

1

Wednesday, 18th November 2009

2 (9.37 am)

3 PAUL CHAMBERLAIN, sworn

4 Examined by MR MOYNIHAN

5 THE CHAIRMAN: Your full names for the record, please.

6 A. Paul Chamberlain.

7 THE CHAIRMAN: Take a seat, please, Mr Chamberlain.

8 MR MOYNIHAN: Good morning, Mr Chamberlain.

9 A. Good morning.

10 Q. You have helpfully provided for the Inquiry a statement.

11 Do you have a copy of that?

12 A. I do indeed, yes.

13 Q. For others the statement is FI0136 but we will not need

14 to bring it up. It is a statement you have signed and

15 you are therefore content that what you have set out was

16 the truth as best you could in that statement?

17 A. Yes, indeed.

18 Q. What we will do is as we proceed I may make some

19 references to your statement. If there are matters that

20 require adjustment in your statement, please just

21 indicate so because what we are interested in is the

22 accurate evidence that you can give today?

23 A. Okay.

24 Q. Your own background, you come now from a company, that's

25 the Forensic Science Services Limited?

1 A. Yes, the Forensic Science Service Limited is  
2 a Government-owned company, a major supplier of Forensic  
3 Services in England and Wales and to other investigative  
4 agencies throughout the world.

5 Q. You yourself are a forensic scientist but you practice  
6 exclusively in relation to fingerprints?

7 A. That's correct. My specialism is fingerprints.

8 Q. Do you have both a research and a practical interest?

9 A. I have a role to play in research which is mostly around  
10 taking research and deploying it into practical  
11 casework. I don't actually undertake research myself  
12 and my other roles are round quality management and I  
13 still undertake casework on a regular basis.

14 Q. Do you still, on a regular basis, give evidence in  
15 court?

16 A. As required, yes.

17 Q. What I actually want to do is to look, with your  
18 assistance, at some of the practices and procedures  
19 concerning fingerprints.

20 In your own statement, you mention membership of  
21 committees and other organisations if I can just deal  
22 with those, first of all, you mention a European Network  
23 for Forensic Science.

24 Are you a member of that European Network?

25 A. Yes. The ENFSI (the European Network of Forensic

1 Science Institutes) is actually an organisation for  
2 directors of forensic science labs throughout the  
3 European Union. In order to be a member, in effect, the  
4 members are those directors. The institutes need to  
5 meet certain criteria, for example, they have to have a  
6 research and development programme. Within ENFSI there  
7 are 16 specialist working groups, one of which is  
8 dedicated to fingerprints and I'm currently the chair of  
9 that working group.

10 Q. So far as the work of that organisation is it sponsored  
11 by the European Union?

12 A. Recently in the last year, yes. It has become what the  
13 European Union call a monopoly organisation, which means  
14 that it the first port of call for the European Union  
15 with regard to any forensic issues. There is some  
16 funding now being provided by the European Union.

17 Q. I will come on in due course to the practices but at the  
18 European level is there any work being done at present  
19 in relation to standardisation of fingerprint  
20 techniques?

21 A. The strategic plan of the working group does mention a  
22 move towards what we've termed a universal standard for  
23 fingerprint identification but at this moment in time  
24 there is no ongoing work.

25 Q. Is there, if one looks across the membership, across the

1 European Union, are there variations in practice in  
2 relation to fingerprint identification?

3 A. There is. The majority of members have a numerical  
4 standard so they set a numerical threshold generally  
5 around 12 minutiae. The minority of members have  
6 holistic or non-numeric practices, as we have in England  
7 and Wales.

8 Q. Does the fact that the majority of the members have a  
9 numerical standard around 12, is that itself a  
10 dis-inhibitor to the search for some universal standard?

11 A. Perhaps inhibitor is the wrong word but, yes, at the end  
12 of the day, they have a system that they believe works  
13 successfully and, therefore, they are, needless to say,  
14 not willing to move away from that necessarily.

15 Q. If I go across the Atlantic to America, we are aware of  
16 a National Academy of Sciences report that came out at  
17 the beginning of this year, I understand, through the  
18 International Association for Identification, IAI, that  
19 you are on a working party?

20 A. Yes. The Standardisation Committee, this is a new  
21 committee but it's called the Standardisation Committee  
22 because there was an initial committee way back in the  
23 1970s. The aim of the Committee is really to address  
24 two resolutions of the IAI. The first that states that  
25 there is no scientific basis for a numerical threshold

1 and the second, which is a resolution which prohibits  
2 quality of reporting or probabilistic reporting by IAI  
3 members. That Committee has finished its final meeting  
4 and the report will be published in January.

5 Q. I don't want you to breach confidentiality in relation  
6 to that organisation but we can understand then that the  
7 two topics that are delayed now until January, I think  
8 your statement has said the autumn but delayed now until  
9 January, are firstly the question of whether there is an  
10 empirical basis for a numerical standard; that's the  
11 first?

12 A. That's correct, yes.

13 Q. Then, secondly, a topic that I will deal with towards  
14 the end of my examination. It will also cover the  
15 relevance of probability-based evidence?

16 A. Correct.

17 Q. Do I take it from what you have said the current  
18 position of the IAI precludes a Fingerprint Examiner  
19 giving any evidence based on a probability analysis?

20 A. That's correct.

21 Q. We will come to that a little later.

22 Before I get too far, one of the things in addition  
23 to your statement that I have found useful in preparing  
24 to ask you some questions is a chapter in a book and the  
25 book is by Professor Fraser and is it Mr Williams?

1 A. **(Nodded)**

2 Q. The Handbook of Forensic Science, a relatively recent  
3 textbook, in which there is a chapter on fingerprints  
4 which you co-author with Professor Champod?

5 A. That's correct.

6 Q. What is your working relationship with  
7 Professor Champod?

8 A. I worked with Professor Champod at the Forensic Science  
9 Service some ten years ago when he was one of the lead  
10 scientists there and we have worked on a number of  
11 projects since then.

12 Q. I will use this, as I've said, as a helpful guide  
13 through some of the topics that I am looking at and I  
14 will be conscious of the fact that I may sometimes be  
15 reading things that are penned by you, sometimes reading  
16 things penned by Professor Champod so if I am straying  
17 into his area, then please just say because he will give  
18 evidence next week.

19 Before I go too far, what I should pick up -- and it  
20 is perhaps worth just putting on the overhead  
21 projector -- is a section in the chapter that begins at  
22 page 74 and actually mentions the McKie case so we just  
23 actually want to see what you are on record as having  
24 said about the McKie case. **(Pause)**

25 Page 74 is simply brought up to give the context.

1           There's a section in the chapter relating to bias and  
2           errors in fingerprint identification and it mentions the  
3           work of, among others, Dr Dror to whom we have had  
4           reference in the Inquiry.

5                     In that context if I go to the next page, page 75,  
6           we will see that you mention in the second paragraph on  
7           the page the case of **McNamee**, again something we have  
8           discussed in the Inquiry. You then mention the McKie  
9           case, which I will come back to just in a second.  
10          Finally, you mention the Brandon Mayfield case.

11   A.   Yes.

12   Q.   What I actually want to do is simply to bring to the  
13          fore what is written about the McKie case. I am not  
14          myself going to ask you anything about the McKie case,  
15          but it is just as well to put on the record what you  
16          have said in a paper that's co-authored with  
17          Professor Champod.

18                     You say:

19                     "The second case is the supposed misattribution  
20                     (with allegedly 16 points in agreement) of a mark found  
21                     in a scene in Scotland to the thumbprint of Shirley  
22                     McKie. The McKie case is covered in a recent book  
23                     (McKie and Russell) and a full inquiry of the Scottish  
24                     Criminal Record Office and Scottish Fingerprint Service  
25                     has been undertaken by the Justice 1 Committee of the

1 Scottish Parliament. In this case, there is not a  
2 complete consensus. A minority of latent print  
3 examiners continue to claim that McKie was indeed the  
4 source of the disputed mark, whereas the majority have  
5 declared an exclusion in this case. This lack of  
6 consistency between examiners is a worrying fact."

7 So far as that is written it has not stated a  
8 position one way or the other on the identification or  
9 mis-identification of Y7.

10 A. That's correct, yes.

11 Q. So far as you yourself are concerned, have you actually  
12 ever on any formal basis studied original material  
13 relating to Y7?

14 A. No. I've seen no original material.

15 Q. You have, however, looked at material on the Internet?

16 A. Yes, indeed, yes.

17 Q. I don't myself wish to ask you your opinion about Y7  
18 and, therefore, I will not take matters further than  
19 that but it is just as well to know that you have at  
20 least studied some material relating to Y7?

21 A. Yes.

22 Q. What I want to do is to look at practice and procedure  
23 more generally and I will come ultimately to probability  
24 analysis. Plainly I will be asking the practical  
25 questions, primarily from the standpoint of your own

1 organisation the FSS but if we stray beyond that to look  
2 at practice more widely, then so be it but I am looking  
3 primarily at the way that you practice and I will also  
4 use the textbook as one of my lead sources in relation  
5 to this.

6 If I begin then with a general understanding of the  
7 methodology ACE-V, you and your organisation subscribe  
8 to the ACE-V methodology?

9 A. We do indeed, yes.

10 Q. So far as the initial A, the analysis, is concerned,  
11 what we are interested in understanding is whether there  
12 is a practice, first of all, in relation to the mark of  
13 beginning by an initial analysis of the mark and do I  
14 understand that you would do that?

15 A. Yes. The initial action of the examination is to look  
16 at the mark, the latent print, before the actual known  
17 prints are seen and another word rather than analysis  
18 phase is the information phase, which probably is a  
19 little clearer, is to look at the image of that mark and  
20 to record all of the observations that can be make. So  
21 this is the number and type of minutiae, other features  
22 that might be present.

23 Q. Plainly, as I proceed through this I will be discussing  
24 each of these initials as a separate exercise. Perhaps  
25 if we could put up page 68 of the article, it might

1 provide a helpful basis for the discussion. You are  
2 discussing ACE-V. What you say is:

3 "In general, most examiners subscribe to the ACE-V  
4 methodology or a comparable protocol. ACE-V is an  
5 acronym that stands for analysis, comparison, evaluation  
6 and verification and implies four distinct stages to the  
7 comparison between a mark and a print. In the UK  
8 practice (and elsewhere), it is common to find little  
9 distinction or clear-cut separation between its stages."

10 A. Yes, I think that's true. Although ACE-V is practised  
11 by the majority of examiners, looking at case notes,  
12 looking at the way in which they undertake their  
13 examination, it's sometimes difficult to split it into  
14 four separate stages.

15 Q. In particular, when I am looking at the analysis, I am  
16 interested in the distinction between it and the  
17 comparison phase.

18 As you practise, do you make a comprehensive  
19 assessment of the mark before you carry out any  
20 comparison?

21 A. I think there is a difference here between perhaps what  
22 theoretically one would want to do and what one can do  
23 pragmatically. Ideally you would make a comprehensive  
24 assessment of that latent print and I think where the  
25 mark is of poor quality that note-taking tends to be

1 very extensive and the examination very extensive.

2 As the quality of the mark becomes better, then I  
3 think some of the note-taking tends to be briefer. From  
4 a pragmatic stance, particularly in my own organisation,  
5 time is of essence so the current process that we use  
6 for recording analysis is perhaps briefer than one would  
7 want to see.

8 Q. So if we begin, I suppose, the way that I am primarily  
9 interested in, which is practice. First of all, the FSS  
10 is a commercial albeit a Government-owned and controlled  
11 organisation?

12 A. That's correct.

13 Q. Do the commercial practicalities impact on the manner in  
14 which you practise.

15 A. They do. We work -- obviously the amount of fingerprint  
16 comparison work that we do within England and Wales is  
17 quite small compared to the police agencies and so,  
18 therefore, our customers are not looking for us to  
19 perhaps provide or charge for more expensive note-taking  
20 over and above those police agencies.

21 Q. Approaching it in stages, as you practise in practice,  
22 if you are dealing with a mark that is of good quality  
23 (and by that I mean it has a substantial number of  
24 readily observable, discernible characteristics, any  
25 number off the top of my head, minimum of 20, very clear

1 observable characteristics), would you in practice  
2 expect to take much in the way of any note at the  
3 analysis stage?

4 A. Well, my expectation -- in a sense there would be a note  
5 that that is the case. So in our current way of  
6 recording this, the sort of minimum I expect to see is  
7 some recognition of the general pattern, if that was  
8 available, and some comment about the fact that there  
9 are 20 readily visible minutiae within that mark and  
10 that would be the extent of the note-taking.

11 Q. Assume a complex mark. Again, I suppose that requires  
12 definition. Can I begin, before I infect things with my  
13 misconceptions perhaps, how would you characterise or  
14 define a complex mark?

15 A. Well, a complex mark, a difficult mark, would be one  
16 where the minutiae in the features are not very distinct  
17 within the image that you're inspecting, there is  
18 clearly a lot of distortion, there might be overlays, a  
19 number of factors that essentially distort the image  
20 that you are trying to analyse.

21 Q. With a complex mark, can you explain in practice what  
22 form of note-taking would you undertake if you are  
23 analysing a complex mark?

24 A. Well, for complex marks the note-taking would be more  
25 extensive. By definition it needs to be. So, again, we

1 would be recording the general pattern, the number and  
2 type of minutiae and other features that are seen but we  
3 would need also to document any distortion, any  
4 artefacts that were visible within that image and  
5 ideally look for some mechanism by which that distortion  
6 has taken place.

7 Q. Let us assume, for sake of argument, again, a number,  
8 let us say there are 10 observable characteristics.  
9 First of all, is that something you would regard as a  
10 complex mark or a clear mark?

11 A. I would probably drop down a bit lower, perhaps around  
12 six, seven or eight as being into the area of complex.

13 Q. That is fine, six, seven or eight. If you are in the  
14 realms of six, seven or eight, would you in practice,  
15 given the constraints you operate under, would you  
16 actually list each of the six, seven or eight  
17 characteristics and give a description, for example,  
18 there is a possible ridge ending here, a possible  
19 bifurcation there or do you simply note down that you  
20 have observed in total possibly six, seven or eight  
21 characteristics?

22 A. If it's a mark where there are that number of  
23 characteristics and no great deal of distortion or  
24 other, I'll use the term red flags, something in that  
25 image that makes you concentrate more and wonder about

1           how it was actually deposited, then the recording would  
2           be, yes, there are six minutiae clearly visible on it  
3           and that would be the result of it.

4                     It really is driven by that particular mark.

5           Sometimes looking at the mark, even if you have clear  
6           features, there will be something there that says I need  
7           to look more closely, I need to analyse this more  
8           closely, maybe the ridge flow is distorted or there is  
9           some aspect of it that requires closer attention.

10    Q.    So you may be more specific depending on how challenging  
11           the mark actually is found to be?

12    A.    Yes. The more challenging the mark, the more I would  
13           expect to see the analysis increase in both time and  
14           recording.

15    Q.    Is this summary that you keep, the note you keep, is it  
16           in narrative rather than visual form at this stage?

17    A.    No, we -- the notes will be taken contemporaneously. We  
18           have a form, although examiners can use plain paper or  
19           type it out on a computer should they wish, but the  
20           notes are taken contemporaneously and kept within the  
21           case file.

22    Q.    I am grateful that they are contemporaneous, for that  
23           observation. What I meant is it someone simply  
24           narrating, "I have seen, say, six features", in  
25           narrative form rather than actually having a picture of

1 the mark on which you would record where the features  
2 were?

3 A. I'm sorry. Yes, it's narrative form.

4 Q. If I then take that up and -- well, first of all, can  
5 there be a conclusion or an end to the process at the  
6 analysis if insufficient characteristics are reserved?

