

1 THE COURT: Call your next witness.

2 MR. STROUD: If Your Honor please, the State calls Special  
3 Agent Hedgecock.

4 DAVID HEDGECKOCK, being first duly sworn, testified as follows  
5 during DIRECT EXAMINATION BY MR. STROUD:

6 Q State your name, please, sir,

7 A David Hedgecock.

8 Q Mr. Hedgecock, how are you employed?

9 A I'm employed with the North Carolina State Bureau of  
10 Investigation crime laboratory as a Forensic Serologist

11 Q And where is it that you're employed, sir?

12 A This is in Raleigh, North Carolina.

13 Q Mr. Hedgecock, what exactly is a forensic serologist?

14 A A forensic serologist is an individual who works in a crime  
15 laboratory and examines various articles of evidence for the  
16 presence of blood and various other body fluids such as semen  
17 and saliva in an attempt to analyze those substances when they  
18 are found.

19 Q What's entailed in the examination and analysis of, for  
20 example, a blood sample?

21 A Depending on exactly what the circumstance is; in general terms  
22 the blood sample is examined for the determination of blood types  
23 or groups that it may contain and is usually used to compare the  
24 groups that are found in a particular sample with those from  
25 various other pieces of evidence to see if they are consistent or

1 are different.

2 Q Are other types of body fluids besides blood examined?

3 A Yes, sir. For example seminal fluid is the most, second most  
4 common fluid we examine and in which seminal fluid vaginal fluid  
5 is often present; saliva, sometimes perspiration, other body  
6 fluid such as that.

7 Q What training and background do you have in forensic serology  
8 and in the examination and identification of body fluid and their  
9 characteristics?

10 A I received a Bachelors Degree in Chemistry from the University  
11 of North Carolina at Chapel Hill in 1972. I began my employment  
12 with the Bureau in 1973 as a forensic serologist. At that time,  
13 I underwent an extensive training program under the auspices of  
14 the two forensic serologists who were on hand who were on the staff  
15 at that time. This training period lasted essentially a year,  
16 a little more than a year. During this time not only did I involve  
17 myself with on the job training, but I was sent to various  
18 schools and seminars throughout the nation pertinent to forensic  
19 serologists. Georgetown University in Washington, D.C., Biscayne  
20 College in Miami, Florida, and Memorial Hospital in Chapel Hill,  
21 just to name a few.

22 MR. STROUD: If Your Honor please, the State offers  
23 Agent Hedgecock as an expert in the field of forensic serology.

24 THE COURT: All right, the Court finds the witness is  
25 an expert forensic serologist.

1 Q Agent Hedgecock, if you would, indicate for the jury by way  
2 of background information, the types of blood and what you're  
3 referring to when you indicate blood groups?

4 A All right. Blood contains a number of different blood groups  
5 other than those that are commonly known. The most common blood  
6 group that is, or blood groups known are types ABO and AB and  
7 usually the RH factor, positive or negative. These various ABO  
8 and AB groups are, fall within what's referred to as the ABO  
9 system. Systems are merely large categories under which various  
10 groups are classified according to the similar properties they have.  
11 There are a number of other different systems in the blood other  
12 than ABO. Enumerable, actually, the ones we deal with in forensic  
13 work are PGM, AKA, ADA, eight or ten others actually that are  
14 abbreviations for large chemical names, but within each of those  
15 systems that are various blood groups just as within the ABO  
16 system. The PGM system, for example, contains three blood groups  
17 and these are referred to with numerous others, also. Groups  
18 1, 2 and 2, and it is also found that these blood groups, some  
19 of these blood groups also occur in other body fluid other than  
20 just blood. Blood groups are found in seminal fluid, vaginal fluid,  
21 and saliva quite often.

22 Q Agent Hedgecock, have you brought with you some diagrams which  
23 help illustrate the ABO/group and PGM blood groups, particularly?

24 A Yes, sir.

25 Q Are these two such charts?

1 A Yes, sir.

2 Q Have you also supplied me with two smaller models of those  
3 charts?

4 A Yes, I have.

5 (MAREKD FOR IDENTIFICATION STATE'S EXHIBITS 22 and 23.)

