

SUPERIOR COURT OF THE DISTRICT OF COLUMBIA  
CRIMINAL DIVISION

-----X  
 :  
 UNITED STATES OF AMERICA :  
 :  
 vs. : Criminal Action Number  
 :  
 ANTHONY JENKINS : F-00320-00  
 : Volume I  
 :  
 Defendant. :  
 -----X

Washington, D.C.  
Tuesday, March 29, 2005

The above-entitled action came on for hearing before the Honorable RHONDA REID-WINSTON, Associate Judge, in courtroom number 302.

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APPEARANCES:

On behalf of the Government:

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MICHAEL AMBROSINO, Esquire  
Assistant United States Attorney

On behalf of the Defendant:

EDWARD UNGVARSKY, Esquire  
CHRISTOPHER FLOOD, Esquire  
Washington, D.C.

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## P R O C E E D I N G S

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1  
2  
3 THE CLERK: On the trial calendar, United  
4 States versus Anthony Jenkins, F003200. Parties  
5 identify yourselves for the record.

6 MR. AMBROSINO: Michael Ambrosino for the  
7 United States.

8 MR. SAYBOLT: David Saybolt on behalf of the  
9 United States.

10 MR. UNGVARSKY: Ed Ungvarsky on behalf of  
11 Anthony Jenkins.

12 MR. FLOOD: Good morning. Christopher Flood  
13 on behalf of the defendant.

14 THE COURT: Good morning. Parties, I  
15 apologize. I was in a meeting. I didn't check the  
16 time. We are ready to start.

17 MR. AMBROSINO: The United States calls  
18 Dr. Chakraborty.  
19 Whereupon --

20 RANAJIT CHAKRABORTY,  
21 a witness, called for examination and, having been first  
22 duly sworn, was examined and testified as follows:

## DIRECT EXAMINATION

24 BY MR. AMBROSINO:

25 Q Good morning.

1 A Good morning.

2 Q Could you please state your full name for the  
3 record and spell it for the court reporter right in  
4 front of you.

5 A My full name is Ranajit Chakraborty. The  
6 first name Ranajit is spelled as, R-A-N-A-J-I-T, as in  
7 Texas. Chakraborty, spelled C-H-A-K-R-A-B-O-R-T-Y.

8 Q And Dr. Chakraborty, what is your current  
9 position?

10 A I am at the University of Cincinnati College  
11 of Medicine in Cincinnati. And my job title is director  
12 of center for genome information and professor --  
13 professor, called Robert Kehoe, K-E-H-O-E, professor of  
14 genetics.

15 Q And what does that mean?

16 A In a professorship is given to scientist of  
17 nationally as well as internationally reputation. And  
18 in a sense, my salary comes from an endowment that the  
19 University of Cincinnati College of Medicine has.

20 Q So if the university went bankrupt, would you  
21 still get paid?

22 A Hopefully so.

23 Q What I would like to do is show you what I  
24 have marked as Government's Exhibit 10.

25 THE COURT: Excuse me, Mr. Ambrosino. Just a

1 moment.

2 BY MR. AMBROSINO:

3 Q I'm showing you what I have marked as  
4 Government Exhibit Numberer 10. Is this your CV?

5 A Yes.

6 MR. AMBROSINO: Your Honor, I move  
7 Government's Exhibit Number 10 into evidence.

8 THE COURT: Any objection, Counsel?

9 MR. FLOOD: No, ma'am.

10 (Government's Exhibit Number 10 was received  
11 into evidence.)

12 BY MR. AMBROSINO:

13 Q Now, Dr. Chakaborty, with respect to your  
14 current position, what are your duties there?

15 A I have three types of responsibilities as the  
16 director of the center for genome information. I  
17 develop research programs for the whole center. That  
18 includes supervision of seven other faculty members,  
19 graduate and postgraduate students and research  
20 assistants, totaling about 45 persons.

21 Second kind of responsibility is to conduct  
22 research of my own interest. Currently, I have three  
23 types of projects, one to find out genes for complex  
24 diseases including cancer, diabetes and others. Second  
25 is to model and understand genetic basis of risk of

1 radiation exposures. And third is utilizing genomic  
2 information for human as well as pathogen  
3 identification, areas of interest in DNA forensics and  
4 microbial forensics.

5 And the third set of responsibility is to  
6 train students. That includes private face-to-face  
7 instruction to graduate students as well as postgraduate  
8 students as well as giving lectures in didactic courses.

9 Currently, I give two courses, one on  
10 statistical genetics, the other is genetic aspects of  
11 epidemiology.

12 Q Now, Doctor, could you just review briefly  
13 your educational background for the Court.

14 A I have bachelor's, masters and Ph.D. degree,  
15 all from Indian Statistical Institute, Calcutta, which  
16 is a world-famous institute of statistical sciences.

17 The highest degree, Ph.D., was in the area of  
18 biostatistics and population genetics that I received in  
19 1971.

20 That is my formal educational background.

21 Q Now, looking at page 1 of your CV, you list a  
22 number of awards, honors and fellowships. What is a  
23 fellowship?

24 A Fellowship could be a multiple types. Based  
25 on your education and research background, you may apply

1 to professional societies, and they may give you a  
2 fellowship and you keep on retaining the fellowship as  
3 long as you pay their yearly dues.

4 The second type of fellowship is more  
5 unsolicited ones, meaning that there are learned bodies  
6 who select or elect persons of extraordinary caliber and  
7 expertise.

8 For example, Chilean National Academia of  
9 Science is academia science at their national level.  
10 You cannot pay membership dues and become a member. The  
11 existing members of that academia might consider  
12 scientist's reputation and elect then to be a fellow.

13 So a fellowship can be of different types.

14 Q Now, do any of the fellowships that you have  
15 received deal in the area of forensic DNA?

16 A Yes, it does.

17 Q Could you just mention one as an example?

18 A For example, towards the end of last year I  
19 was elected in the Mediterranean Academia Forensic  
20 Science. That is, again, academia membership by not  
21 paying membership dues. I was elected by the peer group  
22 there.

23 Q And what did that peer group involve?

24 A Forensics scientists countries in the  
25 Mediterranean region of Europe.

1           Q     I would like to talk to you a little bit about  
2 your academic appointments which begin on page 2 of your  
3 CV. With respect to academic appointments, do any of  
4 those deal with population genetics and DNA forensics?

5           A     Yes, it does.

6           Q     What is TWGDAM?

7           A     TWGDAM, T-W-G-D-A-M is an acronym standing for  
8 Technical Working Group of DNA Analysis Methods.

9           Q     How long have you been involved with that  
10 group?

11          A     I think it is over -- from 1989.

12          Q     To the present?

13          A     To the present.

14          Q     Does it have a new name now?

15          A     Yeah. TWGDAM has changed their name into  
16 SWGDAM, S-W-G-D-A-M standing for Scientific Working  
17 Group of DNA Analysis Methods.

18          Q     And in the course of your participation with  
19 that group, have you had occasion to discuss the  
20 applicability of statistical methods in DNA forensics?

21          A     Yes.

22          Q     Now, also listed on your resume is the DNA  
23 Advisory Board, sometimes referred to as the DAB.

24          A     Correct.

25          Q     How long were you involved with the DAB?

1           A     I was involved with DAB during its entire  
2 lifetime of 1995 to 2000.

3           Q     And were you appointed by the director of the  
4 FBI to serve on that committee?

5           A     Yes. The appointment came from the director  
6 of FBI, but I was a nominee from the American Society of  
7 Human Genetics.

8           Q     Now, in your capacity as a member of that  
9 committee, did you participate in the drafting of a DAB  
10 guideline that was issued in 2000 which addressed the  
11 issue of the statistical applications in the cold hit  
12 context?

13          A     Yes.

14          Q     And who are the other persons that  
15 participated with you?

16          A     Well, that subcommittee -- the whole issue was  
17 one of the charters of the entire DNA advisory board.  
18 And when the entire board deliberated on the issue, they  
19 felt it necessary to write a formal document and the  
20 document was charged to a subcommittee. I was a member  
21 of the subcommittee. The other members of the  
22 subcommittee were Dr. Bruce Budowle from FBI Academy,  
23 Dr. Arthur Eisenberg, a professor in Dallas/Fort-Worth,  
24 Dr. Fred Bieber, myself and Dr. Bernie Devlin from  
25 Pittsburgh

1 THE COURT: Excuse me. Dr. Chakraborty, could  
2 you speak a little more slowly.

3 THE WITNESS: Sure.

4 BY MR. AMBROSINO:

5 Q Now, aside from you, did anyone else on that  
6 committee have your degree of expertise and statistics?

7 A Well , I really do not want to compare myself  
8 with others. Dr. Bernie Devlin is a distinguished  
9 statistical geneticist. Dr. Bieber has a good  
10 understanding of statistical methodologies. But  
11 probably of that subcommittee I had the maximum number  
12 of publications in the relevant area.

13 Q Now, throughout the meetings, either at TWGDAM  
14 or the DAB or the other appointments that you list in  
15 your CV, did you come to learn what the practice is in  
16 the scientific community regarding statistical  
17 applications and interpretations in DNA cases?

18 A Yes, I do.

19 Q Was that a subject that was discussed fairly  
20 frequently in your experience from the inception of or  
21 at least from the start of your involvement in forensic  
22 DNA through the present, statistical applications in DNA  
23 cases, was that a topic that was -- that you have had  
24 occasion to talk with people in this community about  
25 from the time you began working in DNA to the present?

1           A     Yes.

2           Q     Now, on page 3 of your resume, you begin  
3 listing other professional activities. And could you  
4 talk about some that just deal specifically with DNA?