7 A. Yes. Part of that process -- and the American's term  
8 this sufficiency -- is to determine whether or not that  
9 particular mark has any value within the examination.

10 So certainly at the analysis stage the decision could be  
11 made that it's not comparable or that it's -- well, that  
12 it's not comparable.

13 Q. We have also heard some evidence that there may be an  
14 intermediate stage, a mark may not be comparable to this  
15 extent, that it may not be capable of ultimate  
16 identification to an individual but if the mark is  
17 sufficiently important it could be compared against, for  
18 example, the prime suspect to see if he could be  
19 excluded.

20 A. Within the process that we use we determine whether the  
21 mark is comparable and, therefore, that means it can be  
22 compared against any set of known fingerprints that are  
23 supplied. I don't think myself I can make a distinction  
24 between it's excludable and it's identifiable. At that  
25 stage of analysis what I am determining is can I compare

1 that mark.

2 Q. So would there, therefore, be a relatively low threshold  
3 for that or not?

4 A. Yes. By looking at the casework that we do, the vast  
5 majority of marks go through to the comparison stage.  
6 We actually discard very few at the analysis stage.

7 Q. First of all, to look at the scale, how many examiners  
8 do you have, Fingerprint Examiners?

9 A. We currently have six Fingerprint Examiners.

10 Q. Can you give an indication of the sort of volume of work  
11 that you deal with?

12 A. Yes. All examiners, in order to maintain competence,  
13 have to deal with at least 12 cases in a year and most  
14 examiners at the moment are dealing with somewhere  
15 between 12 and 30 cases.

16 I should explain they work within different teams to  
17 different customers and, therefore, to different  
18 requirements and our examiners carry out the full  
19 fingerprint process so we undertake the comparison but  
20 we also undertake all the detection within the  
21 laboratory as well.

22 Q. So, in fact, you will develop marks, for example, on an  
23 exhibit and then carry out the comparison yourself?

24 A. That's correct.

25 Q. Would you, therefore, accept -- and this has been a

1 suggestion -- that your company is not as fully engaged  
2 in fingerprints as a police bureau, at least in terms of  
3 volume of work?

4 A. In terms of volume, that's absolutely correct. We do a  
5 very small volume of work compared to a police  
6 Fingerprint Bureau. Absolutely correct.

7 Q. Do you see that as having any relevance to the  
8 methodologies that you apply, the fact that you are a  
9 small bureau whereas police bureaux are much larger?

10 A. Yes, I think it's fair to say it does because,  
11 obviously, I've worked in a police fingerprint bureau.  
12 I'm not under the same work loads and demands as a  
13 fingerprint bureau. So note-taking, for example, there  
14 is, in theory at least, more time for that to take  
15 place. But then I do have those other constraints of  
16 needing to meet very tight deadlines for customers and  
17 needing to keep costs down, so, yes, different pressures  
18 because I'm doing a slightly different job.

19 Q. However -- and this is where I'm interested just in your  
20 background with various committees that you sit in and,  
21 as you say, you have had a police background before this  
22 company that you work for now -- so far as the benefits  
23 of note-taking applied to the different environment of a  
24 police bureau, a much larger bureau, do you commend  
25 note-taking as a standard methodology?

1 A. Yes, absolutely. I think that one of the key issues  
2 around forensic science, and I think the NAS report  
3 tries to make this clear, is this concept of  
4 transparency, the ability to show to a court what you  
5 have actually done and how you achieved the results that  
6 you are presenting. Part of that is contemporaneous  
7 note-taking and I think that is absolutely essential to  
8 the scientific process.

9 Q. There has also been some discussion, and I just ask for  
10 your comment on this, that contemporaneous note-taking  
11 can actually be helpful to the reasoning processes of  
12 the examiner. In other words, he has observed something  
13 and then note-taking is a helpful check, can he actually  
14 record it in a way that to him is persuasive.

15 Do you recognise that as a collateral benefit?

16 A. Yes, I do indeed. I think it is a very useful way of  
17 articulating to yourself, for want of a better phrase,  
18 what you have actually seen and what that actually  
19 means. I think it's very easy to rely on subconscious  
20 thought or as some people describe the black book  
21 process which doesn't actually force you to really  
22 explain what it is that you are seeing and what that  
23 actually means.

24 Q. If I move from analysis into comparison -- before I do,  
25 perhaps I should ask you something else and, please,

1 feel free, if this is an area that's more  
2 Professor Champod. Written in the analysis section we  
3 can see in italics that the word "tolerances" is used.

4 "Analysis requires the examiner to examine a mark  
5 without the print in order to assess and locate the  
6 friction ridge skin features that may be used for  
7 further comparison. The analysis also allows an  
8 assessment of the quality of the mark and the factors  
9 such as distortion, pressure, amount of residue and the  
10 nature of the substrate and of detection technique used.  
11 Taking these factors into account will help to set the  
12 tolerances or boundaries that the examiner will have to  
13 allow for considering a potential correspondence."

14 Can you explain what is meant by tolerances in that  
15 context?

16 A. Yes, I think it's very much Professor Champod's word but  
17 I believe what we are applying here is that you can, as  
18 you were saying before, make some decisions about how  
19 useful that particular mark is going to be, whether it's  
20 identifiable, whether it's searchable at that analysis  
21 stage.

22 Q. I will take you on then to comparison and, in  
23 particular, what I am going to do is turn to page 69.  
24 It is the second line of page 69. What is written is:

25 "The comparison should always entail observation of

1 features in the mark followed by their location in the  
2 print. The reverse process, from the print to the mark,  
3 should only be made with care (and being documented)."

4 As I read that, first of all, what you are saying is  
5 that, if I understand it, you can work in the reverse  
6 manner, it is possible to do it but you must do it with  
7 care?

8 A. Yes, it's certainly possible to do it. I think it's  
9 allowable to do it but you do need to document that that  
10 has taken place and be very clear in your own mind that  
11 you are now seeing something in the mark that you didn't  
12 see before because you have exemplar alongside it.

13 Q. First of all, I just wish to be clear as far as accepted  
14 practice is concerned. We have heard ranges of opinion.  
15 Perhaps the purest would be when you enter the  
16 comparison stage you should only work with the  
17 characteristics that you had noted at the initial  
18 analysis stage. That's the purest. Then there are  
19 ranges of view on the other side, perhaps the pragmatic  
20 view, that there will sometimes be some event that  
21 becomes more discernible in the light of the known print  
22 so that you can go back to the latent in light of the  
23 known and observe a characteristic not previously  
24 observed and take that into account in the comparison.

25 Do I understand, therefore, in practice you will

1            have occasion to work in the reverse manner?

2        A.    Yes, in practice we do but with that stipulation that we  
3            are very clear and we have document that that is what  
4            we've done.

5        Q.    Obviously, we have heard the danger here is some form of  
6            unconscious/subconscious bias that someone is now, in  
7            effect, perhaps at its crudest, seeing what he wants to  
8            see in the crime scene mark.

9                    Is that the bias that you are trying to protect  
10            against?

11       A.    Absolutely. I think it's a very easy route to follow,  
12            to be influenced by the print and to start to see  
13            features you didn't see before. To guard against that,  
14            you need to work in that direction, between mark and  
15            print. But from a practical standpoint, most examiners  
16            I think would admit that if you do that then sometimes  
17            you do miss genuine features. So it's a practical  
18            application.

19       Q.    I suppose it might be inferred that what you are saying  
20            is that the protection that you have in place to guard  
21            against the subconscious bias is, in fact, you do it  
22            consciously because you are writing a note that you  
23            have, in fact, done this in the reverse manner?

24       A.    Absolutely and, as an example, if the majority of  
25            corresponding features were found only after looking at

1 the print, clearly that would indicate to me, another  
2 one of those red flags, something is perhaps wrong and,  
3 therefore, I'd be very cautious in terms of formulating  
4 a finding on that comparison.

5 Q. The article proceeds to mention that:

6 "Instead of focussing on minutiae during the  
7 comparison process, it is advised to compare every ridge  
8 and furrow (assessing comparatively their length and  
9 sequence) and then the shape of pores and edges if the  
10 quality of the mark allows."

11 Is that set out as something that is more the ideal  
12 than the way you would work in practice?

13 A. No, I think there are two methodologies really. The  
14 more common methodology is to look for those minutiae  
15 and associate the minutiae together in a configuration  
16 by counting the ridges between them. The other  
17 methodology is to, as it says, trace each ridge. So  
18 even if there is not a minutiae there, look at the  
19 ridge, look at the flow of that ridge.

20 That is quite common practice in the United States.  
21 I wouldn't say the majority practice but common practice  
22 in the United States and it does have some benefits. If  
23 you apply that technique, which is one that I've  
24 adopted, you find that, in some respects, you notice  
25 more discrepancies than if you just merely centre on the

1 minutiae points, the events.

2 Q. An alternative methodology we heard is that an examiner,  
3 having carried out a comprehensive analysis of the mark,  
4 will visualise a target group within the mark, an area  
5 that has a prominent series of characteristics, and will  
6 then start analysis of potential matches by looking for  
7 a target group and then, if he finds the target group,  
8 will then expand out going between the two.

9 Do you practice in that manner?

10 A. Yes, it's actually quite a logical -- you need a  
11 starting point. In some respects you can put an S  
12 between the A and the C, as a sort of search area  
13 whereby you have your latent, you have some features in  
14 that latent, you're looking for the known print which is  
15 a potential match, and you are doing that by taking some  
16 notable feature within the mark and looking for it in  
17 the print and that's the process that you take.

18 Once you find that starting point, you can then  
19 undertake the comparison by building out from that point  
20 or, indeed, select another point and build out from that  
21 point.

22 Q. If you are doing your examination in that manner, as you  
23 say, with the intermediate S, the search, is that a  
24 stage where you or is that a situation where you would  
25 see note-taking as essential, given the risks of being

1 influenced as you proceed from one back to the other?

2 A. Interesting, we probably wouldn't take any notes at that  
3 point. Essentially, all we're doing there is taking  
4 that target group and looking for it. What you should  
5 remember, in most comparisons you have not got a mark  
6 against one particular set of ten prints. You might  
7 have several sets of ten prints so you're looking for  
8 the particular finger or thumb which is going to match  
9 within that group. That's the S type process.

10 Once you have found that potential, then you move  
11 into the comparison stage and start, again, with  
12 a starting point and then start tracing ridges and  
13 moving out.

14 Q. So the note-taking would be done at the end of the  
15 analysis phase. You might use an intermediate stage, a  
16 search, to narrow down so that you then know the  
17 particular marks you are going to look at more  
18 carefully, but then you practice what you have mentioned  
19 earlier, where you would do a more comprehensive  
20 analysis of even the print, tracing ridges and the likes  
21 because you feel that that gives more potential to see  
22 differences as well as similarities?

23 A. Yes, that's correct.

24 Q. Also in the article you mention, at the second stage at  
25 the end of the comparison stage, the benefits of

1 documentation. There seems to be a hint here again, of  
2 a practical slant to this because you:

3 "Documentation of this crucial stage is sometimes  
4 sparse due to time constraints and it is not common  
5 practice to produce any form of chart to record the  
6 information."

7 Is that --

8 A. In the comparison stage?

9 Q. Yes.

10 A. Yes, we do actually produce some documentation there.

11 If we exclude a mark, then actually we don't document  
12 why we have excluded it. We merely state it's excluded  
13 but if we make an identification, if we make some  
14 association, then we will document why that association  
15 has been made. That can be in narrative form but more  
16 often is in the form of a digital image of the mark and  
17 the print showing those features that actually  
18 correspond.

19 Q. But you do accept that that is not, across the  
20 fingerprint practising community, common practice?

21 A. It's not. Obviously, if we go back 20 or 30 years it  
22 was common practice for each identification to be  
23 charted and produced for court but as courts have not  
24 required that, then that practice has ceased.

25 Q. The text does, however, gone on to say:

1                    "The absence of documentation may lead to  
2                    difficulties in disputed cases", and you say "we", that  
3                    is you and Professor Champod, "would advise systematic  
4                    documentation of the comparison stage."

5                    So in a sense you have committed yourself to the  
6                    benefits of documentation at the comparison stage,  
7                    conscious that it could always come into a dispute in  
8                    court?

9        A.    Yes, I think the guiding principle here is that in each  
10                   of these stages of this examination, as the forensic  
11                   scientist, what I am doing is recording my observations  
12                   on which I will base my findings. So if there's a  
13                   disputed identification at a later date I can go back to  
14                   contemporaneous notes and show how I formulated my  
15                   decision.

16        Q.    Again, just to follow this through to give a  
17                   perspective, have you yourself had to give evidence in a  
18                   case that involved a disputed identification?

19        A.    No, I haven't.

20        Q.    Have you heard -- other than the examples that are  
21                   mentioned in the text -- have you heard of examples of  
22                   cases going to court with a dispute?

23        A.    Being disputed in court?

24        Q.    Yes.

25        A.    Rarely, and not very many from the United Kingdom.

1 Q. We will come on to some other features of that a little  
2 bit later.

3 What I want to look at in the next context of  
4 evaluation that has been carried out, I will break this  
5 down and what I want to ask you about is a concept I  
6 discussed with you yesterday about unexplained  
7 differences.

8 As you have said, when you are carrying out your  
9 comparison you are as attuned to differences between the  
10 mark and the print as you are to similarities and we  
11 understand that if a difference is observed it's not  
12 necessarily fatal to a conclusion of match if some  
13 persuasive reason is present for the difference.

14 Is that fair?

15 A. That's absolutely fair, yes. I think if there is a  
16 discrepancy, if that can be explained or some  
17 proposition put forward for why that discrepancy occurs,  
18 then that's valid.

19 Q. Perhaps this is helpful, you would use the word  
20 "discrepancy". If it has an explanation, a persuasive  
21 explanation, then it is not regarded as a difference; is  
22 that fair?

23 A. Yes, that's fair.

24 Q. But if there is no ready explanation for the discrepancy  
25 are you beginning to look at it as a difference?

1 A. Again, it's a warning signal. If you cannot see a  
2 reason for it, then you need to be very cautious from  
3 that point on. I think if you have one discrepancy and  
4 you cannot find a persuasive argument for the one  
5 discrepancy, how you proceed is probably based on the  
6 other information that you can see. But if you have a  
7 number of discrepancies and you cannot actually find  
8 persuasive mechanisms for them, then really you are  
9 moving towards exclusion.

10 Q. Can I take it from the answer that you have given that  
11 you could, at least in theory at the moment -- we'll  
12 come back to practice -- you could in theory contemplate  
13 a situation where, with a discrepancy for which you have  
14 no clear explanation, you might nonetheless conclude  
15 that there's a match if there is a sufficiency of  
16 similarities present.

17 A. I think that is absolutely possible, with the caveat  
18 that in any report that is produced I would be saying  
19 that there is this discrepancy so that it would be very  
20 clear to courts and to others and to defence examiners  
21 that I'm aware there's a discrepancy there but I can't  
22 find a mechanism but because of the other information  
23 I'm willing to provide a finding.

24 Q. Have you had experience of doing just exactly that,  
25 reaching a conclusion in the presence of an unexplained

1 discrepancy?

2 A. Actually, I don't recall that I have, no. I think this

3 is a very theoretical argument.

4 Q. That is why I am just interested in the theory, then

5 coming back to the practice. So though you can conceive

6 of this in theory, in practice you've never actually

7 done it?

8 A. Personally, no.

9 Q. Can you explain the difference really between the two?

10 Is there an in-built direction in which you would err,

11 so to speak?