6 Q Agent Hedgecock, you have in your hands there one poster  
7 labled PGM at the top, is that correct?

8 A Yes.

9 Q Isn't, is this an excet reproduction/reduction of that chart?

10 A Yes, it is?

11 A This being State's Exhibit number 22?

12 A Yes, sir.

13 Q Did you also hold another chart down entitled "Semen typing"?

14 A Yes, sir.

15 Q And ~~dois~~ State's Exhibit Number 23 an exact reproduction/  
16 reduction or reduced reproduction, if you will of that chart?

17 A Yes, it is.

18 Q Okay. Can you use those two charts in illustrating your  
19 testimony?

20 A Yes, sir.

21 MR. STROUD: If Your Honor please, I offer into  
22 evidence State's Exhibits 22 and 23.)

23 THE COURT: All right, State's Exhibits 22 and 23 are  
24 admitted into evidence for the purpose of illustrating the  
25 testimony of the witness.

1 Q Agent Hedgecock, inviting your attention also to State's  
2 Exhibit number 17 purporting to be a blood sample of Mary Reep.  
3 Do you recognize that item, sir?

4 A Yes, sir.

5 Q Have you ever seen it before?

6 A Yes, I have.

7 Q From whom did you receive that item?

8 A I received this item along with some other articles in a  
9 package through the registered mail in the laboratory.

10 Q And did that come from Lt. Paul Buchanan of the Jacksonville  
11 Police Department?

12 A Yes, sir.

13 Q All right, calling your attention also to State's Exhibit  
14 Number 18, was that similarly contained in that package?

15 A Yes, it was.

16 Q And what's State's Exhibit 18?

17 A State's Exhibit Number 18 is a cardboard box which contains  
18 two cotton swabs which are vaginal swabs.

19 Q Inviting your attention to State's Exhibit Number 21, is  
20 that similarly contained in the package you received from  
21 Lt. Buchanan?

22 A It was.

23 Q And what's State's Exhibit number 21?

24 A These are two slide specimens which are vaginal smears.

25 Q Agent Hedgecock, also calling your attention to State's

1 Exhibit Number 19 purporting to be a blood sample of Leo Waters,  
2 the defendant in this case, have you also received that from  
3 Lt. Buchanan of the Jacksonville Police Department?

4 A Yes, sir.

5 Q And calling your attention to State's Exhibit Number 20 and  
6 the contents thereof purporting to be a blood sample of Mark  
7 Reep. Do you recognize that item?

8 A Yes, sir.

9 Q Did you also receive that from Lt. Buchanan?

10 A Yes, sir, I did.

11 Q After performing your analysis and comparison on each of  
12 these items, did you, in fact, return them to Lt. Buchanan or  
13 excuse me, Lt. Buchanan?

14 A Yes, I did.

15 Q Agent Hedgecock, if you would, relating to this case,  
16 indicate to the jury what kind of analysis you can perform on blood  
17 and on seminal fluid and what results you may draw from them.

18 A In a case involving a collection, the collection of rape  
19 evidence using the standard SBI collection kit which is supplied  
20 to various hospitals throughout the State of which these are  
21 components, the basis of the examination is to first examine the  
22 vaginal specimens to determine whether or not there is, in fact,  
23 any seminal fluid present. If there is semen present, the vaginal  
24 swabs are used to, in an attempt to determine whether or not  
25 there are any blood group substance or any blood groups detectible

1 in the vaginal material which cannot be attributed to the victim.  
2 In other words, to back track a little bit, the blood sample  
3 from the victim is an important component of the kit. One has  
4 to determine what blood group factors the victim contains so that  
5 the analysis of the vaginal swabs will detect whether or not there  
6 are any substances different from her. The vaginal fluid is  
7 on the vaginal swabs can associate certain blood groups, depending  
8 on what the blood group of the victim is. So, one uses the blood  
9 sample to determine the ABO blood group of the victim and  
10 whether or not she's a secretor. A secretor is an individual whose  
11 blood group is within the ABO system, are found in these other  
12 body fluids, vaginal fluid if it's a female; semen, if it's a  
13 male. Saliva, whether it's a male or female. If the individual  
14 is a secretor, that particular blood group will be under also  
15 in the vaginal fluid and one has to know that so that/the groups  
16 were obtained, a vaginal swab one can deduce whether or not that  
17 group is caused by the victim or caused by a foreign substance  
18 such as semen. For example, if the victim is a group O secretor  
19 and the grouping on the vaginal swab gives you O secretor reaction,  
20 then that's possibly entirely due to the victim's vaginal fluid  
21 and no deduction can be made. If you get an A secretor reaction  
22 on vaginal swabs, for example, and the victim is an O secretor,  
23 then that A had to come from the semen, because it's different  
24 from her, so it's a matter of deduction, but one, first of all  
25 has to know what one is dealing with, what the victim is so you