5           A     Well, everything goes back, really, to very  
6 early of my research career. For example, in 1975, when  
7 we were dealing with the subject of genetic variation in  
8 human populations, one question repeatedly, we were  
9 asked by the founding geneticists of the National  
10 Institute of Health as to what are the other practical  
11 uses of such polymorphism or genetic variation studies.

12                    So in 1975 we wrote a position paper of using  
13 genetic markers or genetic variation as a vehicle to  
14 identify individuals and to address, for example, the  
15 question of whether or not a specific person accused  
16 fathered a child.

17                    So we showed what is the power of genetic  
18 markers in human identification and parent testing.

19           Q     And your involvement with that issue dates all  
20 the way back to 1975?

21           A     Right.

22           Q     Did there come a time when you became involved  
23 or knowledgeable about offender databases?

24           A     Yes.

25           Q     Have you come to learn about the offender

1 database system known as CODIS?

2 A Yes.

3 Q And what is CODIS?

4 A CODIS, C-O-D-I-S, stands for combined DNA  
5 index system.

6 It is an acronym that is often ascribed to the  
7 offenders database of U.S. Federal Government.

8 Likewise, there are other offenders databases in 43  
9 other countries of the world.

10 Q And have you been involved in issues  
11 pertaining to any of those databases?

12 A U.S. one most intimately. And I had given  
13 occasional advice for the Canadian database. And I had  
14 occasions to probe into some of the European databases  
15 as well.

16 Q Now, were you also -- in 2001, were you an  
17 advisory board member for the victims identification of  
18 the World Trade Center incident?

19 A Yes.

20 Q And what did that entail?

21 A As you are probably aware, after the 9/11  
22 disaster, the immediate concern was raised as to what  
23 approaches are to be taken for identifying the victims  
24 of -- who perished in the two towers as well as in the  
25 other airplane crashes related to those events.

1           A national body was selected. I was not part  
2 of that national committee to start with. But soon that  
3 committee, as well as others, me included, recommended  
4 that a more combined and concerted effort has to be  
5 launched because of the peculiarities of the possible  
6 evidence samples, namely, most of the evidence samples  
7 were suspected, and it became a reality later on, would  
8 be highly degraded subject to contaminants not usually  
9 seen in traditional forensic samples.

10           Q     Did the analysis of those samples present some  
11 fairly complex statistical issues.

12           A     Yes, it did.

13           Q     And were you involved with the committee in  
14 resolving what types of statistics should be applied in  
15 analyzing the DNA from the Trade Center incident?

16           A     Yes.

17           Q     Now, have you also been involved with DNA  
18 issues internationally?

19           A     Yes.

20           Q     Have you had occasion to assist other  
21 countries regarding statistical interpretations of DNA  
22 evidence?

23           THE COURT: Excuse me, Mr. Ambrosino.

24           MR. AMBROSINO: Am I talking too fast?

25           THE COURT: I want the pace of this to slow

1 down a little bit. Thank you.

2 BY MR. AMBROSINO:

3 Q Have you had occasion to assist other  
4 countries regarding statistical interpretations of DNA  
5 evidence?

6 A Yes.

7 Q Can you give some examples of that?

8 A Let me start with a case which is almost 12  
9 years old now. It was in Brazil. There was a confusion  
10 as well as mental anguishments about why a family where  
11 both parents were of European white background had a  
12 mulatto baby.

13 The parents did traditional blood group  
14 typing. The father was excluded as the biological  
15 father. Mother's genotypes were compatible with the  
16 child. So while the couple stayed happy, but anytime  
17 that issue was raised, there was some problem.

18 Now, when we were conducting the second  
19 international -- third international DNA fingerprinting  
20 meeting in Bellohorizonte, B-E-L-L-O-H-O-R-I-Z-O-N-T-E,  
21 in that city in Brazil, the father came to us and asked  
22 the DNA technology, the result, the issue, why I'm  
23 excluded and my wife is not. But she claims that it is  
24 our baby.

25 Then we said, we can try. We used the DNA

1 technology at that time, restriction fragment length  
2 polymorphism, RFLP technique, and excluded both parents.

3 And later on, to make the long story short, it  
4 was found out that the director of the nursing home for  
5 some substantial fee exchanged the baby of this white  
6 family with that of a mulatto family. And that is how  
7 they ended up having a mulatto baby.

8 So this is one of the stories of my  
9 international involvement. The most recent one happened  
10 a few weeks when I came back from India and China during  
11 tsunami. I did the statistics for showing that the New  
12 Zealand Forensic Laboratory Assessment of identifying a  
13 particular body as the member of a half sibling may not  
14 be correct by traditional CODIS loci typing.

15 Q Now, you list as one of your activities in  
16 2002, a member of a scientific working group -- might be  
17 microbial forensic genetics, M-I-C-R-O-B-I-A-L, forensic  
18 genetics. And that is part of a working group called  
19 SWGMFG. Could you describe what that entailed?

20 A Well, again, what happened during the last  
21 three years, particularly the anthrax episode prompted  
22 the scientific bodies who are interested in solving  
23 crime issues using modern scientific methods, they found  
24 out just like DNA forensics, we may be able to use the  
25 DNA technology to identify pathogens and possibly to

1 narrow down the source from where the pathogen is  
2 derived.

3 So to look at those issues, just like TWGDAM  
4 or SWGDAM, a new scientific body was created called  
5 SWGMGF, S-W-G-M-G-F standing for Scientific Working  
6 Group of Microbial Genetics and Forensics.

7 Q Did that working group deal with statistical  
8 issues?

9 A Yes. Part of the charter of that working  
10 group is to discuss statistical issues as well.

11 Q On page 5 -- on page 5 of your CV, you talk  
12 about professional societies that you have been a member  
13 of.

14 Do any of those societies that you have been a  
15 member of deal with the area of human population  
16 genetics and statistics?

17 A Many of them do.

18 Q Could you just give an example for the Court.

19 A Well, in terms of population genetics and  
20 human genetics, the society is like American Society of  
21 Human Genetics is the most premier society of which I'm  
22 a life member. The Genetic Society of America also  
23 deals with the population genetic issues in humans as  
24 well as in other organisms. And the American  
25 Association of Human Biology obviously deals with human

1 genetic issues. And then the International Association  
2 of Human Biologies and others, to name a few.

3 Q And in your participation with these groups as  
4 a member, have you had occasion, since from 1970 to the  
5 present, to discuss the application of statistics in DNA  
6 forensic cases?

7 A Not in terms of the meetings of all of these  
8 associations, but surely for some. But there are other  
9 associations of which I'm a member in which those issues  
10 are discussed at a more regular basis.

11 Q And what would those be?

12 A For example, the association called  
13 International Association of DNA Fingerprinting. Their  
14 proceedings regularly deal with the genetic or  
15 population genetic issues, statistical issues related to  
16 human identification.

17 Q And how long have you been involved with that  
18 group?

19 A I'm a founding member of that group, life  
20 member. I think that association started sometime in  
21 1994.

22 Q And have you attended meetings of that group  
23 regularly?

24 A Yes.

25 Q Now, in terms of your teaching activities,

1 what types of courses do you teach?

2 A As I mentioned before, currently I give two  
3 courses. One is called statistical genetics. The other  
4 is called genetic aspects of epidemiology. And in  
5 statistical genetics, particularly in the second part of  
6 that course, I deal with statistical and population  
7 genetic issues relevant to human identification and also  
8 pathogen identification.

9 Q And what is the level of course that you teach  
10 at?

11 A These are graduate level courses, meaning the  
12 course is taken by students who are trying for a Ph.D.  
13 degree.

14 Q Now, at page 7 of your CV you talk about grant  
15 support, and I just want to touch on a few of them.

16 You list a number of grants dating from 1973  
17 through the present. Could you just talk about a few of  
18 those that relate to the area of DNA forensics.

19 A Yes. I had been a recipient of at least three  
20 grants in that area, all from the National Institute of  
21 Justice's DNA research program.

22 And the first one was to deal with statistical  
23 validation of databases being generated by laboratories  
24 under the direction of TWGDAM or SWGDAM. The second was  
25 a grant of a similar nature with a more advanced and

1 changed technology, namely PCR-based systems. And the  
2 third was also in that context to do a more  
3 comprehensive analysis of the U.S. databases in the  
4 context of what information was coming out at an  
5 international level.

6 Q When you talk about your experience with those  
7 grants, does that relate to some of your field  
8 experience that you list from 1992 to the present?  
9 Specifically talking about, on page 9 of your resume,  
10 directing statistical analysis of forensic PCR-based STR  
11 databases generated by 27 forensic laboratories within  
12 the U.S.A. and over six international laboratories,  
13 Brazil, Australia, Canada, Spain, UK and Switzerland.

14 A Yes.

15 Q And this could be described briefly. What was  
16 your interaction with these labs with respect to  
17 statistical issues and DNA analysis?

18 A It really varied. For example, for some of  
19 the SWGDAM laboratories, my connections were much more  
20 closer in the sense that I visited those laboratories,  
21 looked at all of the different stages of their bench  
22 work before having a look at their databases.

23 For others, it stemmed from longstanding  
24 collaborations, but not necessarily visiting them that  
25 closely, simply identifying what kind of technologies

1 they are using for doing the experiments, and then  
2 having a look at their data.

3 But the overall goal was to look at whether  
4 those databases satisfied the assumptions generally made  
5 for making a statistical assessment of a DNA evidence  
6 utilizing those databases.

7 And second to see whether their data is in  
8 conformity with the cumulative knowledge of the human  
9 genome diversity that we have information from based on  
10 other genetic markers, which are not necessarily used in  
11 DNA forensics.