12 A. I don't quite understand. In terms of ...?

13 Q. Without me putting words in your mouth, can you give us

14 an explanation why it would be that despite the

15 theoretical possibility that you might be able to

16 express a conclusion in the presence of an unexplained

17 discrepancy, that in fact you never have?

18 A. I've just never come across that. Yes, that sounds -- I

19 think in most cases where I have had discrepancies I

20 have been able to put forward a proposition for those

21 occurring. It's just the casework that I've seen.

22 Q. If I move beyond the question of evaluation now to

23 verification, I understand verification -- and your

24 article confirms this -- to be an essential, an

25 important part of the methodology. Is that fair?

1 A. That's correct, yes.

2 Q. If I understand it correctly, standing back, the ACE  
3 part is an individual assessment with a high subjective  
4 content; would that be fair?

5 A. That's correct.

6 Q. The verification is, in effect, a quality assurance that  
7 a different individual of competence and qualification  
8 will himself reach the same conclusion, so it's a  
9 cross-check?

10 A. Yes. I think it's fair to say verification has -- there  
11 are a number of different schools of thought around  
12 verification. We take the view that verification is  
13 essentially a quality assurance, it's providing  
14 assurance that the correct answer has been found by the  
15 initial examiner.

16 There is another school of thought which tends to go  
17 by the term of "blind checking", which is essentially a  
18 re-examination. So its two independent examinations  
19 arriving at the same result, both of which are aimed at  
20 providing assurance. One is more labour intensive than  
21 the other.

22 Q. Also we have heard some questions raised as between the  
23 two schools that in a smaller organisation, obviously  
24 yours is on the smaller end with six examiners, it may  
25 be, frankly, impractical to expect entirely blind

1 verification to proceed?

2 A. Yes. I mean, I've been party to the same discussions  
3 and with ourselves, for example, blind verification  
4 would be an issue, essentially it's going to raise costs  
5 and we do have a limited number of staff.

6 I think there is, again, perhaps an academic  
7 argument that if that's the right thing to do that's  
8 what should be done and the resources should follow the  
9 correct practice and not the other way round.

10 Q. Do you see, with all the imperfections as you said of  
11 the cost constraints, do you see a necessity for  
12 entirely blind verification or are you satisfied that in  
13 the appropriate climate with individuals suitably  
14 trained and acting with integrity, obviously, that blind  
15 verification may be an unnecessary complication?

16 A. My personal view is blind verification is a step too  
17 far. I think, as you say, with the correct training, in  
18 the correct environment, assurance by an independent  
19 check is purely sufficient. I don't see the need to  
20 move to blind verification.

21 Q. In this context, you have obviously used the word  
22 "independent", which is the key to this. The key is  
23 what is meant by independence. In a blind verification  
24 one can say there's a high degree of independence, the  
25 Second Examiner does not know what his has preceded and

1 is doing an entirely fresh analysis. In a sense, that  
2 is the highest degree of independence.

3 Before we really debate what is the interpretation  
4 you would apply to independence, if I come back into  
5 your own work and I have an example that I will give,  
6 again, if we were looking at a complex mark let's use  
7 the range of six, seven or eight features that you have  
8 mentioned is indicative of a complex mark for you. The  
9 example I discussed with you yesterday is that a First  
10 Examiner, let us say you, you have reached a conclusion  
11 of a unique identification based on let us say the most  
12 challenging number of six because you have found  
13 something peculiar about that combination of six that to  
14 your eye is indicative of uniqueness. Is that fair?

15 A. That's fair, yes.

16 Q. I am hypothetically the Second Examiner. I also see  
17 those same six but I am just not myself seeing a  
18 sufficient peculiarity in the six. So I am happy that  
19 there are six characteristics there but I am not myself  
20 tending to the view that it's unique.

21 Would it be, in practice, could there be a  
22 discussion between the two of us to see if a consensus  
23 could be arrived at?

24 A. Within the FSS, yes, that form of peer review discussion  
25 takes place and we're quite happy with that. Again,

1 a caveat is because we have well established examiners  
2 with lots of experience, which makes me comfortable with  
3 that process. But what we do is we do not have, for  
4 want of a better word, a conference of all Fingerprint  
5 Examiners discussing a particular comparison. So that  
6 first and Second Examiner may have a discussion. They  
7 may formulate a consensus opinion, again, which would be  
8 documented, as will any of their findings or they may  
9 still disagree, in which case it will go on to another  
10 process through myself as the Lead Examiner to come to a  
11 conclusion as to what we should report in that  
12 particular case.

13 Q. Again, if I am looking in purely theoretical way at what  
14 might be understood by the word "independence" in this  
15 process, one might suggest that if the two examiners  
16 have conferred, they have had a conversation that  
17 has resulted in the second examiner (in this case me)  
18 concluding that there is indeed something persuasively  
19 distinctive about this combination of six so that I can  
20 now sign off on an identification, it might be suggested  
21 that that conversation having taken place has  
22 compromised my independence.

23 Equally, the converse argument is that I am still an  
24 examiner of skill and competence, ultimately the test  
25 for me is my own integrity and professionalism and I

1 know I'm responsible in court for that conclusion. The  
2 independence really consists in my skill and integrity.

3 What view do you take on that?

4 A. I think the independence is the independence of the  
5 examination, so if we take that scenario, the First  
6 Examiner is independent in formulating their findings.  
7 The Second Examiner has been independent in formulating  
8 the findings. The discussion is after, if you like,  
9 that process of independence so the Second Examiner  
10 hasn't been influenced directly. The conversation is  
11 taking place on the difference of findings as like a  
12 separate stage.

13 Yes, it's fair. It's not a perfect system and in  
14 the forming of the word "independence", it probably  
15 isn't there but it is a practical, again, solution to  
16 those issues.

17 Q. You have already anticipated by one of your questions,  
18 the next stage and you do actually have a formal process  
19 if there is a difference of view between two examiners  
20 for the resolution of that, it comes to you as the  
21 Senior Examiner to resolve the difference of view?

22 A. It does and, again, I take a very pragmatic view. The  
23 first set of questions is what value is this particular  
24 identification within the case. If it has no probative  
25 value within that particular case then it's more an

1 academic issue as to whether or not we have made a  
2 match.

3 Then, obviously, I have full written reports of the  
4 examiners who have looked at that before, and more often  
5 than not what I will do is recruit in another examiner  
6 who has had nothing to do with case to make some  
7 judgments for me.

8 Q. Have you had experience, before we become too  
9 theoretical, have you had experience of actually  
10 reporting out as an identification through this  
11 arbitration process something where there had been at an  
12 earlier stage a difference of view amongst some of your  
13 colleagues with one of them not yet persuaded that there  
14 truly is an identification? Have you had experience of  
15 reporting that out?

16 A. Again, no, but I think that's part and parcel of, as has  
17 been pointed out, the low level of casework that we  
18 have. Most of the thinking, as it were, and the way in  
19 which I now carry out my role has developed whilst I  
20 have been with the Forensic Science Service. It would  
21 be interesting to apply those concepts in a busier  
22 Fingerprint Bureau to see if they actually work.

23 Q. With that caveat, therefore, that you have not actually  
24 done this in practice, if we can just take the benefit  
25 of the thinking you have had in relation to the

1 processes, could you conceive of a situation in which  
2 the arbitration process would result in an  
3 identification being reported, for example, to the  
4 police despite a doubt in the mind of one of your  
5 colleagues?

6 A. Again, from a theoretical point of view, yes, but I  
7 think the point there is that the court, the police,  
8 should be made well aware that there is this difference  
9 of view between examiners. I think the underlying thing  
10 there is that all the examinations have been competently  
11 carried out but I have no issue in producing a report to  
12 court that says, "Three examiners believe this is a  
13 match, for these reasons ... and one examiner believes  
14 it's not, for this reason ..." I think that's  
15 fulfilling the role as a forensic scientist.

16 Q. The next part I want to do is just pick up something  
17 that is in the text, moving to a separate part of the  
18 evaluation. I have talked about unexplained  
19 differences. I have gone through verification. I want  
20 to come back now and look at the standards that are  
21 being applied.

22 Your Article goes through, and I don't need to  
23 rehearse the history with you of the 16-point standard.  
24 It then comes to the practice within the UK of the  
25 non-numeric approach and you have a formulation that's

1 on this page, page 69, of the non-numeric standard that  
2 I am interested in just looking at with you. It is the  
3 penultimate paragraph on the page. At least to me the  
4 text is a little blurred but we will do our best:

5 "In the absence of dissimilarities, the examiner  
6 will weigh the corresponding features in reference to  
7 the standards for identification. In a nutshell, the  
8 individualisation will be reached when the examiner  
9 observes a level agreement (across the three levels of  
10 legible features) that exceeds the highest level of  
11 correspondence he observed through his/her training and  
12 experience in comparisons involving non-matching  
13 entities."

14 Then it says:

15 "An identification is then concluded when the mark  
16 shows sufficient ridge quality (clarity) of friction  
17 ridges in agreement with the print so that the  
18 probability for such a match to happen if a print from  
19 another person is submitted is deemed to be impossible."

20 I am interested in that in two different ways. If I  
21 go at it in the reverse way, as we will see later on in  
22 the article you are, in fact, an advocate for the use in  
23 fingerprint examination of probability material?

24 A. That's correct.

25 Q. Writing from that perspective -- and it's clear just to

1 make that perspective -- what you are, in fact, saying  
2 is that conventional fingerprint evidence has implicit  
3 within it a probability analysis. It's simply that the  
4 examiner has concluded from his observation that the  
5 probability of a match is, in fact, so high that any  
6 other individual presenting those same features is, in  
7 fact, impossible?

8 A. Absolutely right. Conventional fingerprints is  
9 probabilistic by basis, a form of subjective  
10 probability.

11 Q. Albeit they might think the threshold is one of  
12 100 per cent before they would express an opinion?

13 A. That's right. It's like a caveat being put over the top  
14 of that that, yes, it's probabilistic but only when I  
15 get into the very high likelihoods of the match am I  
16 willing to report it.

17 Q. We will look at that a little bit later, in a moment.

18 What I want to do is reverse back to the preceding  
19 sentence because that implies that an examiner would be  
20 able to say to me, if asked, that perhaps through  
21 working with an AFIS system that throws up potential  
22 matches, an examiner would be able to say to me,  
23 "Mr Moynihan, I have only ever, in all the AFIS  
24 researches I have done, I have only ever have found two  
25 individuals who happen to share five, six, seven

1 characteristics", whatever it may be, "and, therefore,  
2 the threshold I work to in practice is that highest  
3 number. I have seen two individuals' prints who do not  
4 match and let us say for sake of argument they had five  
5 features in common so, therefore, my working rule is I  
6 must have a minimum of five before I identify".

7 Is that as I should be reading that particular  
8 sentence?

9 A. Yes. Essentially, what we are saying there is that each  
10 individual examiner is formulating a personal threshold  
11 based on their previous observations. It's more than  
12 just the number of minutiae. It's about the  
13 configurations of minutiae as well. Any particular  
14 configuration of five minutiae that I have seen many,  
15 many times before I would treat with less rigour in a  
16 comparison than someone who has only seen that  
17 configuration once before.

18 Q. In fact, before I ask you to comment on the evidence we  
19 have had from others, do you yourself have a personal  
20 threshold that you apply consistently across all  
21 examinations or does your threshold vary?

22 A. I don't have a numerical threshold but undoubtedly, yes,  
23 my examinations are based on my experience as a  
24 fingerprint examiner.

25 Q. Can you tell me -- again, I know that you wouldnot be

1           expressing your conclusion numerically but as you work  
2           and you're checking for corresponding features, do you  
3           have a minimum number at all that you would be working  
4           to before you would express a conclusion of identity?

5    A.   Not consciously, no. I wouldn't say that I set a  
6           threshold at any particular number but again probably  
7           subconsciously there is a number in my head somewhere  
8           but consciously I would say I have no number.

9    Q.   If it is in your head somewhere, it's not popping out  
10           today, fair enough.

11                 What this then comes back to is the answer you have  
12           given is much the same as the other examiners who have  
13           given evidence. We have not had any examiner who says,  
14           "Yes, there is a minimum number I apply consistently",  
15           that leads me to wonder whether the examiners are, in  
16           fact, carrying out a more intuitive judgment because  
17           they are not saying, "Mr Moynihan, I have seen two  
18           individuals with five characteristics in common,  
19           therefore, my minimum number is five", they are simply  
20           saying depending on the particular configuration or  
21           constellation of minutiae in a mark I will either see an  
22           identity or not.

23                 Is that fair, it is a more intuitive process?

24    A.   I think that is fair comment. I think there's probably  
25           a number of reasons why Fingerprint Examiners are loath

1 to state a number and one of the reasons for that is we  
2 know there is no number. We mostly accept that so I  
3 think there's a nervousness to state a number even  
4 though perhaps some Fingerprint Examiners are perhaps  
5 consciously using a number. But, yes, as an intuitive  
6 process that's correct.

7 Q. If I bring up pages 73 and 74 of the article, perhaps if  
8 we could begin to page 73 and then move pretty sharply  
9 on to page 74, page 73 -- if we just move the text up  
10 because it is the last two paragraphs I am interested  
11 in -- you observe, as you have told us earlier on when  
12 talking about standards, that in continental Europe a  
13 fair number of countries use a standard, 12 being quite  
14 common, apparently Italy still being at 16 or 17?

15 A. Yes, that's correct.

16 Q. However, then you go on, along with Professor Champod,  
17 at the foot of page 73 in fact, to argue, as you say,  
18 from a logical perspective that there are reasons for  
19 not insisting on a numerical standard?

20 A. Yes.

21 Q. So, therefore, if I am looking at the perspective from  
22 which you are giving evidence, you are someone who is  
23 persuaded there should be no numerical standard?

24 A. I am absolutely persuaded of that, yes.

25 Q. If we look then at page 74 and I will give you a

1 chance -- and I must apologise, I hadn't forewarned you  
2 I was going to use this article to the extent that I am  
3 today -- if I give you a chance to read it, along with  
4 others in the hall, the reasons you set out as 1, 2 and  
5 3, and the question will be whether you are satisfied  
6 that that gives your own reasoning for firmly advocating  
7 the absence of a numerical standard. **(Pause)**

8 A. Yes.

9 Q. You are content with that?

10 A. Yes.

11 Q. As we say, in looking at -- and this is not intended in  
12 any way to trap you -- what you have actually written is  
13 that you can, in fact, if it is done appropriately, use  
14 even as few as three minutiae and arrive at a reliable  
15 conclusion. The question we will come to ultimately is  
16 how you express that conclusion.

17 A. Yes, you can come to a reliable conclusion and, you're  
18 absolutely right, how you express that conclusion is  
19 perhaps the issue to discuss.

20 Q. If I look at this just now, what I am interested in is  
21 moving through, before we come to probabilities, in  
22 other words, how you advocate things are expressed, if I  
23 take a step back and look at current practice. We have  
24 had examiners give evidence and, indeed, even current  
25 trainers give evidence that the training for Fingerprint

1           Examiners is to express themselves only in terms of  
2           100 per cent certainty. In the absence of 100 per cent  
3           certainty, there will be no expression of opinion about  
4           identity.

5                     Do I understand you, from what you have said about  
6           even IAI's current position where they do not permit  
7           views of degrees of probability that you would accept  
8           that that is the orthodox, in fact, universal practice  
9           of Fingerprint Examiners?

10    A.    Yes, it is the universal practice. I think particularly  
11           with the IAI statement, for example, and I can't really  
12           do this but it's necessary to look at the context in  
13           which this was actually brought into force so it's not a  
14           clear-cut rejection of probabilities as more a response  
15           to events that were taking place in the early 1980s. I  
16           think also there's a large sociological driver to this.  
17           I think there is a perception amongst the fingerprint  
18           community that the customers, the courts and police  
19           forces require them to produce 100 per cent evidence  
20           each time and that is what is driving the process.

