor positively exclude him as being the sperm donor in this case; is that correct?  
 A That's correct.  
 MS. SMITH: Pass the witness.  
 THE COURT: Anything else?  
 MR. PRICE: Doctor --  
 Yes, Your Honor.

#### RECROSS-EXAMINATION

BY MR. PRICE:  
 Q I thought that we agreed that as far as this defendant, your evidence and your interpretation had no value?  
 A No, I think that --  
 Q As to this man right here?  
 A Well you made that statement but if you'll recall, I didn't agree with that. I said that we did have some evidence in the sense that if we took all the 1.1 typings and matched

them with either 1.1, 1.2 or 2, we would eliminate 90 percent of the population and he would be in the 10 percent of the population that could not be eliminated.

But again I cannot positively include nor positively exclude the defendant in this particular case.

Q After 3 tests?  
 A Correct.  
 Q The third one being different from the earlier two?  
 A Correct.  
 Q And as far as this individual here is concerned, you cannot put him in or outside that group? This man right here?  
 A Which group are you talking about?  
 Q Any group of -- your test results? Your test results in regard to this man here? Say yes or no.  
 A I cannot positively say that this man's typing is the same as the typing that was found in the male fraction of the swimsuit on the third attempt. I cannot exclude him from any of the attempts.

What I am saying is that if we take the 1.1, which is a typing which I observed in the male fraction on the third attempt, and pair it with any of the other possible types that we got from that, that is the 1.2 or the 2 or additionally the perpetrator could have been a 1.1/1.1 and we total the frequency of those people in the population, that is about 10 percent of the population, that would say that we can exclude

90 percent of the population as having contributed the sperm in that particular specimen.

The defendant could not be excluded from those, that 90 percent. He would be in the 10 percent we could not exclude.

Q And you couldn't -- in your words, conclusively include him either?

A Correct.

Q Okay. Based upon your third test?

A Correct.

Q After you knew what the results you were looking for were?

A That is correct. We did know at that point in time.

Q It was not a blind study at that time?

A Typically, these of types are tests are never blind anyway unless we're doing a blind proficiency test. I would simply say --

THE COURT: Go ahead and answer the question yes or no.

Q (By Mr. Price) It was not a blind test?

A It was not a blind study.

Q Your first one was a blind study?

A Yes.

Q Your second one, a blind study?

A Yes.

MR. PRICE: I have nothing further.

THE COURT: Is that it?

#### REDIRECT EXAMINATION

BY MS. SMITH:

Q What were you trying to say about the blind study?

A Well I was just going to say that usually when we're doing a DNA test, many times that we will know the DNA typing of the suspect and the victim.

That in no way influences what our results and the way we interpret our results would be. We simply follow the guidelines. If it meets the criteria, then it is a match. If it doesn't meet the criteria, it's not a match.

Q Let me ask you this: Doctor, have you testified on behalf of the State and the defense in the 50-plus cases that you've testified in?

A I have testified for the defense on a few occasions, yes.

Q Are you familiar with reports that came out in the New York Times concerning government studies in DNA?

MR. PRICE: Beyond the --

THE COURT: I'll sustain that. I think we have been carrying that on way too far about what's going past the scope. I will sustain that OBJECTION. It wasn't brought on up his cross.

MS. SMITH: No, but he attacked his credibility and that's the only reason I offered it, Judge.

THE COURT: Still it's not brought out on --



MS. SMITH: May we approach?

(The following ensued out of the hearing of the jury.)

MS. SMITH: At this time, I'd make an offer of proof that when Mr. Price attacked Dr. Gile's credibility in this regard, there is a government study that came and was immediately withdrawn the next day where the statement concerning the government study and they have in fact been found to be accurate.

THE COURT: When did he attack his credibility?

MS. SMITH: When he started talking about the 2 blind tests.

THE COURT: The what?

MS. SMITH: The 2 blind tests and then the test when he knew what the results would be.

THE COURT: He's done that 15 times.

MS. SMITH: That's true.

THE COURT: You don't need to bring it up. That's beyond the scope. It's not did somebody recant or something. I mean the law is --

MS. SMITH: That's true.

THE COURT: If there's 2 options, you give the defendant the benefit of the doubt.

MS. SMITH: That's true.

THE COURT: I don't think he needs this.

(The following ensued within the hearing of the jury.)

THE COURT: I've sustained the last OBJECTION.

Q (By Ms. Smith) Let me ask the question this way, Dr. Giles. Have you testified as truthfully and accurately as you possibly can?

A Absolutely.

Q Thank you.

MS. SMITH: Nothing further.

THE COURT: Is that it?

Thank you, appreciate you coming to court.

MS. SMITH: State would call [REDACTED] to the stand.

THE COURT: All right. Bring [REDACTED] to the stand.

Young lady, if you'll stop right here for a moment and place your left hand on the Bible and raise your right hand.

Do you solemnly swear the testimony you're about to give in the cause now on trial will be the truth, the whole truth and nothing but the whole truth, so help you God?

THE WITNESS: I do.

THE COURT: Have you a seat here, relax if you would.

Do you want this marked as a number?

MS. SMITH: Yes, please.

THE COURT: While they're posting the Exhibit Number 35 upon the easel here, I understand the defendant has no OBJECTION to this exhibit.

MR. BENNETT: That's correct.

THE COURT: And this is a drawing, probably not to scale, but of the first home -- of the residence of where the victim lives.

[REDACTED]  
after first being duly sworn, testified as follows, to-wit:

# DIRECT EXAMINATION

BY MS. SMITH:

Q Would you please state your name and spell your last name for the record?

A [REDACTED]

Q What's your address?

A [REDACTED]

Q How old are you?

A I'm 13.

Q I want to direct your attention back to May 31st, 1991. How old were you on May 31st, 1991?

A I was 11.

Q On that particular day, was that the end of school?

A Yes.

Q What was going on at your house at that point in time initially on that day? First on that day?

A Well I was going to get my report card and then I came back. And my mom left to go to work and she's going to come back and pick me up for a swimming party and my brother went

out with his friend.

Q Were you home by yourself?

A Yes.

Q How long were you going to be home by yourself?

A About 2 or 3 hours.

Q What time did your mom -- she went to take you to get your report card; is that correct?

A Yes.

Q Then she brought you back home?

A Um-hum.

Q What's your brother's name?

A Zig.

Q Did she have to take Zig somewhere?

A No. I think his friend came and picked him up.

Q Okay. So your mom is gone. Did she go back to work?

A Um-hum.

Q And Zig is going somewhere with his friends; is that correct?

A Yes.

Q And you're there by yourself?

A Um-hum.

Q About what time was your mom going to come back and pick you up?

A About 12 o'clock.

Q Okay. About 12 o'clock. Do you have any idea at this