12 THE COURT: Excuse me. We are going to take a  
13 five-minute break.

14 You are excused to go back to the witness  
15 room.

16 (Witness leaves the stand.)

17 THE COURT: Counsel, there are a lot of terms,  
18 and as I recall -- I just can't remember which pleading  
19 I read -- there was a glossary on the back of it. Maybe  
20 you all can just remember. I think that will be  
21 helpful.

22 She has a glossary that one of the other  
23 reporters gave her, but if somebody has -- and I just  
24 can't remember.

25 MR. AMBROSINO: It's in our C2 --

1 THE COURT: All right. And if you can just  
2 give me that, maybe I can have a copy run off.

3 I'm going to ask you, Mr. Ambrosino, a lot  
4 more slowly. And I want the pace of it to slow down so  
5 that the reporter doesn't have any difficulty  
6 understanding you or the witness. And I think if you  
7 can slow the pace of the entire examination down, that  
8 will facilitate it. I just recall it wasn't in a  
9 book --

10 MR. FLOOD: Your Honor, I believe the  
11 Government submitted as one of their appendixes in a  
12 ring-bound fashion -- and there is a glossary in the  
13 back of it.

14 THE COURT: Right. And I have my own. But if  
15 I could just get that one.

16 MR. UNGVARSKY: May I use the rest room while  
17 we're on break?

18 THE COURT: Yes.

19 MR. AMBROSINO: I have it right here, Your  
20 Honor.

21 THE COURT: If we could just make a copy of it  
22 and maybe take ten minutes. And maybe you can look at  
23 it for a couple of minutes.

24 (A recess was taken.)

25 MR. AMBROSINO: Your Honor, I'll proceed

1 without Mr. Saybolt. I apologize. I need to see where  
2 I was.

3 THE COURT: I apologize for interrupting.

4 BY MR. AMBROSINO:

5 Q One of things I believe that you were talking  
6 about was forensic laboratories, and I want to direct  
7 your attention to that. How many forensic laboratories  
8 approximately have you had contact with in your  
9 experience here in the United States and overseas?

10 A Well, it's difficult to give an exact count,  
11 but it would be easily over 24.

12 Q And in your contact with those laboratories,  
13 does that include the FBI's laboratory?

14 A Yes.

15 Q Is it fair to say that you have had fairly  
16 extensive contact with them?

17 A Yes.

18 Q In your contact with these laboratories, have  
19 you gotten a sense of what statistical calculations are  
20 utilized in forensic DNA testing?

21 A Yes, I do.

22 Q And have you had an opportunity to form an  
23 opinion as to whether or not those laboratories follow  
24 the guidelines that were issued by the DAB?

25 A Yes, they do.

1           Q     Now, you use the term "databases." And I want  
2 to make a distinction here. Is there a distinction  
3 between a felon database and a population database?

4           A     Yes.

5           Q     Have you had experience with both?

6           A     Yes.

7           Q     Could you just describe briefly to the Court  
8 what the difference is between the two?

9           A     Population databases are the databases that  
10 were created to have an idea about what is the extent  
11 and pattern of genetic variation at these loci that are  
12 used in DNA forensics in worldwide populations.

13                   So it involved both, one could say training of  
14 the forensic laboratory analysts to use the technology  
15 as they would practice in case work on samples collected  
16 from populations that they might eventually use to do  
17 their statistics from.

18                   The offender's database is something  
19 different. They were generated by legislatures of the  
20 respective government to have a DNA profile of selected  
21 persons, selected best on criteria governed by the  
22 regional legislatures.

23                   For example, in the CODIS system, it is -- a  
24 person is convicted of crimes of some prescribed nature.  
25 In other countries, for example in England, it could be

1 | arrestees of any sort of crime.

2 |           The objectives are different. Access is also  
3 | of different nature. Population databases of  
4 | laboratories are subject to open discovery; namely, the  
5 | profiles could be given out to persons with intended  
6 | causes.

7 |           But offenders database is of restricted use.  
8 | It can be accessed only by proper investigative  
9 | authorities. The offenders database is not open to any  
10 | research quotients, unlike the population databases.

11 |           Q     Now, in your career, approximately how many  
12 | times have you published?

13 |           A     To the last count, I have over 490  
14 | peer-reviewed full-length papers.

15 |           Q     Peer-reviewed?

16 |           A     Seven books and over 290 abstracts.

17 |           Q     And you say peer-reviewed. What do you mean  
18 | by that?

19 |           A     These are papers, full-length papers that have  
20 | been looked at least by one expert in respective fields  
21 | and found to be publishable.

22 |           Q     And of those over 400 publications, how many  
23 | of those publications deal in the area of human  
24 | population genetics?

25 |           A     Human population genetics, I would say over 90

1 | percent in the context, more closely in the context of  
2 | DNA -- statistics of DNA forensics --

3 | Q Well, that was my next question.

4 | A -- it would be at least 150.

5 | Q About 150 specifically in the area of DNA  
6 | forensics?

7 | A Correct.

8 | Q Now , I'm not going to obviously ask you about  
9 | all of them, but with respect to the cold hit issue, did  
10 | you participate in the drafting of an issuance of the  
11 | DAB guidelines in the year 2000, the interpretation of  
12 | the NRC II report?

13 | A Yes.

14 | Q And what was your role in the publication of  
15 | those guidelines?

16 | A Well, to clarify the statistical principles  
17 | behind the relevant questions that are implicit or  
18 | explicit in the NRC II recommendations and to examin<sup>38Xe</sup>  
19 | the scientific validity of the underlying rationale of  
20 | answering each of these questions.

21 | Q Now, other than that particular DAB article,  
22 | have you personally seen a need to address or write  
23 | about the cold hit issue?

24 | A Personally, I didn't feel that has to be -- a  
25 | separate article has to been written on that.

B

iW

1 Q Why was that?

2 A At least in my statistical genetics course, I  
3 go through similar logic in the context of wide variety  
4 of other problems.

5 So I see these as a natural extension of  
6 multiple types of questions that can be answered in a  
7 situation similar to this, and obviously the different  
8 questions begs different answers.

9 Q Did you feel that there was any need to write  
10 on that subject other than the DAB article?

11 A Personally, I didn't feel that was necessary.

12 Q Now, when you look at your 150 articles or so  
13 that involve the area of DNA forensics, did you have  
14 occasion to address other statistical issues,  
15 specifically the application of statistics of DNA  
16 forensic testing?

17 A Yes, I did.

18 Q How frequently would you say that you would  
19 address issues such as that in your publications?

20 A For example, many of these articles,  
21 particularly the ones written in the early '90s, go back  
22 to the issue of how reliable or how accurate the  
23 assumptions of some of the computations of coincidental  
24 match probability.

25 And then later on I addressed some technical

1 issues relating to the technology that has relevance to  
2 statistical methods. For example, when we were using  
3 restriction fragment length polymorphism techniques,  
4 RFLP, then there was an issue of whether or not you  
5 could detect the homozygotes unequivocally in every  
6 case.

7 Q Can you spell homozygote.

8 A H-O-M-O-Z-Y-G-O-T-E-S. And we showed that  
9 because of the limitation of the technology, not all  
10 single-banded patterns are homozygotes. And as a  
11 consequence, that had some statistical ramifications.

12 We discussed that in a number of papers. And  
13 then we moved on to the issues of -- we use population  
14 databases to derive statistics about the rarity of a  
15 specific DNA profile, rareness.

16 Q So a number of them actually discussed the  
17 issue of rarity in a DNA profile?

18 A Right. So to come to that kind of an  
19 estimate, we make some assumptions. And in addition, we  
20 make those predictions based on not sampling all the  
21 individuals of the population, sampling only a fraction  
22 of the total population, so what kind of uncertainty it  
23 produces.

24 And more recently, then we addressed the  
25 issues of since we make some assumptions and those

1 assumptions, even though they are by and large satisfied  
2 by analysis of population databases, can we make some  
3 adjustments? So that one legal requirement is met.

4 Ordinarily, we are often advised that in legal  
5 proceedings we should give a number that is conservative  
6 in the sense that rarity is not exaggerated. So that  
7 instead of getting the answer of what is the frequency  
8 of this profile, can we make a statement that the  
9 frequency of this profile is no more common than this?

10 Q There was a concern that you did not want the  
11 statistics to be exaggerated?

12 A Right. And so what are the population genetic  
13 principles that can be used to achieve that requirement?

14 Q Now, in your publications, aside from writing  
15 about these issues, did you have occasion to actually  
16 discuss these issues with forensic laboratories and  
17 actual state and federal agencies?

18 A Yes. In fact, if you see my list of coauthors  
19 in all of these publications, often one or more persons  
20 who are more intimately related to the forensic  
21 community than me are involved as coauthors.

22 Q Would one of those be Bruce Budowle at the  
23 FBI?

24 A Correct.

25 Q And what was his position at the FBI?

1           A     I really don't exactly know what his technical  
2 title is, he is, but he is, I would say, the director or  
3 leader of the research of the research and development  
4 section of DNA forensic training center.

5           Q     Now, Dr. Chakraborty, did you have occasion in  
6 your consultation with laboratories to follow DNA  
7 analysis in actual cases?

8           A     Yes.

9           Q     Did you ever have occasion to follow that  
10 analysis from start to finish?

11          A     At least on two cases, yes.

12          Q     Did you have occasion to consult with labs in  
13 the context of cold hit cases?

14          A     Yes.

15          Q     Have you had a occasion to search through  
16 population databases to find matching profiles?

17          A     Population databases, yes, not offenders  
18 database

19          Q     Why is that?

20          A     Because I do not have access to offenders  
21 database.

22          Q     You are here as an expert witness today. What  
23 are your fees for being an expert witness?

24          A     You will get a bill from me for the time  
25 spent.

1 Q What is your rate?

2 A I normally charge \$300 for examination and  
3 review and \$3000 per day for testimony.

4 Q And does that money go in your pocket?

5 A No.

6 Q Where does it go?

7 A Currently, it goes to University of Cincinnati  
8 Environmental Health Foundation, which is an account to  
9 pay for student stipends, seminar speakers and travel  
10 money for students attending scientific meetings.