21    Q.    So there's a perception by the fingerprint community, as  
22           you say, universally that the courts are expecting of  
23           them only -- only -- 100 per cent certainty as to  
24           identification and nothing else?

25    A.    I believe that to be the case, yes.

1 Q. Before we look at possible variants to all of this, from  
2 a scientific perspective, what is your reaction to the  
3 proposition that someone can be 100 per cent certain  
4 based on the observation of minutiae in what is, after  
5 all, a sometimes distorted, potentially partial  
6 impression of a fingerprint?

7 A. I think from a purely scientific perspective,  
8 identification or individualisation is not achievable,  
9 certainly on a scientific basis, but I think within  
10 again that pragmatic use of fingerprints what we are  
11 doing is dismissing the likelihood that the source could  
12 be another because it's so diminishingly small and,  
13 secondly, as experts what we're giving is a personal  
14 opinion that it can only have come from one particular  
15 individual. Identification for me is my opinion rather  
16 than something fundamentally founded on a scientific  
17 principle.

18 Q. Because you will come ultimately, as we will see, to  
19 advocate probability as a way forward, do you have from  
20 the benefit of the work you have been doing any  
21 misgivings about evidence being presented in court based  
22 on 100 per cent certainty coupled with the absence of a  
23 numerical threshold so that we have what I was  
24 discussing earlier as an intuitive judgment being formed  
25 by an examiner?

1 A. I think it's fair to say, yes, I do have some small  
2 misgivings. I think the current system does allow for  
3 some overstating of the evidence. I can't produce  
4 examples of this but I'm pretty confident that some  
5 identifications, the actual configurations of the  
6 minutiae, the basis on which that identification was  
7 given is not as strong as the examiner believes it to  
8 be.

9 Q. Indeed, if I look at what has been written by you, I go  
10 back to page 72, page 72 is written:

11 "Fingerprint identification in the UK and around the  
12 world is understood to mean that a mark has been  
13 attributed to a particular individual to the exclusion  
14 of all others, although it is seldom articulated in this  
15 way. 'Others' refers often to any human in the world,  
16 living or dead. In fact such a claim may be unnecessary  
17 as in all but a few scenarios the suspect (or source)  
18 may be from a much smaller or restricted population. It  
19 is therefore interesting that examiners have felt the  
20 need to make a much greater claim, presumably to  
21 increase the perceived evidential value of the  
22 identification."

23 A. Correct, yes.

24 Q. In fact, what I am interested in, as you write there, in  
25 effect it is a two-edged sword. First of all, by the

1 claim of 100 per cent certainty the examiner may be  
2 overstating the reliability of his conclusion in one  
3 particular case -- may be, not necessarily is. Correct?

4 A. Correct.

5 Q. Secondly, this is the other edge of the sword, by  
6 addressing such a standard Fingerprint Examiners, the  
7 community universally may be denying to the courts a  
8 body of evidence?

9 A. I believe that to be the case, yes.

10 Q. If I pick up in relation to your own statement -- I  
11 don't have the particular reference here -- do you have  
12 experience of giving reports and, therefore, giving  
13 evidence to the judicial system, where you are not  
14 concluding a unique identity but you are in fact  
15 offering a view that is, I might suggest, a consistency  
16 between a mark and an individual but not to the degree  
17 of individualisation?

18 A. Yes, in my career I have actually produced evidence on  
19 two occasions, where on one particular occasion, the  
20 examination had been inconclusive in terms of  
21 associating the particular mark. I was asked to, if you  
22 like, give a measure of how inconclusive that was and  
23 that is what I did, based on my observations. So it  
24 wasn't an identification but it was an attempt to  
25 provide the court with some idea of how likely it was

1           that that mark came from a particular individual.

2       Q.    We have heard and we may hear some more evidence about  
3           this next week that there is perhaps or there has been  
4           evidence, starting in England, that looks at it perhaps  
5           from a way that might be more comfortable for a  
6           Fingerprint Examiner expressed in a way that he is  
7           incapable of excluding an individual.

8                        Is that a more relaxed way for a Fingerprint  
9           Examiner to be looking at it?

10     A.    I think that's nicely put. I think it's a very  
11           comfortable way. If your career has developed with this  
12           duality of identification/not identification to be able  
13           to say, "I actually can't make a decision one way or the  
14           other", is a comfortable option.

15     Q.    So, in other words, by incapable of excluding what I  
16           understand this to mean, and please correct me if I am  
17           wrong, is the Fingerprint Examiner is saying the overall  
18           pattern between the mark and the print is the same.  
19           It's a whorl or a loop or whatever. Secondly, there is  
20           a limited number of observable characteristics which  
21           happen to be in common between the mark and the print.  
22           There are no unexplained differences. So far so good?

23     A.    Yes.

24     Q.    But the examiner is saying the level of similarity is  
25           not so high as to persuade me as to unique identity?

1 A. Yes, in a sense, as I mentioned about personal  
2 thresholds, it hasn't exceeded the personal threshold of  
3 that examiner.

4 Q. Without the work you have been engaged in most recently  
5 on probability analysis, how have you found yourself  
6 able to express this intermediate position when giving  
7 evidence in the past?

8 A. This has been purely subjective and reported as such.  
9 What I have --

10 **(Interruption: car alarm)**

11 Q. It has been more a subjective judgment that you have  
12 expressed?

13 A. Yes. The one particular case that I'm thinking of, we  
14 had only a particular number of individuals who were  
15 known to be or for it to have been possible for those  
16 individuals to have left the mark. So I had a  
17 population with which to work to. So there were  
18 immediately some judgments that could be made around  
19 general pattern, for example. But it was intuitive and  
20 it was very much based on my opinion as to how likely  
21 that was to occur.

22 Q. I am grateful to you. What you have explained is it  
23 really fits in with the text, if we put in an artificial  
24 constraint and tell you it can only be a limited number  
25 of individuals, the number of variables is, therefore,

1 at least in theory, constrained by the population that  
2 you are being asked to consider. Is that fair?

3 A. Yes.

4 Q. Therefore, working within this artificial constraint  
5 that you are assuming it can only be one of a limited  
6 number of individuals you, therefore, might need a lower  
7 number of points in agreement to discriminate among that  
8 population?

9 A. Yes. Professor Champod in an article actually made this  
10 point, if you imagine hypothetical situations of cruise  
11 ships in the middle of the Atlantic with a fixed number  
12 of individuals then the number of correspondences you  
13 would need between the mark on the murder weapon and a  
14 particular individual will reduce because you can look  
15 at the entire population.

16 Q. That, in a sense, explains and really introduces what  
17 you are talking about with this, in fact, implicit  
18 probability analysis that if you are looking at it from  
19 an objective point of view, standing back, the scenario  
20 that you are given can give you parameters for your  
21 probability analysis so if the scenario is the murderer  
22 must have been someone on that ship and you have  
23 captured them all at a point in time then the  
24 probabilities assist you in saying that you may need a  
25 fewer number of variables to identify the culprit?

1 A. In that particular hypothetical situation, yes, that's  
2 right.

3 Q. The alternative example we have had, which is not  
4 theoretical, it is practical, is identifying individuals  
5 who have died in a plane crash by reference to  
6 fingerprints. Again, it would be the same probability  
7 scenario that is at play, there is a limited number of  
8 potential individuals. You are simply discriminating  
9 among them, you might need very few characteristics to  
10 do that?

11 A. Absolutely.

12 Q. What I would like to do is just in looking at this in  
13 your own statement, paragraph 53 you mention -- perhaps  
14 I should bring it on screen FI0136. It is paragraph 53  
15 which is at page 12, paragraph 53, page 12.

16 You are looking at likelihood ratios and I will come  
17 to that after we are all fortified by some coffee to  
18 assist but what you say is:

19 "However, the likelihood ratio for different  
20 configurations of the same number of minutiae varies.  
21 In other words, two different matching marks and prints  
22 with the same number of corresponding minutiae may have  
23 a different weight of evidence."

24 If -- and I do say if -- I understand this  
25 correctly, what you are saying is simply to say that

1           there are, let us say, eight points that correspond,  
2           simply eight in the abstract, and I have two sets of  
3           matching prints, each with eight points matching, you  
4           are, in fact, saying from a statistical point of view,  
5           one may in fact be more probable than the other, even  
6           though they both have the same abstract number or  
7           concrete number of matching features of eight?

8        A.    Yes, because what we're talking about is a configuration  
9           of a set number of minutiae so a particular  
10          configuration of eight minutiae could be quite rare and  
11          another configuration of eight minutiae could be very,  
12          very common. So when measuring those probalistically,  
13          statistically, you are going to get different weights of  
14          evidence.

15       Q.    Before we move into probability -- and this is the point  
16           for concluding this particular section -- I discussed  
17           with you this morning me, I think the discussion this  
18           morning will help you to understand where I am coming  
19           from. We have heard evidence that Fingerprint Officers,  
20           Fingerprint Examiners, may think in terms of events. Is  
21           that a term you are familiar with?

22       A.    Yes.

23       Q.    An event can cover something that is in the background  
24           substrate, a pimple in wood or something of that sort,  
25           or it could cover a ridge characteristic and if it's a

1 ridge characteristic it could be a ridge ending or a  
2 bifurcation.

3 Do you follow?

4 A. Yes, I do.

5 Q. Do you accept that?

6 A. Yes.

7 Q. We have heard some evidence that it may not matter to a  
8 Fingerprint Examiner what the precise nature of the  
9 event is, so long as he finds an event in the same  
10 location in mark and print.

11 First of all, just thinking of this in terms of  
12 conventional fingerprint evidence, what is your comment  
13 on the proposition that the precise nature of the event  
14 does not matter provided there is some event in the  
15 corresponding location between mark and print?

16 A. No, I think whether it's a bifurcation or a ridge ending  
17 is very important. I think if you considered two known  
18 fingerprints with three bifurcations lying alongside  
19 each other and you had another known fingerprint with  
20 three clear ridge endings lying alongside each other,  
21 they will be different. I don't think anyone would say  
22 that they are matching events so the type of minutiae or  
23 bifurcation is very significant.

24 Q. Let us just assume, for sake of argument, that the  
25 precise discrimination in mark and print is doubtful, so

1 that it is open to interpretation, and let us say an  
2 examiner, conscious of this and he has reached perfectly  
3 genuinely the conclusion of a match between the two so,  
4 therefore, he is going to have to call the judgments the  
5 same way in mark and print. Let us say he is doing it  
6 perfectly genuine and you have use the example of three  
7 so I will use that. He, therefore, has three events in  
8 sequence in mark and print. He is going to call them  
9 either three matching bifurcations or three matching  
10 ridge endings and plainly in mark and print he must call  
11 them both the same way.

12 At least in theory, starting in theory and then  
13 we'll look at the practicalities, would there be a  
14 difference from the studies that you are aware of be a  
15 difference in the probability of a match if it's called  
16 three matching ridge endings as opposed to calling it as  
17 three matching bifurcations in a row?

18 A. It's interesting. We've not -- or personally, I haven't  
19 actually carried out that experiment using our  
20 mathematical model that but my opinion would be, yes,  
21 potentially there could be. This is really the thing  
22 with measuring the probabilities of a particular  
23 configuration, it is possible they would have the same  
24 weight of evidence but my expectation is it would be  
25 different.

1 Q. Why would you have that expectation? I appreciate you  
2 have not been asked to carry out the experiment.

3 A. I am just basing that on my experience so, therefore, it  
4 might not be the strongest piece of evidence I can put  
5 forward but my experience tells me that that probably  
6 would be the case but until the work is done it's  
7 difficult to be precise.

8 MR MOYNIHAN: I think we may well benefit by being fortified  
9 by caffeine before we move to the next stage, which is  
10 probability analysis.

11 THE CHAIRMAN: Just while I remember to ask you is there any  
12 possibility that the characteristics, the same  
13 characteristics, might appear nearer the core than would  
14 further out, if you see what I mean, the similarities  
15 might appear?

16 A. There are -- yes, there are some research papers that  
17 look at the distribution of different characteristic  
18 types within different areas. So you do get a higher  
19 likelihood for some bifurcations in some areas rather  
20 than others. The simple answer is probably. One thing  
21 with the model we have it doesn't make any assumptions  
22 of that type.

23 THE CHAIRMAN: I was just wondering whether not only the  
24 rarity of the characteristic but the place where it is  
25 found in the print has a bearing on it?

1 A. Yes, as I say, there's limited research around the area  
2 but I'm sure that is the case, certainly in terms of if  
3 you look at the delta-type formations you have more  
4 characteristics around the delta formation than in other  
5 parts of the print. So the type, I am sure, probably is  
6 relevant to those areas as well.

7 THE CHAIRMAN: What we normally do is take a short break now  
8 and we will sit again at 11.25.

9 **(11.04 am)**

10 **(A short break)**

11 **(11.28 am)**

12 MR MOYNIHAN: Mr Chamberlain, if I just reverse back into  
13 some of the questions we were talking about earlier just  
14 to cover some more of the detail. I will ask you  
15 something about verification in a moment and what you  
16 are currently working on.

17 If I step back to the beginning, we have talked  
18 about the volume of work that you are doing and how your  
19 practices may relate to the volume of work. I don't  
20 want to breach commercial confidentialities but the type  
21 of agencies that you work for, do you do work for police  
22 forces?

23 A. Yes, we do, for police forces, some Government  
24 investigative agencies.

25 Q. Any other agencies?

1 A. No, I think that covers ...

2 Q. Do you ever get involved in defence work; in other  
3 words, are you ever approached by solicitors acting for  
4 accused persons?

5 A. It has occurred in the past very rarely. Most of our  
6 work in defence comes through the IPCC(sic), the  
7 Independent Police Complaints Authority, and a couple of  
8 other review commissions but direct from defence,  
9 rarely.

10 Q. So in other words, you are essentially servicing the  
11 public sector?

12 A. Essentially, yes.

13 Q. The second thing is I had asked you about note-taking  
14 and I am quite conscious that perhaps I may be looking  
15 at note-taking practices today.

16 We are looking at events in 1997 (in other words,  
17 more than ten years ago). When you were working for  
18 police forces was there a practice then of taking notes?

19 A. No, there wasn't.

20 Q. Even today, would you regard your own practices as being  
21 the exception rather than the rule for authorities in  
22 England?

23 A. Within England and Wales, from my knowledge, yes, I  
24 believe we are the exception.

25 Q. However, you are also the exception in that you are the

1           one fingerprint agency that is accredited to ISO17025?

2       A.    That's correct, yes.

3       Q.    It least it is your perception that note-taking was an  
4           essential feature of complying with that standard?

5       A.    Yes, as an auditor for 17025 I don't think you can meet  
6           the standard unless you are making contemporaneous  
7           notes.

8       Q.    The final point that I said I would reverse back into is  
9           verification. We had some discussion about the  
10          processes that you currently apply and, in particular,  
11          what independence means.

12                I understand from you that you are actually carrying  
13           out work within your organisation in at least  
14           considering the potential for a greater degree of  
15           independence?

16      A.    Yes. We're looking at a technological solution to this,  
17           a computer-based comparison system. It will actually do  
18           two things. First, in the analysis phase it will not  
19           allow the examiner to see the known print until the  
20           analysis has been completed and the note-taking will  
21           become an audit trail of the actions undertaken on the  
22           computer.

23                Secondly, in terms of verification, once you have  
24           made a match or you need a verification and you push the  
25           button, the computer will decide where that verification

1 is taking place and, at least in theory, that  
2 verification could take place in an entirely different  
3 agency or part of the world. It doesn't have to be  
4 someone within your own department.

