

<p>1 Tuesday, 28 June 2016 2 (10.30 am) 3 (Proceedings delayed) 4 (11.00 am) 5 MR JUSTICE BLAKE: Good morning. I hope you have had 6 an interesting four or five days off. Here we are. 7 Can I say that at about 9.15 this morning my clerk 8 informed me that he had received, I think from the GLP, 9 some documents by e-mail that looked like they were 10 going to be very lengthy to print. I stopped that 11 process. We then had a telephone call, I think from 12 Hogan Lovells, asking to come back at 11.30 with the 13 promise of more materials and I thought you are going to 14 have to do it in hard copy. I have read nothing and 15 I did not intend to read anything. If I have electronic 16 copies, that may prove useful later so they can be 17 stored. They have not been distributed, but that's the 18 current state of play. 19 MR TER HAAR: My Lord, first of all apologies for the 20 material coming in late. 21 All the teams are under some pressure and ours are 22 complicated a little by the fact we are on a pro bono 23 basis. Nevertheless, the Tribunal is obviously entitled 24 to have these matters promptly and I apologise for the 25 lateness of them.</p> <p style="text-align: center;">Page 1</p>	<p>1 Mr Heppinstall at the end of last week's hearing. 2 MR JUSTICE BLAKE: Is this the start of your submissions or 3 this is simply -- 4 MR TER HAAR: Yes, it is. 5 MR JUSTICE BLAKE: Can I just ask you to pause for one 6 moment. 7 Have we agreed who is going to go first? 8 MR TER HAAR: Yes. 9 MR JUSTICE BLAKE: And who is going to go next? 10 MR TER HAAR: Yes. 11 MR JUSTICE BLAKE: And have we -- 12 MR TER HAAR: Yes. Myself, Professor Busby, then 13 Mr Heppinstall, with me coming back if there's anything 14 which comes as a surprise. That's where I say the 15 closing submissions which have been served on me and 16 which I've had an opportunity to read, inform me in some 17 detail as to the approach taken by the 18 Secretary of State which reduces that risk. 19 MR JUSTICE BLAKE: We are here, we are on the Tuesday at 20 11 o'clock, with the assistance of whatever you're about 21 to say to us in writing, which we haven't, as I say, 22 looked at. How long do you think you will be? 23 MR TER HAAR: Unless something happens to throw me off 24 course -- as sometimes happens -- my intention is to 25 finish by 4.15 today which is the time I understand the</p> <p style="text-align: center;">Page 3</p>
<p>1 However, in one sense I hope that you will find what 2 we've put in useful. 3 If I were to attempt today to say orally what we've 4 put in writing I wouldn't finish it today, putting it 5 bluntly. There are a lot of references, a lot of points 6 to be covered, obviously of enormous importance to my 7 clients and we hope of assistance. We hope that when 8 the Tribunal has an opportunity to look at the written 9 submissions, both ours and for that matter the 10 Secretary of State's, and of course Dr Busby's, which 11 you may find commendable because his is a good deal 12 shorter than ours -- 13 MR JUSTICE BLAKE: At least that will earn him one Brownie 14 point! 15 MR TER HAAR: I hope you will actually find them a useful 16 route map through. Certainly from our point of view, as 17 advocates for the Hogan Lovells claimants, appellants, 18 it has been extremely useful because we've had advance 19 notice of the approach taken by the Secretary of State. 20 That is something which I wasn't entirely surprised 21 to see but nevertheless does call for some moderately 22 lengthy comment, I'm afraid. 23 Can I just step back. I think the Tribunal is aware 24 of the history of this matter but it may be important 25 just to re-visit it. It was touched upon by</p> <p style="text-align: center;">Page 2</p>	<p>1 Tribunal wishes to rise. 2 MR JUSTICE BLAKE: Yes, I have a meeting at 4.30 that 3 I ought to be at. 4 MR TER HAAR: Also I think on Thursday, your Lordship said. 5 Actually in a long day of submissions that's quite 6 enough anyway. 7 MR JUSTICE BLAKE: Quite. 8 MR TER HAAR: Something with which I have considerable 9 sympathy. 10 MR JUSTICE BLAKE: I am sure my colleagues are able to 11 absorb technical information at a faster speed than 12 I am. 13 MR TER HAAR: So what certainly I had in mind was -- 14 MR JUSTICE BLAKE: Right. 15 MR TER HAAR: -- basically today is me; tomorrow, Dr Busby; 16 Thursday, Mr Heppinstall; and hopefully we'll be pretty 17 well finished by the end of the day. 18 MR JUSTICE BLAKE: You have Friday morning and you won't 19 be -- 20 MR TER HAAR: I won't be here. Mr Sage will be. 21 MR JUSTICE BLAKE: He can pick up any rebuttal or reply, or 22 whatever it's called, surrebuttal points. 23 Right, that's a consensus you've reached amongst 24 yourselves? 25 MR HEPPINSTALL: Yes.</p> <p style="text-align: center;">Page 4</p>