11 Q Now, in terms of your experience, have you  
12 testified as an expert before?

13 A Yes.

14 Q Approximately how many times?

15 A I think I testified in over 150 cases. And I  
16 review for court more than 250 cases.

17 Q And what areas of -- in testifying previously,  
18 have you been qualified as an expert in the area of  
19 statistics and its application to population genetics  
20 and forensic DNA?

21 A Yes.

22 Q Now, what different courts have you testified  
23 in?

24 A I think there are some statements in my CV. I  
25 forget how many states.

1           They range from State of Washington up to  
2 Florida to northwest to southeast, from Massachusetts to  
3 California, from northeast to southwest, federal courts,  
4 courts in Canada, Germany, Brazil.

5           Q     So you have testified both in the United  
6 States and out?

7           A     Yes.

8           Q     And has the topic of your testimony -- what is  
9 it, typically? What types of issues have you typically  
10 testified on?

11          A     Mostly on statistical aspect, database,  
12 statistical issues. But there were some cases where the  
13 testimonies were more comprehensive, dealt with the  
14 laboratory side of the questions, issues as well.

15          Q     And did you have occasion in the case called  
16 Robinson to testify specifically in California on the  
17 issue of cold hit analysis?

18          A     Yes.

19          Q     And do you recall also that there was a  
20 defense expert by the name of Dan Krane who testified in  
21 that hearing?

22          A     Yes.

23          Q     Do you know whether your position was accepted  
24 by the Court in its ruling?

25          A     I think the ruling was consistent --

1 MR. FLOOD: We object to relevance at this  
2 point.

3 THE COURT: Counsel, why is it relevant  
4 whether the court there accepted it or whether its  
5 ruling was based on or consistent with this witness'  
6 testimony? Don't I have to evaluate this witness'  
7 testimony and decide in the context of this case and all  
8 the evidence that is presented in this case whether or  
9 not -- or what is going to be the basis for my ruling?

10 MR. AMBROSINO: Absolutely, Your Honor. But I  
11 think a factor can be that he has testified previously  
12 on this issue and that the Court has not only accepted  
13 him as an expert but credited his testimony over the  
14 very expert the defense is calling.

15 THE COURT: If you are going to offer him as  
16 an expert, I'll rule on that. I think it's relevant  
17 that he has testified on this issue before. I will not  
18 receive testimony on what the Court did with regard to  
19 his testimony.

20 MR. AMBROSINO: That is fine, Your Honor. At  
21 this time, I do proffer Dr. Chakraborty as an expert in  
22 DNA analysis, population genetics and statistical  
23 calculations pertaining to DNA forensic evidence.

24 MR. FLOOD: Same as yesterday.

25 THE COURT: Very well. Then I'll accept the

1 doctor as an expert in those areas.

2 BY MR. AMBROSINO:

3 Q Now, Dr. Chakraborty, I'm going to begin by  
4 talking a little bit about with you about the product  
5 rule and the random match probability, okay. Could you  
6 just briefly describe to the Court those two principles.

7 A Well, it all starts from what are we trying to  
8 look at.

9 In the most common situation, you have an  
10 evidence sample which provides an opportunity to look at  
11 the DNA makeup by using a technology -- if you want, we  
12 can discuss that in more details -- but using certain  
13 technology for some region of the genome, you have a DNA  
14 type called genotype of certain locations of the genome.

15 Then based on the criteria of that profile, we  
16 use some scientific principles to make a judgment as to  
17 whether that DNA came from a single or multiple  
18 individuals.

19 Q Let me cut you off there for one second. Do  
20 people -- does everyone have DNA in their bodies?

21 A Yes. Every cell of our body that contains a  
22 nucleus has DNA in it.

23 Q Do twins have the same DNA in their body?

24 A Identical twins have the same DNA.

25 Q Do people who are not identical twins have

1 different DNA?

2 A Yes.

3 Q Assuming -- when you are taking identical  
4 twins out of the mix, does anyone have the same DNA as  
5 another person or is DNA unique?

6 A If you look at the entire genome, DNA is  
7 unique.

8 Q How is it possible for scientists to make that  
9 statement if you haven't mapped everybody's DNA?

10 A We haven't mapped everybody's DNA, it's true.  
11 But we have mapped enough regions of the genome to have  
12 an idea as to how many places you and I will differ in  
13 our DNA makeup no matter who that you or I are.

14 To give you a guesstimate, of the 3.3 billion  
15 places of our genome, we roughly vary from each other at  
16 1 percent of those regions -- positions. 1 percent of  
17 3.3 billion is a huge number.

18 And for some of those positions, the number of  
19 different types of variants are so extensive that it is  
20 empirically impossible to have seen the same DNA type of  
21 the entire genome during the entire lifetime of an  
22 organism. Namely, I think during the life history of  
23 modern human, there were no two individuals born alike  
24 at the DNA level except identical twins.

25 Q Now, there has been a lot of testimony about

1 13 loci profiles so far in this case. And I want to ask  
2 you about those 13 loci. Are you aware of the fact  
3 that, at least now, that many labs use testing with 13  
4 loci?

5 A Yes.

6 Q Are those 13 loci just randomly selected or do  
7 they have a specific purpose?

8 A No. They are not randomly selected.  
9 Incidentally, these 13 loci are derivatives of one of  
10 the research projects that I supervised in 1992.

11 Q And what was that?

12 A Well, in 1992, we were asking a question in  
13 the context of a Ph.D. project of one of my students.  
14 Since we know so much about the variability of the human  
15 genome, can we pick up from the reservers of the genetic  
16 markers the ones that could be efficiently and robustly  
17 used in forensics? That was the question we asked.

18 So we used three criteria. First is at that  
19 time for additional disease hunting projects, we were  
20 using a panel of roughly about 600 markers. So from  
21 those 600 markers, we selected markers which have an  
22 extensive level of variation both in terms of number of  
23 different types of DNA materials as well as there are  
24 frequencies of these different types in worldwide  
25 populations.

1           Second was, can we type these loci in a robust  
2 fashion in samples of a compromised nature? And third,  
3 can that typing method be implemented on a set of  
4 equipment or hardware that the forensic community would  
5 be able to use?

6           So these are by no means random location of  
7 the genomes. So the first criterion, namely extensive  
8 level of variation, showed that the number of possible  
9 types of genetic variants that can be obtained by  
10 looking at all the 13 loci is so high that probably any  
11 specific DNA type, even though it is not the entire  
12 genome level analysis, would be unique.

13           Q     Let me follow up on that for a minute. So is  
14 it fair to say that the 13 loci that are currently being  
15 used at least at the current state of technology or the  
16 most variable section of the human genome that we know  
17 of?

18           A     Yes.

19           Q     To date, Doctor, are you aware of  
20 scientists -- whether it be in the field of medical  
21 research or DNA database collections or forensic  
22 testing, are you aware of a single incident of which two  
23 persons who are not identical twins have been found to  
24 share the same DNA profile at 13 locations?

25           A     At these 13 locations?

1 Q Yes.

2 A No.

3 Q If you have a profile developed of somebody  
4 who does not have an identical twin and it's developed  
5 at 13 loci, how many profiles like that would you expect  
6 to find in the entire world?

7 A To a reasonable degree of certainty, I can say  
8 none at these 13.

9 Q And can you state right now, as you sit on the  
10 witness stand, whether science will ever find two people  
11 who are not identical twins who will share 13 loci?

12 A Well, it's difficult because you never know  
13 what is going to come in future. Because although it is  
14 not very common, we do see some aberrations of normal  
15 practices. So for all that, I do not know. We might  
16 have the day after tomorrow an incident were an  
17 incestual conception would occur.

18 In that case, in a highly consanguineous  
19 situation, we might have almost a replica of a single  
20 person in two different individuals. In those unusually  
21 extraordinarily uncommon situations, we might.

22 But with the normal practices, I would be  
23 highly surprised if anybody ever finds these two 13  
24 loci -- two individuals to have the same genotype.

25 Q And to date, even including in this question

1 highly incestuous situations, what are the most  
2 locations you have seen two people matching at,  
3 excluding identical twins?

4 A I think there was an incident of 10 locus  
5 identity. But those 10 loci were not exactly part of  
6 these 13. Many of those 10 loci included much less  
7 variable locations of the genome.

8 Q And did that situation involve a situation  
9 where there was incest?

10 A Yes.

11 Q Let me take you back to in developing -- first  
12 off, let me -- I cut you off in talking about random  
13 match probability and product rule. How is that  
14 actually -- can you just briefly describe how those two  
15 tools are used in statistics?

16 A Those tools are used in the context that I was  
17 mentioning before. When you find an evidence sample  
18 which gives a DNA profile supportive of to have come  
19 from a single person and then, through investigation or  
20 other tools, you find that that DNA profile matches the  
21 DNA profile of a known person, the question at hand then  
22 becomes, how common is this DNA profile?

23 Because if it is as common as having two hands  
24 for a person, then it is obviously of less significance  
25 then if it is very uncommon.

1           Q     When you say how common, is that something  
2     that is sometimes expressed by people by asking the  
3     question of how rare is this DNA profile?