5 Q. If it is within your own department, would you still  
6 envisage, because you are a small community, that one  
7 examiner would almost inevitably know that somebody else  
8 has been involved before him, even with a computer-based  
9 system?

10 A. Yes. If it was restricted within that department, yes,  
11 clearly.

12 Q. The technology you are talking about, is that still very  
13 much under development?

14 A. Yes, there are a number of technical issues to solve so  
15 it's still very much in development. I wouldn't imagine  
16 it will be available for a couple of years.

17 Q. What I want to do before we move on to probability is  
18 looking at the conclusion in relation to current  
19 fingerprint practice. In the article, if I go back to  
20 the article, it is at page 78 it begins and then I will  
21 quickly move from page 78 to page 80, at page 78 you  
22 begin with the context and you are looking at  
23 fingerprint evidence in court and you're looking at a  
24 number of unreported cases in relation to this. That is  
25 the context.

1                   If I then turn you, please, without diminishing the  
2                   conversation that has taken place preceding this, turn  
3                   to page 80 you might write in the second full paragraph  
4                   on the page -- probably, I should start on page 79 at  
5                   the foot. You are mentioning some American case law.  
6                   It is page 79, four lines up from the foot you say:

7                   "Later in Mitchell the Court of Appeals for the  
8                   third circuit, the Appeal Court gave, while accepting  
9                   fingerprint evidence under Daubert, a fair assessment of  
10                  the field: on balance the probative benefits outweigh  
11                  the risks, but the field lacks clear standards and the  
12                  debate is marred by the ill-defined concept of the  
13                  criteria for sufficiency."

14    A.    That's correct.

15    Q.    If I understand what you mean by "the debate being  
16            marred by an ill-defined concept of the criteria for  
17            sufficiency", is that going back to the conversation I  
18            had with you earlier about the intuitive judgment about  
19            whether there is, on a non-numerical basis, sufficient  
20            observed characteristics consistent with a unique  
21            identity?

22    A.    Absolutely right, it's back to that issue of personal  
23            standards, personal thresholds.

24    Q.    You then go on and say:

25            "The scientific status of identification evidence

1 and in particular fingerprint evidence still receives  
2 critical attention from scholars and commentators."

3 You mention a number.

4 "Simon Cole in particular published a series of  
5 papers pointing out some critical weaknesses in latent  
6 fingerprint identification", and you refer to his series  
7 of articles.

8 I then turn to what I wanted to ask you about with  
9 that background:

10 "The present situation is that the UK courts accept  
11 the non-numerical standards and for the most part do not  
12 challenge the identification."

13 So if I just stop there, that is your personal  
14 experience, is that fingerprint evidence remains largely  
15 undisputed in the judicial process?

16 A. That is certainly my experience.

17 Q. You say:

18 "The reasons for this may be twofold. First, the  
19 general perception among the public (including  
20 judiciary) is that fingerprint evidence is irrefutable  
21 and safe."

22 A. Yes, very much so.

23 Q. Then:

24 "This view is consistently reinforced by the media."

25 A. Yes, I think you can again take a rather simplistic

1 example, if you look at the TV programme CSI,  
2 fingerprint comparison there is carried out by a  
3 computer and hardly plays a part in the process at all.

4 It's accepted that it's scientifically sound and there  
5 is no variance in the decisions.

6 Q. I suppose CSI has actually made your discipline much  
7 more attractive, so I understand.

8 A. Apparently so, yes.

9 Q. Then you say:

10 "Second, there may be a lack of adequate defence  
11 expertise. The defence, therefore, tend to try to  
12 devalue the evidence through claims to legitimate  
13 access, attacks on the chain of evidence or occasionally  
14 discrediting the examiner."

15 So, in effect, collateral challenges to fingerprint  
16 evidence.

17 A. Yes, I think in the past talking to barristers there was  
18 very much a view that the identification could not be  
19 attacked, that it would always be essentially correct  
20 and, therefore, the only areas to attack were the  
21 examiner themselves and the chain of custody.

22 Q. Then you go on to say:

23 "In fact, there are a number of other lines of  
24 questioning that may be appropriate (especially in the  
25 aftermath of the Mayfield case): for example, the lack

1 of a demonstrable process, issues relating to ongoing  
2 competence of the examiner and lack of contemporaneous  
3 notes and detailed records of the conclusion and its  
4 basis."

5 A. Yes and, again, that's very much looking at the American  
6 justice system at the moment, where they are making and  
7 have done for the last 10 to 15 years, numbers of  
8 attacks, for example, specifically around the existence  
9 of notes taken at the time of the comparison have been  
10 issues raised in open court for debate.

11 Q. Again, those may be regarded as process or collateral  
12 issues. On the basis of the work that you have been  
13 doing, the thinking you have been doing over the years  
14 that feed into this paper, do you believe that in  
15 particular with a non-numerical standard that there  
16 ought to be scope, in fact, if there were defence  
17 expertise for a head-to-head dispute in relation to the  
18 conclusion of fingerprint evidence rather than just  
19 collateral process issues?

20 A. I think there's certainly scope for them. Some of what  
21 we discussed before about the issue of events versus  
22 actually saying it's a bifurcation/ridge ending I  
23 believe does give scope for challenging an  
24 identification.

25 Q. So, in other words, there would be scope, if I use a

1 perhaps more technical expression, there would be scope  
2 for dispute in relation to the interpretation of  
3 particular events perhaps -- perhaps -- giving rise to a  
4 dispute as to the conclusion reached?

5 A. Yes, I think that's exactly right.

6 Q. For the reasons that you have canvassed in that  
7 paragraph, it just simply doesn't occur today?

8 A. Correct.

9 Q. You then go on to look at the manner in which matters  
10 are presented in court. When you were looking at how it  
11 was presented in court are you primarily writing, or  
12 with Professor Champod, your own experience of matters  
13 in England?

14 A. Yes, that's correct.

15 Q. Do you have any personal experience of practice in  
16 Scotland?

17 A. None in Scotland, no. I do have some knowledge of  
18 practices in the United States and some other countries  
19 but strangely enough not Scotland.

20 Q. It is just so that when we are reading this you are  
21 tending to think of those jurisdictions and not ours.  
22 Nonetheless we will speak of it from its parallels. You  
23 say:

24 "Examiners supply statements in accordance with the  
25 prevailing rules. However, in general, these statements

1 do little more than offer the opinion of the examiner  
2 and provide rather limited detail on how the conclusion  
3 has been drawn."

4 So if I tell you I understand Scottish practice both  
5 in 1997 and today is to present a very, very brief  
6 report consisting of not much more than the conclusion  
7 of the examiner, that would in fact be consistent with  
8 the jurisdictions that you are familiar with?

9 A. With my experience of them, yes.

10 Q. What you then go on to say is:

11 "The practice of charting the mark and print to  
12 demonstrate the features in agreement is no longer  
13 common ..."

14 That is your experience of other jurisdictions?

15 A. Yes, it is. Even in the United States where that was,  
16 up until very recently, a very common practice it seems  
17 to have fallen into disuse. Certainly in the United  
18 Kingdom I don't know personally of anyone who has  
19 charted a mark for a long period of time.

20 Q. In fact, that, if I tell you, seems to be the experience  
21 in Scotland and this week we also had Mr Logan from  
22 Northern Ireland and that seems to be his experience as  
23 well.

24 You then say though, and this is the conclusion of  
25 this that is written by you and Professor Champod:

1                    "... thus the transparency of the examination  
2                    process may be questioned."

3                    Do you have difficulties about the transparency if  
4                    there is no note-taking and no charting being produced  
5                    in court?

6        A.    Well, I think this stems from perhaps  
7                    Professor Champod's and my view that as forensic  
8                    scientists we should be providing all the information to  
9                    the court, so showing transparently exactly what we have  
10                   done, how we have arrived at our decision. Note-taking  
11                   is part of that but if we refer to the statements,  
12                   statements from the FSS, for example, provide perhaps  
13                   not the most robust but at least some information about  
14                   how we arrived at our decision rather than just the  
15                   decision itself.

16        Q.    That leads naturally to the question, we have talked  
17                   about note-taking and about the degree to which you  
18                   would note specific characteristics and you said at the  
19                   end of the comparison stage you would tend to capture  
20                   images of mark and print with the features of  
21                   correspondence highlighted in some way.

22        A.    That's absolutely right, yes.

23        Q.    In the reports that FSS produces for the various  
24                   agencies that it works for, will there be a definitive  
25                   description given of the characteristics that are

1 observed in mark and print that are in sequence and  
2 agreement?

3 A. At the present moment in time, no we don't. We provide,  
4 as I say, this explanation of the process. We declare  
5 the existence of what we call these feature maps but we  
6 do not provide much more than the conclusion at the end  
7 of the statement.

8 Again, unfortunately, that is rather driven by  
9 customer requirement rather than by necessarily my view  
10 of how we should be producing that.

11 Q. When you say customer requirement, your customers it  
12 would sound are more interested in your conclusions than  
13 in the reasoning that's preceded that?

14 A. I think that's absolutely correct, yes.

15 Q. Then you say:

16 "There is a common practice within the fingerprint  
17 community to document factually what has been done  
18 without documenting why a given conclusion has been  
19 drawn."

20 A. Yes that's right. It tends to be lots of documentation  
21 around chain of evidence, for example, and techniques  
22 that have been used in detection but less documentation  
23 supporting the formulation of the findings.

24 Q. Again, inhabiting the practical world you do and you  
25 have described, you would accept that even your own

1 practices may not match up to what one might take out of  
2 some of the features of this article or chapter as the  
3 ideal?

4 A. Absolutely. We are a way from perhaps the standard that  
5 I'm writing about there.

6 Q. Just stopping there, before we go on to look now next at  
7 probability, are there key features of even what you  
8 practise that you regard as matters that should be given  
9 more careful consideration, from the consumer  
10 perspective?

11 A. Yes, it's difficult but I think the fundamental process  
12 that I'm involved in in providing evidence or  
13 intelligence to my customers is based on the findings  
14 that I record. So I would like my customers perhaps to  
15 be more interested and more supportive of the need for  
16 me to document what I do, absolutely.

17 Q. We will look at the future, which looks perhaps at the  
18 more headline areas and doesn't look at documentation.

19 You look in the first paragraph at developments in  
20 technologies to recover fingerprints. We need not take  
21 up time with that. You are also expecting AFIS  
22 technology to continue to improve and then the point  
23 that I did want to discuss with you was the final  
24 paragraph on page 80. You say:

25 "... probably the most important development will be

1 the design of statistical models to evaluate low  
2 features matches."

3 A. **(Nodded)**

4 Q. That takes us into the realm of probabilities?

5 A. It does indeed.

6 Q. Before we get too far into the realms of probabilities,

7 first of all, if the dispute in a particular case

8 relates to what we have just discussed previously,

9 namely, the interpretation of particular characteristics

10 as a ridge ending or a bifurcation, that is one;

11 secondly, the presence of coincident characteristics, in

12 other words, whether there were 16 points in sequence

13 and agreement or relatively fewer than that; probability

14 analysis is irrelevant to that?

15 A. Yes. If the issue is whether or not there is a

16 corresponding configuration for whatever reason then

17 probabilistic analysis is not going to assist in making

18 that decision.

19 Q. Then looking at probabilistics and probability analysis

20 do I therefore take it you begin with a conventional

21 fingerprint analysis of mark and print to form a

22 conclusion about the presence in both of a number of

23 points that are in agreement?

24 A. Yes. The ACE-V process remains identical to as it is

25 today. It doesn't change that process at all.

1           Essentially, what we're doing is once a corresponding  
2           configuration of minutiae is found is providing a  
3           mathematical measure of the weight of that evidence as  
4           an additional piece of information that's used in the  
5           evaluation stage.

6       Q.    As I have said, perhaps it helps because your article is  
7           speaking of statistical models to evaluate low features  
8           matches. Are you envisaging that probability analysis  
9           would be used in every case or only in cases where there  
10          are relatively few minutiae?

11     A.    I guess within those people in the community talking  
12          about this that is the debate, whether you use  
13          probabilities across all matches or just low feature  
14          matches.

15                What our research and other research has shown is  
16          that when you get in excess of 12 minutiae likelihood  
17          ratios become very large numbers which appears to  
18          indicate that genuine configurations of 12 minutiae plus  
19          are quite safe and very specific. So, therefore, at the  
20          moment my view is that these models are aimed at those  
21          low features, between 3 and 12.

22     Q.    In what you have said you have used, to some extent,  
23          a vague, if you will forgive me for saying, quite safe,  
24          reasonably specific, you are not claiming from a  
25          scientific point of view using the word "claim"

1 appropriately. The proposition is not there is  
2 100 per cent certainty above that level, it's just that  
3 there is a relative degree of security in the findings?

4 A. Yes, the words are chosen carefully. It's this concept  
5 of difficulty with individualisation as provable, which  
6 it's not so probabilistic models will indicate there's a  
7 very slight chance that it could come from some other  
8 individual but they will not support an  
9 individualisation or identification.

10 Q. So they will not support a unique identification but  
11 they will show -- and you have said experience is from  
12 12 points and upwards, there is a low chance of a  
13 coincident observation of these features in two  
14 different individuals?

15 A. One way of putting it is to say the likelihood of that  
16 mark coming from a different individual is so  
17 diminishingly small that I can reasonably dismiss that  
18 as a proposition.

19 Q. Therefore, I take it from that that, as you say, the  
20 balance of the debate tends to be whether probabilistics  
21 or probability analysis is a useful tool in the criminal  
22 justice system when one is encountering lower levels  
23 than 12?

24 A. That's I think where the debate should be had, yes.

25 Q. Again, based on what we discussed before the break, do I

1 take it that part of the thinking that underpins this,  
2 the example I used earlier was eight characteristics,  
3 you might have eight genuinely identical characteristics  
4 in two different sets of matching pairs and your studies  
5 would suggest that the likelihood ratios associated with  
6 those matching pairs can be different.

7 A. Correct.

8 Q. So the likelihood is not a feature of the number of the  
9 number of characteristics that are common, it's rather  
10 peculiar to the precise configuration?

11 A. That's correct, yes.

12 Q. If I understand, equally, what you have written in the  
13 article, by looking at low frequency of minutiae you are  
14 looking contemplating going very low down, down as far  
15 as, for example, three minutiae might be discriminating  
16 to an acceptable level for the criminal justice system?

17 A. Yes, from a mathematical statistical point of view we  
18 can generate likelihood ratios on three minutiae which  
19 appear to be useful evidence or intelligence for the  
20 court process. I think it's worth saying that, to a  
21 certain extent, the acceptability of that within the  
22 criminal justice system is something that will be  
23 decided in the fullness of time.

24 Q. So, in other words, the whole model is one that remains  
25 under examination rather than having been verified and

1 accredited?

2 A. The current situation is we're approaching the end of  
3 its scientific validation. The next stage will be to  
4 move to acceptance into judicial systems. That's not  
5 necessarily an easy process to go through.

6 Q. If I can then just look at it with those qualifications  
7 in mind, first of all, it is based on a statistical  
8 model; is that correct?

9 A. That's correct, yes.

10 Q. It is a computer system based on a statistical model. I  
11 understand that the author of the statistical model is  
12 Professor Champod?

13 A. This particular model in the FSS is actually Dr Cedric  
14 Neumann who worked with Professor Champod.  
15 Professor Champod provided a lot of the early momentum  
16 to this project when he was an employee of the FSS.