1 can subtract contribution and see what's left, if anything.  
2 The same is true with PGM types. PGM's are also found in semen  
3 and vaginal fluid and PGM doesn't have anything to do with  
4 secretor status, however. Whether or not one is a secretor  
5 or not, this PGM factor would be found and again, one has  
6 to know what the victim's PGM type is and this is determined  
7 from the blood sample to that the PGM factors found in the  
8 semen or in the vaginal swabs so that one can deduce whether or  
9 not that is caused by the vaginal material from the victim  
10 or from something foreign, then it has to come from the semen  
11 itself. If I may use the chart, maybe I can make sense of all  
12 that.

13 Q Certainly.

14 A As I said, there are four common ABO groups. ABO and AB, and  
15 if one is a secretor, in 80 percent of the population are  
16 secretors, it's a very common factor to have, then whatever  
17 particular blood group one is will also be expressed in that  
18 person's semen or saliva or vaginal fluid, et cetera. If one  
19 is a non secretor, then no reaction is obtained. In other words,  
20 this blood factor is not found in these other body fluids. Of  
21 course, the blood groups still remain the same in blood but in other  
22 body fluids it is not present. PGM factors, as I said, there  
23 are three PGM types 1-2, 1 and 2, which is not dependent on the  
24 secretor status, and these are also found in, well, PGM is found  
25 in semen and vaginal fluid and not found in saliva. These two



1 groups are used if one has, his semen is found in the material  
2 in the rape kit, then one finds what the victim is and runs  
3 the blood groupings on the vaginal swabs and the results are  
4 used to compare back to her and possibly to a suspect. Of  
5 course, that is the whole point of it is to compare it back  
6 to a male individual, what his type is and see if it's the  
7 same as the foreign type found in the vaginal swab.

8 Q Agent Hedgecock, is one of the items before you there  
9 a blood sample taken from Mary Reep, the victim in this case?

10 A Yes, sir.

11 Q Did you analyze or examine that blood sample?

12 A Yes, sir, I did.

13 Q And that is the object identified as State's Exhibit Number  
14 17, is that correct?

15 A That's correct.

16 Q Did you also examine State's Exhibit Number 19, a blood  
17 sample taken from the defendant, Leo Waters?

18 A I did.

19 Q Did you also examine State's Exhibit Number 20, the blood  
20 sample taken from the husband of the victim, Mark Reep?

21 A Yes, sir.

22 Q And did you also examine State's Exhibits 18 and 21,  
23 identified as vaginal smears and vaginal swabs prepared from  
24 the samples taken from Mrs. Reep at the time she was examined  
25 at the Emergency Room?

1 A Yes, sir.

2 Q Agent Hedgecock, referring to your chart, if you find it  
3 helpful, would you indicate to the jury exactly what your  
4 analysis was on those items and what your analysis revealed?

5 A First of all, the examination of the slides was performed,  
6 the vaginal smears, State's Exhibit 21. That examination revealed  
7 the presence of spermatozoa; that is, the presence of semen.  
8 The blood samples from the two individuals were analyzed next  
9 and the analysis show that the blood sample of the victim, item  
10 State's Exhibit Number 17, was that of an ABO group O secretor,  
11 group O and A secretor, and PGM group 1. The analysis of the  
12 of the sample from the husband, which is State's Exhibit Number  
13 20, revealed that this individual was an ABO Group A, the top  
14 A secretor, and also PGM group 1. The sample from the defendant,  
15 State's Exhibit Number 19, revealed that the individual is also  
16 an ABO group O secretor, and a PGM type 2-1. The vaginal swab  
17 was grouped then and the grouping from this sample gave a  
18 reaction for an ABO group O secretor and a PGM group 2-1.