4           A     Yes. The common is just the complement of  
5     rare.

6                     So we have to use some principles to find what  
7     is the frequency at large in the population of such a  
8     profile. And that is technically called random match  
9     probability. Now, if it was simply an observation like  
10    I'm driving a blue car, you could just count on the road  
11    how many blue cars are there for every 100 cars.

12                    But the DNA profile is a little bit more  
13    complex than that because we are looking at a number of  
14    positions at the genome. And at each position we have  
15    two copies, one given by father and one given by mother.  
16    And we have -- as a consequence, I have to rely on  
17    population genetic principles.

18                    To make the long story short, we then, for  
19    each location or locus, compute the frequency of a  
20    genotype by looking at the alleles or two genetic  
21    variants presented at that location.

22                    We go back to a principle which is as old as  
23    to have been derived in 1908 to compute frequency of a  
24    genotype from frequency of alleles.

25           Q     Is that the product rule?

1           A     That is called Hardy-Weinberg Rule or product  
2 rule at a single locus level. And then, since these  
3 locations were not adjacent to each other, they were  
4 from different compartments of the genome, from  
5 different chromosomes. And even the ones that sit on  
6 the same chromosome, they are far apart to be jointly  
7 inherited.

8                     We rely on another assumption, namely  
9 independence between loci, technically called linkage  
10 equilibrium --

11           Q     Let me stop you right there. Does that mean  
12 that if I have a particular number at one loci, that  
13 that would have absolutely nothing, no impact on what a  
14 particular number would be at a separate loci?

15           A     Yes. Usually it translates into that.

16                     So we multiply over the genotype frequencies  
17 to get the profile frequencies. So the product rule has  
18 two components. The independents are a product of the  
19 alleles to form genotypes, and product of the genotypes  
20 of two loci to form genotypes of the two locus profile.

21           Q     So Doctor, is it fair to say that if you're  
22 just looking at one location on the genome, that you  
23 look at the rate that is computed using the random match  
24 probability?

25           A     Yes.

1           Q     But once you start to look at additional  
2 locations, in order to then calculate the rarity of that  
3 profile, you then have to utilize the product rule to do  
4 that?

5           A     Yes.  What I was trying to explain was the  
6 product rule really applies at two levels.  We have to  
7 take the product of allele frequencies to get the  
8 genotype frequency at a location.  So you are using a  
9 part of the product rule.  The second is multiply the  
10 probabilities for each locus to get the whole profile  
11 frequency.

12          Q     How long have these principles, the random  
13 match probability and the product rule, been used in  
14 science in general and statistics -- not specific with  
15 their application to forensic DNA, but just in science  
16 in general?

17          A     In science in general, the one locus product  
18 rule dates back to 1908; multilocus, 1928.

19          Q     And how long have these principles been  
20 applied to the area of DNA forensics?

21          A     As old as DNA forensics is, 1985.

22          Q     Now, was there a time when there was a dispute  
23 over the use of the product rule in DNA forensics?

24          A     In court, yes.

25          Q     Looking now, today, Doctor, is the use of the

1 product rule and the random match probability generally  
2 accepted amongst scientists as a valid tool to use in  
3 analyzing forensic DNA?

4 A Yes, with the qualification that very few  
5 people to start with and all -- none to this date uses  
6 the strict product rule. What is used in the context of  
7 DNA forensics could be called a modified product rule,  
8 the basic product rule modified with at least two or  
9 three levels of adjustments, all seeking towards  
10 achieving what I call previously conservativeness.

11 So nobody uses strict product rule in DNA  
12 forensics. Everybody uses modified product rule, and  
13 that is generally accepted.

14 Q When you say "everybody," would that include  
15 the FBI laboratory?

16 A Yes.

17 Q Would it include other forensic laboratories  
18 here in the United States?

19 A Yes.

20 Q Would it include all forensic laboratories who  
21 follow the DAB guidelines?

22 A Yes.

23 Q So when you refer to the term "product rule,"  
24 are they, in effect, referring to the modified product  
25 rule?

1           A     Yes.

2           Q     And that modification is utilized in an effort  
3 to be conservative?

4           A     Yes.

5           Q     All right.  So if we assume for a moment that  
6 we have a crime scene sample that is left at a crime  
7 scene and a 13 loci profile is developed from that  
8 sample, if we are asking the question, how rare is that  
9 particular sample in a general population, what  
10 calculation should be used to answer that question?

11          A     As we implied in our discussion, it would be  
12 the modified product rule.

13          Q     Now , in your experience, when you consulted  
14 with laboratories, is that a question that laboratories  
15 typically answer or address when they are analyzing a  
16 sole source sample of evidence?

17          A     Yes.

18          Q     Have you ever encountered a case, whether it  
19 be in Court or just in consultation with the FBI or any  
20 other laboratory, where you have a sole source evidence  
21 sample -- and what I mean by "sole source," for the  
22 record, is just one contributor in an entire profile  
23 developed at 13 loci.  Have you encountered a situation  
24 where that question has not been addressed in the  
25 context of a full profile, sole source profile at a

1 scene?

2 A I have not.

3 Q Would it surprise you if you were involved in  
4 a case and a DNA analyst or the people involved in that  
5 case, for whatever reason, didn't address that question,  
6 ignored it completely?

7 A If they ignored it completely, it would  
8 surprise me.

9 Q And why is that?

10 A Because I know that in some of the scientific  
11 literature as well as in some court proceedings,  
12 alternative questions have been implicated. But in  
13 answering those questions -- also as one of the initial  
14 steps, they have to go through the computation similar  
15 to the random match probability.

16 So if laboratory analysts did something which  
17 completely avoided this question, I would be surprised.

18 Q Let's talk about that for a minute.

19 Doctor, are you familiar with NRC II?

20 A Yes.

21 Q I want to show you what has been marked as  
22 Government's Exhibit 2A.

23 MR. AMBROSINO: If I may approach.

24 THE COURT: You may.

25 BY MR. AMBROSINO:

1 Q Doctor, I'm going to be asking you some  
2 questions about NRC II, so what I'm going to do is flip  
3 to Recommendation 5.1 in NRC II. So I'll just read  
4 that:

5 "Recommendation 5.1. When the suspect is  
6 found by a search of DNA databases, the random match  
7 probability should be multiplied by N, the number of  
8 persons in the database."

9 Now, Doctor, are you familiar with that  
10 recommendation?

11 A Yes, I am.

12 Q Doctor, is it possible to calculate that  
13 calculation without calculating the random match  
14 probability?

15 A No.

16 Q In your view, would it be possible to explain  
17 that calculation to a jury without explaining what the  
18 random match probability was?

19 A It would be difficult, if not impossible.

20 Q Now, I want to stick for one minute on the  
21 issue of rarity of a DNA profile.

22 If you assume, Doctor, that you have a crime  
23 scene, and there is a profile from that crime scene that  
24 is developed that cannot be attributable to the victim  
25 of that crime, the victim has been excluded as a

1 potential contributor to that piece of evidence, if you  
2 assume that for a moment and you have a 13 loci profile  
3 developed from the single piece of evidence and you want  
4 to calculate the rarity of that piece of evidence in the  
5 general population, what tool would you use as a  
6 statistician?

7 A We have already discussed it. I would use the  
8 modified product rule.

9 Q Now, if after you calculate the modified  
10 product rule, you calculate the rarity of that profile,  
11 that particular profile is sent through the CODIS  
12 database, does the rarity of that profile change in any  
13 way?

14 A No.

15 Q Is there anything that you can think of that  
16 could somehow alter the rarity of that profile, assuming  
17 that you don't change the number of loci searched or  
18 change the definition of the population that you are  
19 identifying, is there anything that you can think of  
20 that would change the rarity of that profile?

21 A No, I don't.

22 Q Now, in the context of a cold hit case, what  
23 question, in your view, was the NRC II addressing?

24 A When they recommended that the random match  
25 probability should be multiplied by N, the number of

1 persons in the database is implicated, that they were  
2 answering the question of what would be the chance of  
3 finding that specific profile in a database of that  
4 size.

5 Q Now, Doctor, does that question or -- does  
6 that question, is that the same or different from the  
7 question that is addressed when one asks what the rarity  
8 of the DNA profile is in the general population?

9 A It's a different question. So the  
10 recommendation 5.1 is not answering the question of  
11 rarity. It is answering the question of what is the  
12 chance of finding a profile, a specific profile in a  
13 database of given size or, equivalently, how many  
14 persons in a database of that size are expected to have  
15 that specific target profile, given the rareness of the  
16 profile specified by the random match probability.

17 Q Now, is the answer to the question posed by  
18 NRC II the same or different from the answer to the  
19 question posed when you ask what the rarity of the  
20 profile is?

21 A It's a different question, different answer.

22 Q Anything surprising about that in the field of  
23 statistics?

24 A No. They use the same principle.

25 Q Is there anything when looking at the question

1 and answer involved in -- or when you look at the  
2 statistical tools used to answer the question posed,  
3 what is the rarity of the DNA profile in the general  
4 population, and you look at the statistical tools used  
5 to answer the question, what is the chance of finding a  
6 coincidental match of a database of a particular size,  
7 is there anything about the tools used in answering  
8 those two questions that, in your view, creates any type  
9 of a scientific controversy?

10 A No.

11 Q I'm showing you what has been marked as  
12 Government's Exhibit F3. I'm going to direct your  
13 attention specifically to particular language in  
14 Exhibit 3. But first I just want to have you take a  
15 look at it and tell me if you recognize Government's  
16 Exhibit F3, which is in evidence.

17 A Yes, I recognize it.

18 Q And what do you recognize that to be?

19 A This is the resolution of the DNA Advisory  
20 Board written by the specific subcommittee to address  
21 the statistical and population genetic issues in  
22 relevance to infrequency of occurrence to relevance of  
23 DNA profiles calculated from population databases.