17 Q. So if I wanted to ask about the detail of the statistics  
18 Professor Champod would be the better person?

19 A. Absolutely. He would be the person to ask, yes.

20 Q. With that qualification I will be relatively superficial  
21 in my conversation with you.

22 Is the statistical base something different from the  
23 national fingerprint register or catalogue?

24 A. Yes. The model works on a database which is essentially  
25 of minutiae configurations and generates a statistic

1 based on that database. So it's not attempting to say  
2 how likely a particular configuration is within the  
3 national database, it is providing a pure statistical  
4 measure of the likelihood of that  
5 configuration appearing.

6 Q. Do you use a particular restrictive population for your  
7 database?

8 A. Yes, the database at the moment is based on  
9 configurations which have been extracted from the  
10 fingerprints of Swiss prisoners.

11 Q. Therefore, do you recognise at least the possibility of  
12 limitations in that?

13 A. It's one of the interesting things. We would, at the  
14 moment, say fingerprints are the same regardless of race  
15 and nationality but undoubtedly at some point in the  
16 future someone is now going to test that assumption.

17 Q. So far as, again, the work that we would understand that  
18 you are having to undertake, is the statistical  
19 reliability of the database something that's having to  
20 be considered?

21 A. Indeed it is and publications will be produced that show  
22 the theoretical basis for why that is a suitable  
23 database to use.

24 Q. Again, because of the commercial application we'll not  
25 go too far in relation to that.

1                    So it's based on a data population of fingerprints;  
2                    do I understand?

3        A.    Yes.

4        Q.    What it is trying to do, is it, to answer the Chairman's  
5                    question, it is trying to look across a database of the  
6                    prevalence of particular combinations, for example, in  
7                    proximity to the core or the delta. That's the type of  
8                    thing it is trying to do?

9        A.    Absolutely, yes.

10       Q.    It results in something called a likelihood ratio and I  
11                    understand what that is trying to do is to tell me what  
12                    the chances that a print, for example, is mine compared  
13                    with the chance that it might be the print of somebody  
14                    else completely unrelated to me?

15       A.    Yes. As with all these things, it's very easy to slip  
16                    into transposing conditionals and saying things which,  
17                    strictly speaking, are incorrect but the easiest way to  
18                    think about it is it's a measure of the weight of  
19                    evidence, the likelihood that that particular mark came  
20                    from a particular individual is a very simplistic way of  
21                    looking at it.

22       Q.    Is the object then in looking in particular at  
23                    relatively low minutiae, for example three, to enable a  
24                    Fingerprint Officer ultimately, if this is all tested,  
25                    to be able to answer the type of question I was posing

1 to you earlier, namely, it is not a claim this is  
2 indicative of a unique match but is nonetheless  
3 expressing the chance, in completely lay terms, that  
4 that fingerprint may indeed have been left by the  
5 suspect or an inculpatee or someone of that sort?

6 A. Yes. We see it as a tool for even the higher numbers of  
7 minutiae to assist the examiner but, essentially, it  
8 does open up that possibility of taking marks with very  
9 low numbers of minutiae, three minutiae, and providing  
10 some evidence, intelligence, some information to a  
11 court. So, yes, one of the -- it's not a driver for the  
12 project but one of the benefits of the project could be  
13 that there are more marks out there which can be used  
14 within the judicial process.

15 Q. Because it is helpful to express it in that way, what is  
16 the driver for the project?

17 A. Well, the project actually established with  
18 Professor Champod before we were a commercial  
19 organisation and was, essentially, an academic  
20 experiment to look at configurations of minutiae and how  
21 specific they were. It's now developed into an attempt  
22 to provide an objective tool that can be used by  
23 Fingerprint Examiners.

24 I should add that at the moment we're very -- this  
25 is very much first generation. We're only looking at

1 bifurcations and ridge endings and no other feature sets  
2 so models of this type will develop over time to become,  
3 probably, a fundamental tool in the arsenal of  
4 Fingerprint Examiners.

5 Q. Do you see that as a tool that would be used in every  
6 case or do you, for the reasons we have discussed, see  
7 it as being essentially one where we are looking at  
8 below 12 characteristics?

9 A. I think this particular tool, and probably for the  
10 foreseeable future, we're looking at below 12  
11 characteristics but as the feature sets are added and  
12 the tools mature it's possible they will become used  
13 right across fingerprint comparison.

14 Q. I started with the proposition that the probability  
15 analysis won't assist if the dispute is a dispute among  
16 practitioners about the observable characteristics, it  
17 simply converts what the examiner records as having seen  
18 into a number of likelihood.

19 A. Yes.

20 Q. So far as that is concerned then, as you envisage  
21 operating the system, how would you expect the examiner  
22 to be inputting the data? Would he be looking simply at  
23 confirmed characteristics or would he be looking at  
24 debatable characteristics as well?

25 A. I think initially the process would be to look at those

1 characteristics in which they have a high confidence,  
2 those confirmed characteristics, to measure a likelihood  
3 ratio around those.

4 If there were characteristics of less confidence  
5 then to add those in in subsequent runs of the  
6 likelihood ratio is a logical thing to do. It's  
7 possible that one of those less clear characteristics  
8 will not affect the likelihood ratio of the ones that  
9 have already run or it could turn out to be very  
10 significant and that is part of that comparative process  
11 to establish what could be used to base the findings.

12 Q. So, in other words, you could envisage two ranges of  
13 likelihood: one on the more certain characteristics; one  
14 on the more debatable or including the more debatable  
15 characteristics?

16 A. I think it's quite possible in any examination you would  
17 generate several different likelihood ratios and several  
18 different sets of minutiae and then the evaluation stage  
19 would be to look at those and to base your findings on  
20 what you thought that was telling you.

21 Q. Something that we may hear a little bit more about next  
22 week, the danger in all of this, in particular, as you  
23 say, because of the intuitive feel that from 12  
24 characteristics and above the likelihood of a match is  
25 high, is that a probability analysis might give a

1 misleading impression of the reliability of the work  
2 because, for example, someone who is observing a high  
3 incidence of points of similarity may inappropriately  
4 discount a difference and the probability analysis will  
5 not reflect that. Is that fair?

6 A. That is fair and I think we are back round to this issue  
7 of transparency and to the judicial process actually  
8 challenging those decisions. Certainly, I would  
9 envisage that reporting a likelihood ratio  
10 probabilistically is going to include probably some  
11 charts and certainly far more detail about what has  
12 actually been done in order that that may be challenged.

13 Q. In a sense, the very fact that it's being presented with  
14 a degree of mathematical precision means that it is all  
15 the more necessary for the assumptions that have been  
16 made to be clearly stated and to be capable of being  
17 audited?

18 A. That's correct, yes. The production system that we  
19 would envisage would audit trail every input that's put  
20 into a particular mark so there would be clear  
21 demonstration of what the examiner has done, how they  
22 have placed particular minutiae, how they may have moved  
23 the placement of particular minutiae and how that's  
24 affected the likelihood ratio.

25 Q. Because this involves you working, as you say, not the

1 driver to begin but what is seen as a collateral benefit  
2 can involve you working with low minutiae fingerprints,  
3 is it envisaged that this will result in scenes of  
4 crimes officer, in fact, detecting and ingathering a  
5 greater volume of marks from crime scenes?

6 A. We certainly saw that as a possibility. There is some  
7 work being undertaken at the moment to try and establish  
8 whether that is the case and try to quantify how many  
9 additional marks there are out there to be captured. I  
10 think logically I know that there are but quite what  
11 that impact will be is difficult to assess at this time.

12 Q. As you say, because as a scientist you work both on the  
13 disclosure of the marks and their identification, you  
14 are in a position to say from personal experience to  
15 what extent additional volumes of mark may, in fact, be  
16 disclosable or do you yourself find this is something  
17 that just needs further research?

18 A. I think it might be difficult to base it on my -- from  
19 my own experience are there additional marks to recover?  
20 Yes, there certainly are. Maybe 6 to 10 per cent but  
21 whether that is a reliable figure to place on crime  
22 scene examination and other types of item that are  
23 examined I couldn't say.

24 Q. As you say, research is being undertaken in relation to  
25 that?

1 A. Yes.

2 Q. Obviously from a police force point of view, let alone a  
3 prosecution point of view, there might be a degree of  
4 trepidation that fingerprint bureaux are going to be  
5 swamped by an increased volume of fingerprints of  
6 doubtful value. You are careful to say that you  
7 envisage probability as being a tool. Do you envisage  
8 that it will be one that will be deployed  
9 proportionately by the investigators to decide whether  
10 they indeed do want to engage with low value minutiae in  
11 particular cases?

12 A. Absolutely, I think this is part of perhaps something  
13 which has not really been undertaken very well by  
14 fingerprint bureaux around the world, is that, yes, you  
15 have a tool, yes, you have the ability to look at these  
16 low feature marks, whether you do, whether you recover  
17 them, whether you look at them, is based on the value to  
18 that particular investigation. So I think each  
19 department will draw up its policies for how that is  
20 used. It's not illogical for a department to say, "We  
21 will not do that because of the volume of our work  
22 because of the type of work we do we will not report  
23 probabilistically we will always report very, very clear  
24 marks in every case". That, as an administrative  
25 decision, is valid.

1 Q. Ultimately, from the point of view of moving beyond the  
2 police and even the prosecution, from the courts'  
3 perspective, if I understand it correctly, at least what  
4 you are aiming to do with all the uncertainties that  
5 surround reliability of observation characteristics you  
6 are at least aiming to give a quantifiable measure for  
7 the output of the observations of the examiner?

8 A. Yes. It's introducing some objectivity. It's something  
9 external to the examiner and should be giving the same  
10 result regardless of which examiner inputs the  
11 information so, if you like, it's providing a baseline  
12 measure of the weight of evidence in particular cases.

13 Q. But looking at the totality, therefore, of the  
14 discipline of fingerprints you are giving an objective  
15 output, however, to subjective inputs; is that correct?

16 A. To an extent, yes.

17 Q. Do you see, as a practitioner involved in various  
18 committees that you are, the need for standardisation as  
19 to the inputs?

20 A. Yes.

21 Q. Do you have any thoughts yourself about the appropriate  
22 direction for that to proceed or is it too early to say?

23 A. I think it's too early. I think it's a piece of work  
24 that naturally springs out of what we are doing. As you  
25 say, we have looked already at the input from

1 Fingerprint Examiners into the model and we know there's  
2 a variation, as there always will be to a certain  
3 extent, but I think there is quite a bit of work that  
4 can be done to try and reduce that variation in terms  
5 of, for example, if you're marking a bifurcation, a very  
6 clear and defined definition criteria for marking that  
7 is something will be required.

8 Q. But do you see in looking at this, in a sense, of the  
9 chicken and the egg, that what you are doing is giving  
10 the aura of scientific quantification and, therefore,  
11 accuracy to inputs that are, in fact, subjective and  
12 inherently variable, that perhaps the appropriate place  
13 to start would be properly gauging the inputs before you  
14 translate those into a mathematical expression?

15 A. That is true. In fact, to do that would be to have some  
16 technology that located the minutiae in the first place  
17 and, therefore, did it objectively. Such technology  
18 does exist but is very unreliable. I think if we look  
19 forward into the future, will there be systems that  
20 replace that Fingerprint Examiner in terms of locating  
21 minutiae? I think yes.

22 Q. If I am looking at it today, what is technically  
23 available, if I understand what you are saying, is that  
24 because there is the variability of the inputs the  
25 controls for that go back to having proper procedures in

1 place, structured around the ACE-V methodology, proper  
2 procedures to have a quality assurance as to the inputs?

3 A. Absolutely. I think the other thing is that the model  
4 that we have is laptop-based so if there was a  
5 disagreement about where a particular minutiae has been  
6 placed by a particular examiner it's quite possible to  
7 move that and demonstrate actually in a court what  
8 effect that would have on the likelihood ratio if it was  
9 placed in a slightly different position. So it does  
10 provide an absolute tool for, not just providing the  
11 likelihood ratios and assisting examination, but  
12 actually demonstrating the examination as well.

13 Q. If I just conclude in this way in trying to understand  
14 the inputs. We have obviously heard of the Evett  
15 & Williams that studied the observation of comparison of  
16 particular individuals, you have obviously done some  
17 work of that sort in your own exercise. Are you aware  
18 whether there is a regular enough process within bureaux  
19 of studying the extent to which identifications and  
20 comparison work are susceptible to variability,  
21 dependent on the observations of the individuals?

22 A. I'm not aware of study in that area, no.

23 Q. Is that something that merits being studied?

24 A. I would think so, yes.

25 Q. Why?

1 A. I think, as a general rule, what has happened over the  
2 years in this sort of identification side of  
3 fingerprints is a lack of study into different areas and  
4 I think any study that looks at the variation between  
5 examiners is going to be useful in terms of informing  
6 how we go forward.

7 Q. So you do yourself see it, as a practitioner in the  
8 field, that there has been a lack of experimentation and  
9 study in the past?

10 A. Undoubtedly, yes.

11 MR MOYNIHAN: I have no further questions. Thank you very  
12 much.

13 THE CHAIRMAN: Perhaps, Mr Holmes, I might ask you first.

14 MR HOLMES: Yes, sir, there are four areas I would like to  
15 cover briefly. The first relates to the usefulness of  
16 note-taking; the second relates to dealing with  
17 discrepancies; the third relates to the expression of  
18 the examiner's opinion in court; and the fourth is a  
19 single question relating to confirmation bias.

20 THE CHAIRMAN: Yes, very good.

21 **Cross-examined by MR HOLMES**

22 Q. Can I ask, first of all, you have spoken a bit about  
23 note-taking. Your own figures record only two disputed  
24 identifications in the last 15 years or so; is that  
25 correct?

1 A. Yes, I don't think that's a precise figure, that isn't  
2 recorded but that is about right, yes.

3 Q. We have also heard evidence from Mr Logan of the PSNI  
4 that in a relatively busy bureau the taking of  
5 comprehensive notes is not practical.

6 What would your comment be to that?

7 A. I think, as I said before, I think, yes, it's a  
8 challenge but we're in an issue of whether what should  
9 be done is dictated by resources or what should be done  
10 dictates the resources.

11 Q. Will there not always be a question of resources where  
12 we're dealing with a service that's publicly funded?

13 A. I think that's absolutely true, yes.

14 Q. If those resources are to be applied to avoiding a  
15 situation which is fairly rare, is that a good use of  
16 those resources?

17 A. My personal opinion is that note-taking is a central  
18 part of the process. If you look at the note-taking  
19 that we are doing it is below what I would recommend and  
20 part of that is resource issues and other constraints.  
21 I think it's a difficult one to give a simple solution  
22 to.

23 Q. Whatever your view of it is, is it practical to use this  
24 as a solution?

25 A. I believe that, practically, more extensive note-taking

1 could be made within fingerprint bureaux of which I'm  
2 aware.

3 Q. I would also like to speak about dealing with  
4 discrepancies. I have you noted as saying that you have  
5 been able to explain in most cases where a discrepancy  
6 occurred between the known print and the crime scene  
7 print.

8 Can you have an identification with an unexplained  
9 discrepancy so long as you have a sufficient volume of  
10 ridge detail in sequence and agreement?

11 A. Yes, I think that's possible. Again, it's talking  
12 hypothetically but if you had a particular mark with a  
13 lot of correspondence with the known print and you had  
14 one discrepancy for which you could not provide a  
15 reasonable understanding -- I'd say it does depend a lot  
16 on what that discrepancy is, it's possible.

17 Q. When you are providing an explanation about a  
18 discrepancy, how much detail would you be expected to go  
19 into? You are, after all, only providing a theory of  
20 something you can't possibly prove, aren't you?