19 Q Agent Hedgecock, you indicated that your examination of  
20 the vaginal swabs indicated the presence of spermatozoa. Can  
21 you indicate for the jury in lay terms, exactly what spermatozoa  
22 are?

23 A Yes. Spermatozoa is the reproductive cell found in seminal  
24 fluid in males. It is the cell which associates the generic  
25 material from the father to the off spring.

1 Q In a normal adult human female, would spermatozoa ever  
2 appear naturally?

3 A No, it never would.

4 Q Agent Hedgecock, from your analysis of the items before  
5 you, were you able to determine whether or not Mark Reep, the  
6 victim's husband, could have been the donor of the vaginal  
7 material that you analyzed on the vaginal swab?

8 A The blood group factors which were detected on the vaginal  
9 swab specifically PGM type 2-1 was different from the husband  
10 and was different from the victim, both being PGM type 1, and  
11 could not have been contributed by either of those individuals.

12 Q Could not have been contributed by either Mary Reep or  
13 Mark Reep?

14 A That's correct.

15 Q Can you relate that result to your analysis of <sup>the</sup> blood of  
16 Leo Waters, the defendant in this case?

17 A Yes, sir. The blood of Mr. Waters showed that he is a  
18 PGM type 2-1, so the PGM type detected in the vaginal swabs  
19 is consistent with Mr. Waters' PGM blood type.

20 Q Does that indicate the defendant could have been the donor  
21 of the fluid found on the vaginal swab taken from Mrs. Reep?

22 A With regard to that particular blood group, yes, it shows  
23 a consistency.

24 Q Agent Hedgecock, are you familiar with the percentages of  
25 the general population which carry these various blood characterist

1 you have testified about?

2 A Yes.

3 Q And as to PGM type 2-1, approximately what percent of the  
4 white male adult population carries that blood factor?

5 A PGM type 2-1 is found in approximately thirty-five percent.  
6 thirty-five and a half percent of the general population.

7 THE COURT: What about the other two which were on  
8 the topic.

9 A The other groups?

10 THE COURT: Yeah, 1 and 2.

11 A PGM Group 1 is the most common of the PGM groups. It is  
12 found in approximately fifty-eight percent and type 2 is the  
13 least common. It is found in approximately six and a half percent.

14 Q (Mr. Stroud) Agent Hedgecock, after performing your analysis  
15 on all of those items, what did you do with them, sir?

16 A These items were sealed and were placed back in their  
17 original containers and put into a box and the box they were  
18 received in and mailed back to Officer Buchanan of the--in  
19 Jacksonville.

20 Q Other than as you've indicated was necessary to perform  
21 the analysis that you performed, did you alter or change those  
22 objects in any way while they were in your custody?

23 A None other than what the analysis that I had to perform, I  
24 did change or alter some of these items quite a bit, but that  
25 was the sole purpose of my alterations that were made.

1 Q And one last question. What condition was the container  
2 in that you received those objects in when you actually  
3 acquired it?

4 A It was sealed; it was wrapped, of course. It was in a  
5 box and was wrapped with brown paper and taped and completely  
6 sealed.

7 Q Were any of the seals damaged or broken?

8 A No, sir.

9 MR. STROUD: Thank you, sir. No further questions.

10 THE COURT: Cross-examination?

11 CROSS-EXAMINATION BY MR. POPKIN:

12 Q Mr. Hedgecock, was any ABO group foreign to the victim's--  
13 foreign to the victim found?

14 A No, sir, there was not.

15 Q So, no conclusion can be drawn as to the ABO blood group of  
16 the donor of the semen on that items?

17 A Yes, sir, that's correct, because the ABO type O vaginal  
18 swab is the same as the victim's. As I explained earlier, that  
19 can be contributed entirely by her, so no conclusion can be  
20 made, that's correct.

21 MR. POPKIN: I don't have any further questions.

22 THE COURT: Redirect?

23 MR. STROUD: None, Your Honor.

24 THE COURT: You may step down.

25 (WITNESS EXCUSED.)