24 Q Now, Doctor, you have explained previously  
25 that you were actually involved in the issuance of these

1 guidelines. And is it fair to say for the record that  
2 Government's Exhibit F3 are the DNA advisory board  
3 guidelines that were issued in February of 2000?

4 A Yes.

5 Q Now, Doctor, what was the reason  
6 specifically -- and I'm going to direct your attention  
7 to some specific language on page 6 of the DAB  
8 guidelines, and I'm going to read them to you. Under  
9 the heading, Database search, it reads, "As felon DNA  
10 databases develop in all 50 states, searches for matches  
11 between evidentiary and database profiles will become  
12 increasingly common. Two questions arise when a match  
13 is derived from a database search. One, what is the  
14 rarity of the DNA profile? And, two, what is the  
15 probability of finding such a DNA profile in the  
16 database searched?"

17 Dr. Chakraborty, what prompted the DAB to  
18 address that particular issue which is addressed in the  
19 language in which I just read?

20 A I would say it is -- there are several places.  
21 But more crystal clear is the recommendation 5.1 of  
22 NRC II because recommendation 5.1 says when a suspect is  
23 found by a search of DNA databases, the random match  
24 probability should be multiplied by N, the number of  
25 persons in the database.

1           If you look at this recommendation in  
2 isolation of the rest of the section of NRC II, it might  
3 imply that -- as if random match probability is  
4 irrelevant, if not wrong, in this context. But if you  
5 look at the entire section, you would see that that  
6 statement, if were to be interpreted on its own merit,  
7 should have a clause as to answer the question of  
8 finding the chance of that profile in the database.

9           Because that clause is absent, DAB felt it  
10 necessary to supplement the NRC II recommendations as to  
11 what implicitly they are meaning when they made that  
12 prescription.

13           By these bold letter recommendations of NRC  
14 II, it is not always explicit as to what questions they  
15 were answering, so that there are some ambiguities left  
16 if you read those bold lettered recommendations alone,  
17 free from the context of the report.

18           Q     Now, Doctor, before and after the DAB article  
19 guidelines were issued, did you have occasion to talk  
20 and discuss this issue with an individual by the name of  
21 James Crow?

22           A     Yes, I had.

23           Q     Approximately how many times have you spoken  
24 with Dr. Crow?

25           A     I think we discussed this subject at least a

1 dozen times during and after the NRC II report because I  
2 was invited by the NRC II when they were deliberating on  
3 this report at least two times.

4 I was sent several questions to answer, and  
5 after the report came out, I met Dr. Crow in at least  
6 half a dozen meetings. And we had e-mail communications  
7 a number of times, as well as telephone conversations.

8 Q By the way, as a footnote, are you cited in  
9 NRC II?

10 A 26 times, to my count.

11 Q Is it fair to say that NRC II relied heavily  
12 on your statistical analysis?

13 A Quite a bit.

14 Q Now, when you talked to Dr. Crow, did you have  
15 occasion to ever talk to him specifically about  
16 recommendation 5.1?

17 A Yes.

18 Q And did you convey to him your interpretation  
19 which was later set forth in the DAB guidelines?

20 A Yes.

21 Q And what was Dr. Crow's response?

22 A His response was, yes, the recommendation 5.1  
23 is intended to answer the question of the chance of  
24 finding that profile in a database of that given size.

25 And more precisely, that answer gives the

1 expected number of persons in the database to have that  
2 profile.

3 Q Now, Dr. Chakraborty -- by the way, for the  
4 record, what was Dr. Crow's position on the NRC II?

5 A He accepted our interpretation.

6 Q I'm sorry. I mean, technically his position.  
7 Was he a chairman?

8 A On NRC II, yes, he was the chairman of that  
9 committee.

10 Q Now, Doctor, when you look at statistical  
11 tools that are utilized to answer the second question,  
12 which is noted in the DAB Guidelines, specifically the  
13 question that is posed by NRC II, is there anything in  
14 those statistical tools that, in your view, creates any  
15 type of controversy within the scientific community?

16 A No, in my opinion.

17 Q NRC II, Doctor, talks about likelihood ratios.  
18 Are likelihood ratios -- what are -- if you could  
19 describe very briefly for the Court, what are likelihood  
20 ratios?

21 A The likelihood ratio usually can be described  
22 as the ratio of probabilities or chances under two  
23 scenarios.

24 Q And in using likelihood ratios. Do  
25 statisticians oftentimes utilize something called the

1 Bayesian analysis as well?

2 A Well, likelihood ratio per se is not a  
3 Bayesian approach. Likelihood ratio is simply  
4 contrasting the chance of finding a specific observation  
5 under two scenarios and take a ratio of that.

6 How to say it in plain English requires  
7 expertise and articulations without which likelihood  
8 ratio can be totally misinterpreted.

9 What you can do with a likelihood ratio is,  
10 you can use another concept of statistics called  
11 Bayesian inference and translate that likelihood ratio  
12 into the probability of a certain event.

13 Q Such as a probability of guilt?

14 A Such as probability of guilt.

15 Q Is that sometimes, to your knowledge, used in  
16 courts outside of the United States?

17 A Sometimes yes. In fact, there are some  
18 advocates, particularly in nonadversarial courses, that  
19 use Bayesian statistics.

20 Q Have you ever seen Bayesian statistics  
21 utilized in criminal courtrooms inside the United  
22 States?

23 A I have not seen.

24 Q But have you seen advocates of such statistics  
25 such as Peter Donnelley?

1           A     Yes.

2           Q     In terms of likelihood ratios -- and again,  
3 I'm going to limit my question to sole source samples of  
4 DNA forensic evidence in the context of criminal cases  
5 in the United States -- have you seen likelihood ratios  
6 used?

7           A     In some courts I have seen likelihood ratio  
8 being discussed. In fact, I have discussed myself some.  
9 But I have always opined that when there is nothing  
10 wrong in talking about likelihood ratio because it  
11 doesn't do anything new than random match probability  
12 computation under two different scenarios.

13                     But to say it directly, it requires expertise  
14 and the Court must be cautioned as to how not to  
15 misinterpret the likelihood ratio.

16           Q     So is it fair to say, Doctor, that likelihood  
17 ratios are a tool that can be used in the courtroom and  
18 it has been an acceptable statistics tool?

19           A     It is acceptable, but there are instances when  
20 the transcripts of court proceedings reflect a  
21 misunderstanding of likelihood ratio. And also for that  
22 matter, there are proceedings of scientific meetings  
23 where advocates of likelihood ratio make the same  
24 mistake.

25                     So my position on the likelihood ratio concept

1 is the following: There is nothing wrong with it. It  
2 is based exactly on the same scientific premises of  
3 random match probability but what likelihood ratio means  
4 has to be stated with very cautionary articulated  
5 statements. Otherwise, it may be misinterpreted.

6 Q Now, Doctor, considering that, in your view,  
7 the rarity of a DNA profile can be expressed using just  
8 the random match probability or, alternatively, using  
9 likelihood ratios, does that in any way create any kind  
10 of scientific controversy in your view, the fact that  
11 this can be expressed from two different means?

12 A In my opinion, no.

13 Q Now, Doctor, when you consider the  
14 recommendation, or actually, since the issuance of the  
15 DAB guidelines in 2000, are you familiar with the actual  
16 practices of forensic laboratories across the country  
17 with respect to statistical calculations?

18 A Yes, I am familiar.

19 Q And in your experience, Dr. Chakraborty, what  
20 percentage of forensic laboratories that calculate or  
21 compute statistics of a sole source DNA sample utilize  
22 the random match probability?

23 A In my estimate, almost 100 percent.

24 Q In utilizing the random match probability,  
25 what percentage of those laboratories are asking the

1 first question, namely, how rare is this DNA profile in  
2 the general population?

3 A Almost everybody.

4 Q And Doctor, in your experience, what  
5 percentage of laboratories across the country address  
6 the second question that is mentioned in the DAB  
7 article, namely the computation that is set forth in  
8 recommendation 5.1 of the NRC II, what are the chances  
9 of finding a match in a database of a particular size?

10 A Well, that question is a little bit hard to  
11 answer because I do not think that I have seen all of  
12 the reports of the laboratories in this country that  
13 dealt with sole source DNA match associated with  
14 database search questions.

15 But the five or six cases that I reviewed, all  
16 of them answered the first question and also stated by  
17 this profile was investigated through database search  
18 and at that time, database size was X many individuals.

19 THE COURT: Excuse me Doctor, could you just  
20 repeat that answer.

21 THE WITNESS: In five or six cases that I have  
22 reviewed which involved evidence sample of single source  
23 origin and the defendant was identified through database  
24 search, they gave answers to the first question, namely  
25 random match probability. And there was a statement

1 that the defendant was identified through a database  
2 search, and at that time, the database size was X many  
3 individuals, which, by the way, grew over time.

4 BY MR. AMBROSINO:

5 Q Now, Doctor, if you were called to testify in  
6 a case where a database search had been conducted -- and  
7 when I say "database search," I mean an offender  
8 database search of, say, 100,000 individuals -- let's  
9 say we are using a Virginia database for example, and I  
10 asked you to come in to court and talk about the second  
11 question, the one that is posed by NRC II  
12 recommendation 5.1, and I asked you to talk about the  
13 calculations that were done, would you be able to --  
14 assuming that you had the records before you, would you  
15 be able to perform the calculation set forth in  
16 recommendation 5.1?

17 A Yes, I will be. But I would need information  
18 as to when the -- if you give me the information that  
19 the known person was identified through database search,  
20 I would need the answer to the question that, how many  
21 people were there in the database at the time the search  
22 was made.