21 A. Yes. The explanation of discrepancy is effectively  
22 opinion but I would be basing that on some observation  
23 I've made. The most easy one to understand is if there  
24 are two prints overlayed which has created a discrepancy  
25 or a double tap, I would be attempting to show why I

1 believe that was a double tap.

2 Q. You said or you made reference there to your opinion.

3 You are, when you are giving evidence, only giving your

4 opinion -- is that correct -- I think you said earlier

5 on, rather than something based on fundamentally

6 scientific principle?

7 A. I think a fingerprint identification is an opinion, yes.

8 Q. Indeed, you have identified a sort of third option

9 that's given to an examiner when you are giving what you

10 have called the comfortable option of saying that you

11 simply cannot come to a conclusion on the basis of the

12 detail that's before you. Is that right?

13 A. I think that was the phrase that was used, yes.

14 Q. Is there, therefore, room within any fingerprint

15 organisation for examiners to hold different opinions on

16 the same mark?

17 A. Yes. I think it's perfectly feasible, bearing in mind

18 the subjective nature of the process, on a particular

19 mark, it's possible for competent examiners to formulate

20 differing opinions.

21 Q. In relation to the expression of opinion in court, is it

22 ultimately the intention that a Fingerprint Expert will,

23 in future, give evidence as to a likelihood of

24 identification based on something like a percentage?

25 A. It's too early to say. I think Professor Champod and

1 myself what we're saying is that we believe that  
2 qualified reporting of a match is possible. So I can  
3 envisage a time when a Fingerprint Examiner will say  
4 there is a strong likelihood or a weak likelihood.  
5 Exactly how that is articulated, whether it uses  
6 numbers, whether it uses verbal scales, whether it's  
7 actually explained graphically I think is too early to  
8 tell.

9 Q. Finally one question in relation to confirmation bias.  
10 You said earlier on that the decision on whether to do a  
11 probability analysis should be based on the value of the  
12 mark to the investigation. Does knowledge of the value  
13 of a mark not carry with it the risk of influencing the  
14 examiner's conclusions?

15 A. Yes, that's a possibility. I think this is again one of  
16 those big discussions that is sweeping through a lot of  
17 areas of forensic science, not just fingerprints. If  
18 you work totally in the abstract with the mark and the  
19 print, then you are going to examine (for example, in a  
20 murder scene) every mark that's recovered. If you have  
21 some knowledge or someone within the process has some  
22 knowledge to say, "Well, actually you can ignore marks 1  
23 to 100, I'm only interested in 102", then you can reduce  
24 those work loads and be more effective. So I think the  
25 decision-making about which mark should be examined

1 doesn't have to be the Fingerprint Examiner's. It could  
2 be another party so therefore the Fingerprint Examiner  
3 doesn't know necessarily why that decision is being  
4 made.

5 Q. Are you speaking about something like investigators  
6 relaying to Fingerprint Examiners that they would like a  
7 particular fingerprint looked at before the others or  
8 they would like it looked at as a matter of priority  
9 rather than the Fingerprint Examiner themselves  
10 knowing the value of that particular mark to the case.

11 A. I think that resolves that confirmational bias issue,  
12 yes.

13 MISS GALBRAITH: Sir, thank you. There are four points I  
14 would like to raise with this witness, largely arising  
15 out of the article that has become available today.  
16 Firstly, I do appreciate this is to an extent going over  
17 ground already covered both by Counsel for the Inquiry  
18 and Mr Holmes, but I would like some clarification as to  
19 Mr Chamberlain's position on unexplained differences,  
20 particularly with reference to comments in the article.

21 THE CHAIRMAN: Yes.

22 MISS GALBRAITH: Secondly, to clarify a comment regarding  
23 the training and experience of individual officers;  
24 thirdly, to ask about cultural reasons behind errors  
25 (again, it is a matter that is raised within the

1 article; and, lastly, to cover the comment that has been  
2 made about lack of challenge of fingerprint  
3 identification being perhaps due to a lack of defence  
4 expertise.

5 THE CHAIRMAN: Yes. You may ask about those matters.

6 **Cross-examined by MISS GALBRAITH**

7 Q. Mr Chamberlain, you just have been asked some more  
8 questions regarding the issue of unexplained differences  
9 within prints and this is an issue that has been of  
10 considerable interest to the Inquiry. I wonder if I can  
11 just ask you for some clarification as to your position  
12 on that.

13 Can I perhaps ask you to look at page 69 of the  
14 article that we have been looking at. If we go to the  
15 second paragraph down at the end of that paragraph, what  
16 is written there is:

17 "In fact as soon as a difference is observed between  
18 the mark and the print that cannot be reconciled in the  
19 light of tolerances defined during the analysis stage,  
20 then an exclusion conclusion will be reached. Logically  
21 the absence of any irreconcilable discrepancy is a  
22 prerequisite for identification."

23 My understanding of that is that there is a basic  
24 principle of fingerprint identification which is that  
25 obviously fingerprints are unique and that would lead on

1 to a principle that a conclusion of identity cannot be  
2 made where there is an unexplained difference.

3 What you seem to be saying today doesn't appear to  
4 be reconciled --

5 A. Okay, if I can clarify. Perhaps I need to clarify this  
6 slightly. It depends what we mean by "discrepancy". If  
7 we had a bifurcation appearing in the print that was not  
8 in the mark or in the mark that's not in the print,  
9 clearly that is something that can't be reconciled. If  
10 it is a flow of the ridge or some other artefact of the  
11 ridge, pore position as such, these things possibly are  
12 less of discrepancy, in a sense. Though a mechanism for  
13 why that discrepancy occurred might not be obvious, if  
14 there is a substantial amount of other information  
15 available, it's possible that you could determine that  
16 they are from the same source even though you haven't  
17 got the absolute mechanism for why that discrepancy has  
18 occurred. So there is a level of discrepancy  
19 essentially I think is the clarification I'm putting in  
20 place. Certainly if there is a mismatch, a difference,  
21 in the actual minutiae themselves, then that would be  
22 irreconcilable.

23 Q. There seems to be something of a sliding scale from the  
24 way you are describing it. There may be a discrepancy  
25 that's not a discrepancy?

1 A. Not at all. I think there are just different levels of  
2 discrepancy. If I explain again, if there were a  
3 bifurcation appearing in the latent or the print that is  
4 not in the known, then that discrepancy could not be  
5 reconciled. It is quite clearly a discrepancy.

6 The type of discrepancies that I was talking about  
7 are more around the flow of the ridge, perhaps the  
8 appearance of a particular ridge. So it's not a sliding  
9 scale, but there are different discrepancies that can  
10 occur.

11 Q. Perhaps as a lay person you can help me with  
12 understanding how is anyone to know what the sliding  
13 scale of differences is? What is an important  
14 difference? What is a reconcilable difference? Is  
15 there any sort of accepted way of approaching the issues  
16 of unexplained differences?

17 A. As I said, the starting principle is to actually be able  
18 to articulate why there is a discrepancy there (be it  
19 double tap, be it movement) within the mark. The  
20 situation I was being given to talk about was where you  
21 have an awful lot of agreement between the mark and the  
22 print, lots of features in agreement, and one  
23 slight discrepancy. In that situation, I would expect  
24 to articulate to the court that that discrepancy is  
25 there and I cannot explain why that discrepancy takes

1 place, but my decision is based on the fact that I have  
2 found substantial other agreement.

3 Q. I notice there you have used the word a "slight"  
4 discrepancy. Again, it sounds from the way you're  
5 explaining it like there is, for example, if there was  
6 to be ridges missing or a bifurcation going the wrong  
7 way that wouldn't be something you would consider as a  
8 slight discrepancy?

9 A. An unfortunate turn of phrase. The discrepancy is a  
10 discrepancy. It is whether or not you can explain that  
11 discrepancy .

12 Q. So the explanation is the key aspect. You gave the  
13 example to Mr Holmes earlier of there being a double  
14 tap. Now, if there was a double tap, would you expect  
15 to see some sort of evidence of crossing ridges or  
16 movement or something that would allow you to reach the  
17 conclusion that there may have been double tap?

18 A. Yes, I would expect to see that.

19 Q. So, again, that perhaps allows for an explanation of any  
20 difference rather than there just being simply nothing  
21 to explain it?

22 A. Yes.

23 Q. Can I ask you is there any science that you are aware of  
24 or research that has been done in relation to an  
25 identity being reached but there being any kind of

1 unexplained difference? Have you ever known it to  
2 happen?

3 A. Not in my personal experience, no.

4 Q. If I can move on from that, please, to ask you about a  
5 comment you made in relation to the training and the  
6 relevance of training and expertise of individual  
7 officers. If we read on further down that page, in the  
8 next paragraph you say:

9 "In the absence of dissimilarities, the examiner  
10 will weigh the corresponding features in reference to  
11 the standards of identification. In a nutshell, the  
12 individualisation will be reached when the examiner  
13 observes a level of agreement (across the three levels  
14 of legible features) that exceeds the highest level of  
15 correspondence he observed through his/her training and  
16 experience in comparisons involving non-matching  
17 entities."

18 Now, the way that that reads would appear to suggest  
19 that the examination is dependent on the level of  
20 training and expertise of the individual examiner. Is  
21 that correct?

22 A. I think, yes, the examination is very firmly based on  
23 the experience of the examiner -- training to a certain  
24 extent but more the training provides the ability and  
25 the mechanics to carry out that comparison.

1 Q. You have spoken a little bit about the subjective nature  
2 of the examination. Would this mean that a different  
3 conclusion could be reached by somebody with many years'  
4 of experience and training rather than a novice?

5 A. Well, I think there probably is a threshold. I don't  
6 think your ability as an examiner increases just because  
7 of the number of years, it's actually the work that you  
8 undertake. But could a more experienced examiner  
9 perhaps formulate an identification that a novice could  
10 not? It's possible.

11 Q. If we were to be looking at any kind of objective  
12 standard, are you aware of there being any national or  
13 international accepted standard or guideline in terms of  
14 training or experience that should be expected of  
15 Fingerprint Officers?

16 A. Within England and Wales, there is a national training  
17 scheme for examiners which I'm not familiar with the  
18 scheme as it stands at the moment but presumably has a  
19 certain level of assessment to be reached. Across the  
20 world there is a huge variation in how Fingerprint  
21 Examiners are actually trained.

22 Q. Would you agree that even within the UK there's a huge  
23 variation between bureaux and individual examiners as to  
24 levels of training and expertise?

25 A. There's clearly a difference in the expertise. In

1 theory, the training is all the same because it's  
2 through national training schools but I suspect there is  
3 some variation.

4 Q. In terms of the research that you have done and are  
5 aware of, are you aware of there being any published  
6 accounts of error rates within identifications?

7 A. I'm not familiar with any per se, I don't think. I'm  
8 aware that there are some publications that emanate, I  
9 think, from the FBI around error rates but I'm not  
10 cognisant with those.

11 Q. Sorry, I am just reading your answer there. You are  
12 aware of some publications that emanate from the FBI?

13 A. I believe, yes.

14 Q. But nothing that's been done within the UK or anything  
15 that you are aware of?

16 A. Not to my knowledge.

17 Q. Do you feel that the lack of that information or that  
18 information would have been valuable in terms of your  
19 work on the probability aspect of fingerprint analysis?

20 A. I'm not sure to my area of work within that which is to  
21 take the system and enter it into casework, no. I'm  
22 sure that the researchers are more aware of those papers  
23 than I am.

24 Q. Can I ask you to look further on in the article, please,  
25 to page 80. This is a part you referred to earlier, the

1 second complete paragraph there, and what is being  
2 considered here is the reason for a lack of challenge of  
3 fingerprint identification. From the third sentence,  
4 you say:

5 "First, the general perception amongst the public  
6 (including judiciary) is that fingerprint evidence is  
7 irrefutable and safe. This view is consistently  
8 reinforced by the media. Second, there may be a lack of  
9 adequate defence expertise."

10 Can I just clarify when you say defence expertise, I  
11 take it you're not referring to defence Fingerprint  
12 Experts but rather the solicitors and defence team that  
13 may be involved?

14 A. I think we were referring to the actual defence experts  
15 but actually it's probably both.

16 Q. In relation to the legal team side of it, if I can put  
17 it like that, would you accept that in the entirety of a  
18 criminal prosecution there may be other defences that a  
19 particular accused may be using so that there isn't a  
20 denial of being somewhere or touching something they  
21 shouldn't have been which may mean that a challenge to  
22 the fingerprint identification may not be required, may  
23 not be an appropriate use of resource or time?

24 A. Absolutely. I recognise a fingerprint examination in  
25 any case is a part of a larger picture and is not

1 necessarily the most probative piece of evidence.

2 Q. In terms of a lack of expertise, I think, as you fairly  
3 said yourself, it would be any defence Fingerprint  
4 Experts that would have the expertise to advise the  
5 legal team as to any possible challenge?

6 A. Yes.

7 Q. Just bear with me for a second, Mr Chamberlain. **(Pause)**

8 I have entirely forgotten something I said I would  
9 ask you about. If we could go back in the article to  
10 page 74, this isn't a part that has been put to you  
11 previously. The last paragraph on that page really  
12 deals with possible reasons as to why there may be  
13 errors in identification. What you say there is:

14 "Research aimed at identifying the potential bias to  
15 which examiners may be susceptible has made significant  
16 recent progress."

17 There is reference there to Dror and Charlton:

18 "This empirical research highlights the existence  
19 and the need of a full awareness of the impact of  
20 contextual information on the final decision-making of  
21 Fingerprint Examiners. The studies by Dror et al are  
22 mainly focused on the final decision arising from the  
23 comparison. We believe that a strict adherence to the  
24 ACE-V protocol with a distinct analysis and comparison  
25 stage is critical to mitigate the risk. Clearly there

1 are dangers here that may be more pronounced given the  
2 close working relationship between the examiners and the  
3 police investigators."

4 Is that something that you yourself have found to be  
5 of concern where there can be seen to be a close  
6 relationship?

7 A. I'm not so sure "concern" is the right word. I'm not  
8 able to put forward any examples where I think that's  
9 caused an issue but I think, from the personal  
10 perspective, it's logical that the two are separated.

11 Q. I think just in the last sentence you go on to mention  
12 the importance of a clear and documented analysis which  
13 would minimise the risk of any bias creeping in but you  
14 say:

15 "It's not universally seen in the UK and it is  
16 unlikely that marks are regularly analysed in this  
17 fashion."

18 A. Yes. I think, as was mentioned before, the ACE-V  
19 process, the different segments tend to be blurred and  
20 run together and I think certainly in the UK my  
21 experience is that you do not see a clearly documented  
22 analysis as a separate stage.

23 Q. In relation to the point I made previously about the  
24 perhaps lack of defence expertise and defence experts,  
25 just for your comment if I can put to you what the

1 exercise the Inquiry is undertaking is on the basis of  
2 an inquisitorial system and I just wondered from your  
3 position whether there may be use in having a report  
4 provided more for the court's benefit rather than one  
5 for prosecution, one for defence.

6 A. I think, again as a personal view, the inquisitorial  
7 system has a lot of merits.

8 Q. Can I finally just going back briefly to the unexplained  
9 differences point, you have described your probability  
10 procedure, and from my understanding of the way you have  
11 explained it, that programme is really based on the  
12 ACE-V process properly carried out and that the analysis  
13 of the mark remains crucial and the quality of the  
14 analysis will be key in the ultimate probability that  
15 arises out of that work.

16 A. Yes.

17 Q. With that in mind, how would any unexplained difference  
18 be treated if the probability tool were to be used?  
19 Would that factor into the model at all?

20 A. In a way it doesn't. The model measures the  
21 correspondences between a mark and a print. If you were  
22 to put in -- in a sense, you can't put in a disagreement  
23 because you can only mark it on one or other. So the  
24 probability does not necessarily help that but, again,  
25 to reiterate, it comes back to what that discrepancy is.