23 Q You would need the exact number in order to do  
24 the NRC II calculation?

25 A Correct.

1           Q     And in computing that calculation and then  
2 explaining that to a jury, would you be able to explain  
3 that fact without explaining the fact that the  
4 individual is identified in an offender database?

5           A     I would have to tell them that information.  
6 Otherwise, the relevance of the question doesn't come.

7           Q     And would you be able to explain that  
8 computation without first explaining the random match  
9 probability and what it meant?

10          A     Absolutely not.

11          Q     Now, Doctor, you touched on this subject a  
12 little bit earlier, and I want to draw your attention  
13 back to it. And it's the issue of uniqueness or source  
14 attribution. Are you familiar with the FBI's policy of  
15 source attribution, namely that if a profile is  
16 developed and the random match probability is calculated  
17 to be rare, one in 280 billion people, are you familiar  
18 with the fact that the FBI has a policy of, in addition  
19 to calculating -- making statistical calculations within  
20 a series of populations, that the FBI analyst  
21 additionally issued a statement that, to a reasonable  
22 degree of scientific certainty, that a particular person  
23 has been determined to be the source of that evidence --  
24 are you familiar with that policy?

25          A     Yes.

1 Q And do you think that there is a valid  
2 scientific basis for that policy?

3 A Yes. There is a valid scientific validity.

4 Q And I see you flipping through one of the  
5 Government's exhibits as I ask you this question. Is  
6 there something relevant to this question in the  
7 Government's Exhibit F3 which is the DAB advisory  
8 guidelines?

9 A Yes, because the DAB guidelines on this  
10 subject has a section called source attribution.

11 Q And what page of the guidelines, just for the  
12 record, are you looking at?

13 A This page number --

14 Q Page 4 of 9?

15 A Yeah. It says page 4 of 9, which essentially  
16 describes the scientific background behind the policies  
17 which are in the standard operating procedure of the FBI  
18 laboratory on this subject.

19 Q Now, in view of your opinion, there is a  
20 scientific basis for an analyst to make a conclusion  
21 regarding source attribution. I want to now direct you  
22 back to the issue of recommendation 5.1.

23 If you have a case where you have a degraded  
24 DNA sample, one which is calculated at, say, two loci,  
25 and the rarity computation, the RMP is calculated to be

1        somewhere in the neighborhood of 1 in 1,000. And you  
2        subsequently run that DNA profile through a database of,  
3        for example, 100,000 offenders, how many matches, as a  
4        statistician, would you expect to find in such a  
5        database?

6            A        Expectation would be 100. The actual number  
7        might vary. My own -- although I have no access to the  
8        offenders database to probe into research, but from my  
9        experience of dealing with the population databases, I  
10       wouldn't be surprised if I find more than a hundred  
11       matches because the offender database might have  
12       relatives embedded in that.

13            Q        Now, if there were such a case and you were  
14        called upon to talk about the second question with the  
15        jury, and the fact that there were potentially 100  
16        matches, in your view, Doctor, would that issue have  
17        some relevance under that scenario?

18            A        It has relevance because it does apply the  
19        random match probability associated with it. But to  
20        state that alone would be somewhat problematic without  
21        telling what that really means because the search was  
22        made on 100,000 people. But of those 100,000 people,  
23        there may be 30,000 under lock and key which had no  
24        relevance or no association with the crime scene at the  
25        time the crime occurred.

1           So the question that we've answered, namely a  
2 profile of the degraded sample, which has the overall  
3 expectation to be found in a frequency no more common  
4 than 1 in 1,000 found in the population is expected to  
5 be seen 100 times in a database of 100,000 offenders,  
6 this statement has to be told to the Court by us saying  
7 it is possible that of those 100,000 offenders, 30,000  
8 were still behind the bars at the time of the crime; the  
9 other 70,000 who were on the street, there may be 10,000  
10 who were being monitored on a 24-hour basis. The other  
11 10,000 might be sleeping happily with their wife and so  
12 on and so forth.

13           So unless that is told, the meaning that we  
14 would find 100 matches has very little relevance.

15           Q     Now, let me ask you -- I want to change the  
16 hypothetical that I gave you for a moment. Let's assume  
17 for a moment that you had a full 13 loci match. And the  
18 profile that was developed had an RMP that was rarer  
19 than the FBI's guideline of 1 over 280 billion. In  
20 other words, for example, it would one 1 in 25  
21 quadrillion. And if you, Doctor, were to learn that  
22 that profile was run through a convict database of  
23 100,000 people, how many matches at most would you  
24 expect to find?

25           A     Theoretically, there could be many, but the

1 expectation is not more than one.

2 Q And if you searched, if it were possible to do  
3 so, the population of the entire world, how many matches  
4 would you expect to find, assuming that the perpetrator  
5 did not have an identical twin?

6 A It still would be one at most. None other  
7 than the defendant identified.

8 Q And just to clarify your answer, are you  
9 saying that the one person that you would expect to find  
10 would be the same person who left the sample at the  
11 crime scene?

12 A You already told the person was identified  
13 with this profile. And if we searched the entire world,  
14 we probably would find none other.

15 Q Now, I want to read to you from Government's  
16 Exhibit F4 which is a statement of Dr. James Crow. And  
17 specifically, I would like to turn your attention to  
18 paragraph 16. And it reads, "The reliability and  
19 discriminatory power of a DNA match has changed  
20 dramatically since 1996 when the last NRC report on the  
21 forensic use of DNA evidence was published.

22 "With 13 STR loci, random match probabilities  
23 are much less than they were using the DNA analytical  
24 techniques that were available in the first half of the  
25 1990s.

1           "Currently, random match probabilities are  
2 usually considerably less than the reciprocal of the  
3 world population. With such small probabilities, it is  
4 likely that a particular DNA sample is unique, except  
5 possibly for close relatives, and the manner in which it  
6 was developed becomes irrelevant."

7           Are you familiar with that statement by  
8 Dr. Crow?

9           A     Yes, I am.

10          Q     Is that statement consistent with the dozen or  
11 so conversations that you have had with Dr. Crow?

12          A     Yes.

13          Q     Do you agree with that analysis?

14          A     Yes, I do. And in fact, I have written in  
15 several symposium papers what -- how I would amplify his  
16 clauses such as "close relatives" and what does he mean  
17 by "irrelevant."

18                 For example, whenever I opine on the issue of  
19 uniqueness, apart from looking at the aspects that are  
20 embedded in the FBI's policy, I also compute the  
21 frequency in close relatives. I also compute the  
22 frequency under population substructure.

23                 I also compute the frequency of what has been  
24 in the literature called conditional probability; in  
25 other words, the chance rarity, given that it is already

1 seen in one person. And on the basis of all of that, I  
2 come to the issue of uniqueness.

3 Q Now, that brings me to a question, Doctor.  
4 Oftentimes, we see profiles that are calculated to be  
5 one in trillions, and yet the world population is only  
6 6 billion, or somewhere thereabout. How is it possible  
7 for you or I to have a profile that is calculated to be  
8 somewhere in the trillions when the world population is  
9 6 billion? How would you answer that question?

10 A The world has 6 billion people now, but it had  
11 some before and will have some in the future.

12 So by the techniques used for computer random  
13 match probability, you are not really going to a  
14 physical population and finding out what the frequency  
15 is. You are giving an expectation or estimate as to  
16 what the number out in the population would be. So when  
17 the number turns out to be one in a trillion, it really  
18 has meaning a little bit deeper than what the frequency  
19 is today.

20 It means the profile is so uncommon that it  
21 probably does not exist right now and never existed  
22 before. Because world population is 6 billion now. But  
23 over the history of modern humans, probably there were  
24 not more than 10 or 15 billion people. We grew to a  
25 size of 6 billion only recently.

1           100 years back. It was much less than a  
2 billion. 1,000 years back, it was probably on the order  
3 of thousands. So the number of people who ever lived  
4 probably is less than 15 billion. So when we come up  
5 with an estimate as uncommon as one in a trillion, what  
6 it probably says is that these 13 locus profile does not  
7 exist today, never existed before.

8           Q     Doctor, I want to move in new area --

9           THE COURT: Before we do that, we should take  
10 about ten minutes.

11           (A recess was taken.)

12                                 DIRECT EXAMINATION

13           BY MR. AMBROSINO:

14           Q     Dr Chakraborty, one of the things I asked you  
15 about is if you had ever learned about two persons,  
16 excluding identical twins, matching 13 loci. Have you  
17 ever had occasion to talk with the heads of any DNA labs  
18 or DNA databases?

19           A     On numerous occasions. But two persons  
20 specifically I remember to have talked to about database  
21 search issues. One is from Virginia and the other  
22 person is from Florida.

23           Q     Who is the person from Virginia?

24           A     Paul Ferrara (phonetic).

25           Q     And in terms of the history of DNA databases,

1       which state has the oldest DNA database?

2           A     Virginia.

3           Q     Do you know which one has the largest?

4           A     I'm not sure of the current statistics.

5       Either Virginia or Florida.

6           Q     And who did you speak to in Florida?

7           A     In my county, Michael -- what is his last  
8       name? He is a technical leader of my immediate county  
9       laboratory, Mike Haas, H-A-A-S.

10          Q     Did you have occasion to specifically ask  
11       Mr. Ferrara whether or not, since the time in which the  
12       Virginia database began, using 13 loci profile, whether  
13       or not, in fact, they had ever gotten more than just one  
14       hit on a database search?

15          A     They never got more than one hit.

16          Q     Have you discussed that issue as well as with  
17       the individual who ran the Florida lab, Florida's  
18       database?

19          A     Yes.

20          Q     And what was the answer?

21          A     Same.

22          Q     I think I asked you this, but if there ever  
23       were in science anywhere a 13 loci match, would you  
24       expect to learn about it pretty quickly?

25          A     I have not heard of any so far. And given the

1 experience, I think if there were, I would be informed  
2 within two to three days.

3 Q When there was a 7 loci match in a criminal  
4 case over in London, or England, did you learn about  
5 that pretty quickly?

6 A Yeah, I came to learn about it before U.S.

7 Q Were you interviewed about it?

8 A Yes.

9 Q So is it fair to say that that is the type of  
10 topic you keep careful watch on?

11 A Yes.

12 Q I would like to turn your attention to the  
13 first NRC report. Are you familiar with the  
14 recommendation contained in the first NRC report which  
15 addressed cold hit situations, database search  
16 situations?

17 A Yes.

18 Q What was the recommendation by the first  
19 report that was issued back in 1992?

20 A In plain terms, it means the following. If  
21 you found the profile through a database search and the  
22 database searched contained loci 1, 2, 3 and 4, develop  
23 a profile based on locus 5, 6, 7, 8, et cetera, which  
24 are not in the database, and verify your match, and use  
25 statistics based on the additional loci only -- again,

1 what statistics? Going back to something like that in  
2 random match probability.

3 Q All right. So if we search a database using  
4 four loci and get a hit, and then do a confirmatory  
5 analysis using another four loci, but using loci 5, 6,  
6 7, 8 rather than the 1, 2, 3, 4 that were used in the  
7 initial database search, you would then, if you were  
8 using the recommendation in the first NRC report, you  
9 would just calculate the random match probability based  
10 on loci 5, 6, 7, 8?

11 A Correct.

12 Q Are the scientific principles, statistical  
13 tools utilized in making that computation any different  
14 from the scientific principles used to calculate the  
15 random match probability on all the loci?

16 A No. But I should qualify, don't quote me  
17 wrong in the future, since NRC, I talked about a  
18 different method of computing random match probability  
19 which nobody -- everybody misused and later on got  
20 disbanded. One should not take my testimony as saying  
21 the NRC I suggested computation or random match  
22 probability by the modified product rule. Nonetheless,  
23 no matter what method they used, the recommendation  
24 called for computing some sort of random match  
25 probability based on additional loci.

1           As a consequence, it doesn't really provide a  
2 ground for scientific controversy per se. They were  
3 simply saying that if you found a profile through a  
4 database search based on a limited number of genetic  
5 loci, confirm your match by additional loci. And that  
6 was 1992 technology.

7           Q     Now, has DNA technology changed significantly  
8 since that recommendation was issued?

9           A     I would say dramatically, yes.

10          Q     Do you feel that that is a recommendation that  
11 here today is generally accepted within the scientific  
12 community?

13          A     I didn't get your question.

14          Q     In your view, is the NRC I recommendation one  
15 that is generally accepted within the scientific  
16 community today?

17          A     No. Because it is not feasible to do it.  
18 Because technology has changed. Everybody has put the  
19 best foot forward in creating offenders database with  
20 the maximum number of validated loci.

21                 As a consequence, there is nothing left  
22 validated to do additional testing, so that  
23 recommendation became obsolete, not feasible to apply in  
24 today's technology, knowledge and practice.

25          Q     Now, Doctor, are you aware of a single

1 laboratory currently today that utilizes this approach?

2 A I do not know of any.

3 Q In your experience, dating back to 1992 when  
4 this report was issued, are you aware of a single  
5 laboratory that did use this approach at any time?

6 A Actually, I haven't found any documented cold  
7 case where it was used.

8 Q Now, at the time NRC II issued this report --  
9 NRC I, I apologize -- NRC I issued this recommendation,  
10 was source attribution a possibility at that time?

11 A At that time, no, because the number of loci  
12 were limited.

13 Q Do you believe that that was a factor in the  
14 recommendation that they issued?

15 A Actually, my reading of NRC I, particularly  
16 the context, lead me to the notion that NRC I was aware  
17 of that although at that time only the RFLP loci were  
18 being used in offender databases. But there were other  
19 technologies in the wings waiting to be validated.

20 That recommendation made sense because there  
21 was a possibility in near future at that time to have  
22 other validated forensic loci to be done on case work.  
23 But at that -- the science has progressed to the extent  
24 that today we are using all to create the database so  
25 that we do not get a surreptitious coincidental match by

1 chance alone.

2 Q Now, Doctor, you mentioned earlier that back  
3 during the days of NRC I you felt as though the random  
4 match probability was being misused?

5 A Yes.

6 Q How was it being misused back then?

7 A Well, they discussed the sort of controversies  
8 or the lack of validity of the assumptions behind  
9 product rule RH modification. And as a consequence to  
10 guard against, to avoid such controversies, they adopted  
11 a rule which they call ceiling principle, C-E-I-L-I-N-G  
12 principle, which is neither a ceiling nor a principle.  
13 And it was so ambivalent that it was used by some  
14 experts in court to give numbers as fictitious as  
15 anything about DNA profile.

16 Q Were you ever called to testify about the  
17 appropriateness of using ceiling principles?

18 A Yes.

19 Q What was your position on that issue?

20 A It's exactly what I said a few minutes back.  
21 It is neither a principle nor a ceiling. And as a  
22 consequence, does not have any scientific basis.

23 Q Is it fair to say that your position became  
24 the practice now of the scientific community?

25 A Yes. In fact, I was published on that subject

1 in several letters to the editor.

2 Q And is it fair to say that, here today, that  
3 ceiling principles are no longer used by the scientific  
4 community in forensic DNA testing?

5 A No.

6 Q Are there other aspects of NRC I that are  
7 outdated or that are no longer -- scientific  
8 restrictions back then with respect to NRC I that are no  
9 longer applicable today?

10 A There may be a couple of more, but these are  
11 the two major ones, namely the use of ceiling principle  
12 or the use of counting method for computer random match  
13 probability, and then the recommendation about dealing  
14 with statistics for database search issue.

15 Q Now, I want to read to you some language from  
16 the Crow declaration in paragraph 15, which is  
17 Government's Exhibit Number F4.

18 It indicates -- in the middle of paragraph 15,  
19 Dr. Crow writes, "The NRC I recommendation pertaining to  
20 cold hit cases was the result of technological  
21 limitations regarding forensic DNA science as it existed  
22 in the early '90s."

23 The last two sentences of that paragraph read,  
24 "These concerns, however, no longer exist in light of  
25 the advancements in forensic DNA methodologies. Thus,

1 while the underlying mathematics set forth in NRC I are  
2 valid, no laboratories utilize this approach because it  
3 is outdated and impractical."

4 Are you familiar with Dr. Crow's position as I  
5 just stated in his affidavit?

6 A Yes.

7 Q And do you agree with that position?

8 A Actually, I think my statements a few minutes  
9 back speaks on their own, namely that I have completely  
10 amended Dr. Crow's affidavit on that regard.

11 Q And just for the record, in the field of human  
12 population genetics, where does Dr. Crow stand?

13 A I usually describe him as the dean of human  
14 population genetics.

15 Q And why is that?

16 A He is one of the pioneers in the field, has  
17 written a number of textbooks that are sort of the bible  
18 in population genetics courses. And not only that, on  
19 the scientific front he is highly regarded. And he has  
20 chaired a number of national as well as international  
21 committees where recommendations have been a very  
22 balanced view of scientific advances in problems of  
23 several societal importance, DNA forensics included,  
24 radiation research, genetic counseling to name a few.  
25 And he is a very highly regarded person of extremely

1 good theoretical as well as practical knowledge of the  
2 field.

3 Q To your knowledge, has he ever testified in  
4 court?

5 A I doubt whether he has ever testified in  
6 court. But he has written a number of affidavits and  
7 gave his advice whenever sought.

8 Q Now, I would like to turn the focus now to a  
9 different topic. Before moving on to an individual by  
10 the name of Peter Donnelly, I would like to focus your  
11 attention on one thing. If you could take a look at an  
12 affidavit which has been marked as Government's F8, it's  
13 an affidavit by an individual by the name of Terence  
14 Speed. I would like you to take a look at this  
15 affidavit and ask you if you have had an opportunity to  
16 look at it?

17 A Which paragraph are you --

18 Q Just the affidavit in general. Have you seen  
19 that affidavit?

20 A Yes, I have seen it before.

21 Q Do you know who Terence Speed is?

22 A Yes. He is a respected statistical  
23 geneticist, has done some very interesting work in  
24 statistical inference as it applies to science,  
25 particularly micro area analysis.

1           Q     I want to focus your attention on paragraph 6.  
2     I'll read that into the record.

3                     "I regard the use of DNA profiling as a  
4     potentially powerful identification tool, one in which  
5     statistics are routinely misused.  For instance, I  
6     understand that some forensic laboratories, such as the  
7     Federal Bureau of Investigation's, generate a random  
8     match probability statistic to reflect the significance  
9     of both confirmatory and database DNA matches.

10                    "The use of RMP in such instances is, in my  
11     opinion, statistically inappropriate."

12                    Have you had occasion to read that  
13     paragraph 6?

14           A     Yes.

15           Q     Do you think that paragraph number 6  
16     accurately reflects the practice of the Federal Bureau  
17     of Investigation?

18           A     No, it does not.

19           Q     And why is that?

20           A     Because he phrases it as his understanding  
21     that the laboratory generates RMP statistics to reflect  
22     the significance of both confirmatory as alleged in DNA  
23     matches.

24           Q     In other words, is he saying that they use one  
25     statistic to answer questions number 1 and 2?