1 If the discrepancy is something like an additional  
2 bifurcation or ridge ending, you probably wouldn't even  
3 get to -- well, you wouldn't get to the probability  
4 model because you already will have excluded it. If  
5 it's something around a ridge flow, our model will not  
6 measure a ridge flow. So, again, it's not within the  
7 scope that measurement.

8 MISS GALBRAITH: Thank you very much, Mr Chamberlain.

9 MISS GRAHAME: There is one matter I would just like to  
10 clarify if I may regarding the independence of an  
11 expert.

12 THE CHAIRMAN: Yes.

13 **Cross-examined by MISS GRAHAME**

14 Q. If you take it from me in Scotland that experts are  
15 required to be independent and the purpose of an expert  
16 is to assist the court, whether that be a judge sitting  
17 alone or a jury, in deciding the factual issues in the  
18 case. The expert is there to give advice on perhaps the  
19 scientific matter or their area of expertise rather than  
20 being there as advocate for one particular side.

21 It was suggested to you today that perhaps the  
22 inquisitorial system made that different. In your  
23 experience in England, when you give evidence in court  
24 are you there to assist the judge or the jury or are you  
25 there to give evidence on behalf of one party to the

1 case?

2 A. I'm quite clear as a forensic scientist that my role is  
3 to assist the court. So I tend to give my evidence with  
4 no bias in either direction.

5 Q. Does it make any difference if you are dealing with a  
6 situation which is a hearing in an inquisitorial or an  
7 adversarial system?

8 A. No.

9 Q. It is possible no doubt in England, in the jurisdiction  
10 in which you mainly work, or perhaps in other  
11 jurisdictions, for individual barristers or solicitors  
12 to challenge an expert, an individual expert, on the  
13 basis that perhaps, because he only prepares reports for  
14 one side, that he is in some way biased or not  
15 independent such as he only ever prepares cases for the  
16 defence or for the prosecutor or in the public sector.

17 A. Yes.

18 Q. Is it fair to say that, leaving aside that type of  
19 challenge against an individual expert on that basis, it  
20 doesn't necessarily mean that the comparison of  
21 fingerprinting as a science is not some sort of  
22 independent scientific discipline?

23 A. No -- if I understand you correctly.

24 MISS GRAHAME: Thank you very much.

25 THE CHAIRMAN: Ms Jones?

1 MS JONES: Two quick points, sir, if I may, one on blind  
2 verification and one on workload.

3 THE CHAIRMAN: Yes, very good.

4 **Cross-examined by MS JONES**

5 Q. Mr Chamberlain, hopefully I will not keep you very long.

6 You gave evidence earlier about the workload of FSS  
7 and you said, I think, you have got six fingerprints  
8 experts; is that right?

9 A. That's correct, yes.

10 Q. What I wasn't quite clear on was you said they work on  
11 between 12 and 30 cases. Is that at any one time or a  
12 year?

13 A. That's over the course of a year.

14 Q. Thank you.

15 The other point I wanted to ask you about was in  
16 your statement you mentioned blind verification and I  
17 think you say it's impractical at present but you say  
18 that you are looking at a technological solution to deal  
19 with that.

20 I wondered if you were able to tell us what you  
21 meant by that?

22 A. I did mention this is the idea of computerising the  
23 comparison process, part of which would be the  
24 verification. So on the computer system, once I've  
25 declared that I have a match, I will push a button for

1 verification and that verification will then be sent to  
2 another examiner to undertake, who -- I don't know who  
3 that examiner is and that examiner may not even be  
4 within my organisation.

5 Q. Would that be within your organisation, within the six  
6 people who are in the organisation, do you mean?

7 A. Well, you would say naturally it would be within the  
8 same organisation but potentially that verification  
9 could be sent to anybody with that system so you could  
10 envisage actually having verifications or some  
11 verifications being undertaken by different  
12 organisations.

13 MS JONES: Thank you.

14 THE CHAIRMAN: I am not sure if anybody else's LiveNote has  
15 stopped but I am sure we can cope.

16 **Re-examined by MR MOYNIHAN**

17 Q. Mr Chamberlain, I just wanted to return to some of the  
18 questions you were asked by Mr Holmes, who was the first  
19 one who asked you some questions and it may simply have  
20 been that I was imprecise when I asked you some  
21 questions.

22 It is back to this question of asking a Fingerprint  
23 Officer something in a comfortable formulation. What  
24 Mr Holmes put to you was that I had suggested that I  
25 would be asking in court whether a Fingerprint Officer

1 had reached a conclusion or not. Plainly if I, as a  
2 lawyer, since I have a bias in a case, I'm trying to  
3 prove one proposition or another, if I were simply to  
4 ask you have you reached no conclusion it would be very  
5 comfortable because you would be at home with your pipe  
6 and slippers if you had reached no conclusion, I assume,  
7 in un-adversarial situation; is that fair?

8 A. That's fair.

9 Q. However, what I was, in fact, intending to discuss with  
10 you was accepting, as you previously said, that  
11 universally the training of Fingerprint Officers is in  
12 terms of 100 per cent or nothing I, as a lawyer, might  
13 for one side or the other -- this is neutral -- might  
14 try to get some evidence out of a Fingerprint Officer  
15 where he is less than 100 per cent certain. That's the  
16 scenario. It's a question of the way I formulate the  
17 question. If I ask you have you reached a conclusion as  
18 a traditional Fingerprint Officer I would understand  
19 that you would say no?

20 A. That's right. I think I understand what you are saying,  
21 yes.

22 Q. However, if I asked a differently formulated question,  
23 have you been unable to exclude either the suspect or  
24 perhaps more importantly an incriminee, then I might get  
25 a different answer, I might get an answer, "No, I've

1           been unable to exclude"?

2       A.    That's right, yes.

3       Q.    You have had experience of giving that answer, in other

4           words giving evidence that you have been unable to

5           exclude?

6       A.    Yes, I certainly have given evidence.

7       Q.    Then simply this is, I suppose, a reflection of advocacy

8           training, if I try to chance my arm and go further and

9           convert that negative answer, "I have been unable to

10          exclude", into a positive, ie to infer a match and ask

11          you, therefore, the chances that the mark and the print

12          may come from a suspect or an incriminee, at present you

13          would simply have to give an intuitive answer to that,

14          if any?

15       A.    Yes. It's as the case I described. If I could give

16          more than just unable to exclude I already would have

17          done in any case and I would have given some opinion as

18          to how likely it came from a particular individual. So

19          hopefully it wouldn't happen in court. You would

20          already be aware I could go further than just unable to

21          exclude.

22       Q.    So the extent to which you would be able to give a

23          confident answer would simply be, "I am unable to

24          exclude"?

25       A.    Yes.

1 Q. Then one would need to arrive at it by different  
2 inferential ways about how small the population is that  
3 may be under consideration?

4 A. Yes.

5 Q. But perhaps more positively, if I wanted a positive  
6 answer, that's the realms where the probability analysis  
7 that remains under consideration really does enter the  
8 field?

9 A. Absolutely. In a sense, it removes that unable to  
10 exclude and replaces it with some measure of the  
11 likelihood that it came from a particular individual.

12 Q. So it removes what I would call the negative, unable to  
13 exclude, and puts it into some quantified positive  
14 likelihood of match?

15 A. Yes.

16 MR MOYNIHAN: Thank you very much.

17 THE CHAIRMAN: Just one or two matters if you could clear up  
18 for me. This Handbook of Forensic Science, your  
19 article, roughly what date is it? Is it recent or --

20 MR MOYNIHAN: Sir --

21 THE CHAIRMAN: Did you mention it earlier?

22 MR MOYNIHAN: No, sir, I apologise. When I took the  
23 photocopy from the book and we then sent the book back  
24 to Strathclyde, I forgot to take the editing date. I  
25 think it's relatively recent. I think it's within the

1 last year.

2 A. It was published, I think, the early part of this year,  
3 May or such, but it was written actually a couple of  
4 years before.

5 THE CHAIRMAN: The reason I was asking was at page 74 you  
6 speak of:

7 "At the time of writing no uniform competence or  
8 proficiency scheme is employed throughout the UK. Plans  
9 exist for its introduction."

10 I was wondering has that happened as yet?

11 A. To my knowledge and I'm a little disconnected from the  
12 police, sir, to my knowledge, their plan still exists  
13 there is no ...

14 THE CHAIRMAN: The plans exist.

15 Another matter I wanted to ask you about: we have  
16 had an example or maybe examples in the course of the  
17 Inquiry, where an image taken from the same negative has  
18 appeared different to examiners and that, I'm sure, is  
19 something of which you would have had experience that it  
20 all depends on the way that an image is developed?

21 A. Yes.

22 THE CHAIRMAN: Is it ever possible for the examiner to  
23 actually look at the fingerprint on whatever surface? I  
24 mean, I'm assuming it's something that's portable and --

25 A. Well, yes, it is. I mean, in fact, because we process

1 the items as well as carry out the comparison of the  
2 marks recovered the actual fingerprint on the item is  
3 available to us in most of our cases. The only time  
4 it's not available is if, as you say, it's a  
5 non-portable item or is attached to a building.

6 Where you have a fingerprint lift, for example,  
7 essentially, that is the original mark, in some respects  
8 so, yes, it is possible.

9 THE CHAIRMAN: It just seemed to me it might be one should  
10 go back to the original because anything else is a  
11 reproduction of it which may depend on the way it has  
12 been reproduced.

13 A. Within our process, obviously with a fingerprint lift,  
14 which are generally imaged to produce a photograph for  
15 comparison, I would always go back to the fingerprint  
16 lift. In my own casework I have seen the original so I  
17 have the ability to look at the photograph and the  
18 original mark to see that they a true representation, so  
19 I do have that ability in those cases.

20 THE CHAIRMAN: You referred at one stage in your evidence to  
21 sometimes you and your colleagues would use a piece of  
22 plain paper but you do have a form that you can use for  
23 note-taking.

24 A. We do have forms for note-taking, yes.

25 THE CHAIRMAN: That is something you have devised yourselves

1 for the purpose?

2 A. Yes. They are very simple and they are devised for that  
3 process. For me the main issue is the information is  
4 recorded so, to a certain extent, our procedures allow  
5 variation away from that form if it is a more  
6 appropriate way of documenting the information.

7 THE CHAIRMAN: I think I do know the answer to the next  
8 question but you said, I hope I quote you correctly, but  
9 something to the effect that fingerprint evidence is  
10 part of the larger picture and not necessarily the most  
11 probative piece of evidence, but I take it that doesn't  
12 mean if the only evidence was a fingerprint that  
13 wouldn't be or may not be sufficient?

14 A. Oh no, there are cases where fingerprints is the only,  
15 physical evidence, in a case then clearly, therefore, it  
16 is the most probative.

17 THE CHAIRMAN: If the Fingerprint Expert is certain then  
18 that is the evidence. It is up to the court and the  
19 jury whether it is accepted or not.

20 Thank you very much. I think those were all the  
21 questions I wanted to ask you. Thank you for your  
22 assistance and for travelling up today.

23 That, contrary to my estimate that we had to start  
24 at 9.30, now means we have finished this part of the  
25 evidence earlier than expected.

1                   We can release you from having to stay in the  
2                   witness box.

3                   The only other question is whether it is an  
4                   appropriate time to deal with the question about the  
5                   closing statements.

6       MR MOYNIHAN:   Sir, just before we do, I do apologise, the  
7                   estimate for starting at 9.30 this morning was simply  
8                   due to the fact that I had to finish Mr Chamberlain  
9                   today and I had no means of knowing how long it would  
10                  take. So I do apologise to all concerned for that.

11       THE CHAIRMAN:   For some people it means early journeys.

12       MR MOYNIHAN:   Sir, before I forget I have also been asked to  
13                  relay a message to the public. It looks as if there is  
14                  a fair chance we will have Mr Wertheim's evidence by  
15                  video link on Monday afternoon and we may be, as I  
16                  understand the message I have received, convening in  
17                  Edinburgh to have that evidence taken by video link.

18                  What we can say is that if it does transpire that we  
19                  are doing that we will place a message on the website to  
20                  disclose that we are giving the evidence, the time and  
21                  the place and if there is an ability for members of the  
22                  public to attend that will be disclosed as well.

23       THE CHAIRMAN:   However, any evidence given will appear on  
24                  the website.

25       MR MOYNIHAN:   Yes, sir, any evidence given will ultimately

1 appear on the website. It's just simply there may be,  
2 at relatively short notice, a session of the Inquiry in  
3 a venue as yet to be determined in Edinburgh on Monday  
4 afternoon and we will try to give notice to the public,  
5 if at all possible, of that fact.

6 THE CHAIRMAN: I assume that is because we haven't the  
7 facilities here?

8 MR MOYNIHAN: That is correct.

9 THE CHAIRMAN: I think if it avoids Mr Wertheim coming from  
10 the United States yet again, it is reasonable to do it  
11 in that way.

12 MR MOYNIHAN: Sir, in relation to the submissions the piece  
13 of information is that Mr MacPherson is not here from  
14 Simpson & Marwick. We understand he might take about  
15 half-an-hour, if that assists.

16 There is however one other matter that we're trying  
17 to resolve with him which means that the exact duration  
18 of his information for a closing statement is  
19 unresolved. Subject to that it won't unduly impact on  
20 others, I don't think, and therefore if you wish to have  
21 a discussion today about the duration and manner or  
22 order for closing statements then that would be  
23 possible.

24 THE CHAIRMAN: I am quite content if it is arranged between  
25 the Core Participants as to the order in which they want

1 to go. It is not going to influence me in the least  
2 which order I hear people in, if I may say, so it is  
3 more for your own convenience.

4 My initial feeling is that it would be reasonable if  
5 Turcan Connell and Digby Brown came towards the end but  
6 that is merely because they have had the heaviest burden  
7 in a way and that they should have longer to prepare  
8 their submissions but if that is agreeable to everyone  
9 then we will do it in that order and, as I say, it's not  
10 going to make any difference to me who has the last  
11 word, as it sometimes used to be said in trials. That  
12 doesn't arise.

13 So I would be quite happy to leave it to you to  
14 decide between yourselves and if you can't decide, then  
15 I will decide for you but I hope that won't be  
16 necessary.

17 That would conclude today's --

18 MR MOYNIHAN: That concludes today, sir, and if I take  
19 responsibility for what I am next about to say: again,  
20 we can have a conversation about timing but Mr Pugh is  
21 coming up from London with two of his colleagues. They  
22 will be here as a panel of three to give evidence,  
23 primarily Mr Pugh but if there are any technical  
24 questions he is bringing colleagues with him. He is  
25 only available on Tuesday and, therefore, with

1 considerable apologies to all concerned, I would prefer  
2 to err on the side of starting at 9.30 even if that  
3 turns out to be unnecessary simply because we don't have  
4 the opportunity to overspill with Mr Pugh.

5 THE CHAIRMAN: Well, since it's the last week of the public  
6 part of the Inquiry I am sure everyone will tolerate one  
7 more day at 9.30.

8 MR MOYNIHAN: Sir, if I can confess again, the same  
9 difficulty may arise with Professor Champod.

10 THE CHAIRMAN: All right, two more days.

11 Thank you very much. So we will sit at 9.30 on  
12 Tuesday but the Inquiry will officially take place, we  
13 believe, on Monday subject to the notification that will  
14 be given.

15 MR MOYNIHAN: May take place. The arrangements have to be  
16 finalised -- may.

17 THE CHAIRMAN: Thank you.

18 **(1.00 pm)**

19 **(Adjourned to a date and time to be fixed and published)**

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