<p>1 MR JUSTICE BLAKE: Thank you, that's helpful. Yes, right. 2 Closing submissions by MR TER HAAR 3 MR TER HAAR: So do I understand from what my Lord said that 4 you do not physically have copies of anybody's 5 submissions yet? 6 MR JUSTICE BLAKE: Yes. 7 MR TER HAAR: Have we copied everybody's or just ours? Ours 8 and Dr Busby's. Right, well, there are files being made 9 available now. Perhaps they can be handed up to the 10 Tribunal so you can see what it is you are getting. 11 MR JUSTICE BLAKE: Yes. Well, if everyone is making their 12 hard copy offerings at this time we'll receive them, 13 obviously. So we can do some document managing and some 14 labelling. I think we have two there which I have given 15 out. (Pause) (Handed) 16 MR TER HAAR: The bigger file is our submission. I'll come 17 back to exactly what they are in a moment. 18 MR JUSTICE BLAKE: Yes. 19 MR TER HAAR: You can put a label "Hogan Lovells" on those. 20 The second file, we've taken the step of assisting 21 Dr Busby by copying out his document. That's a slimmer 22 file. 23 MR JUSTICE BLAKE: So that's his closing submissions. 24 MR TER HAAR: That's his document, yes. There was another 25 document I saw. Maybe that was speaking notes. I think</p> <p style="text-align: center;">Page 5</p>	<p>1 MR JUSTICE BLAKE: The project is hereby abandoned. 2 MR HEPPINSTALL: I agree, my Lord. 3 MR JUSTICE BLAKE: It's simply the ability to lose things 4 which are loose at the moment is -- 5 MR TER HAAR: Is enormous, yes. 6 MR JUSTICE BLAKE: -- more than a reasonable possibility, 7 I suspect. 8 Right. 9 MR TER HAAR: So what we have handed up to you in the bigger 10 file has two sections. First are what we describe as 11 our written closing submissions. They're like the real 12 engine of our submissions. What we've also done is to 13 take at tab 2 the "Possibilities and certainties" 14 document, which is effectively our original pleading in 15 this matter -- 16 MR JUSTICE BLAKE: Yes. 17 MR TER HAAR: -- and added in two columns which deal with 18 references to closing submissions and also transcript 19 references from this hearing. Sorry, the original 20 closing submissions, that was an original entry. We've 21 added one column which are the transcript references to 22 this hearing so you'll find text of, for example, 23 Mr Hallard or whoever else it may be. 24 MR JUSTICE BLAKE: Yes, and all the transcript references to 25 the previous hearing, insofar as that is something --</p> <p style="text-align: center;">Page 7</p>
<p>1 that's what he's submitting to the Tribunal, yes. 2 MR JUSTICE BLAKE: All right. Table of issues for closing 3 statements; is that it? 4 MR TER HAAR: Yes. 5 MR JUSTICE BLAKE: Right. 6 Somewhere in the ether there is the 7 Secretary of State's. Thank you. 8 In the course of your submissions are you going to 9 take us to the law, to the authorities bundle? 10 MR TER HAAR: I am going to take you to the law, but only in 11 SB1, i.e. the decision of the Upper Tribunal. 12 MR JUSTICE BLAKE: Right. 13 MR TER HAAR: So I don't need you to have the authorities 14 bundles available. 15 MR JUSTICE BLAKE: In order to manage what is coming up on 16 the table would it be benefit for me to put the 17 supplementary authorities into the tab now? 18 MR HEPPINSTALL: Well, if you have time. From what 19 Mr ter Haar has just said, I mean it sounds like only 20 I will be going to those additional authorities. 21 MR JUSTICE BLAKE: Right. Just give me a minute. 22 MR HEPPINSTALL: Although having said that, I attempted to 23 do just that thing this morning and failed because the 24 SB18 is not big enough so I've caused bigger files to 25 turn up so actually --</p> <p style="text-align: center;">Page 6</p>	<p>1 well, that's where you called your witnesses and if you 2 are still standing by them, is it cross-referred to our 3 supplementary bundle? 4 MR TER HAAR: Yes, you should now find that every reference 5 in the original pleading is now cross-referenced to the 6 SB bundle. 7 MR JUSTICE BLAKE: The SB bundle. 8 MR TER HAAR: There are two additional SB bundles from us, 9 23 and 24. 10 MR JUSTICE BLAKE: I saw those are -- 11 MR TER HAAR: You may remember that on Thursday I mentioned 12 that in our original pleading we referred to some of the 13 library documents. Where we've referred to library 14 documents we've now copied them so hopefully you can 15 just forget the library now. 16 MR JUSTICE BLAKE: Yes, well, for archival purposes, for 17 those who want to study this case in 150 years' time 18 I am going to make sure that they don't disappear, that 19 they are retained and I will take hold of them 20 personally or in my room after we complete the oral 21 submissions, but if there is a strong degree of 22 confidence that for forensic purposes our study, restudy 23 and calibration of what you want to tell us can all be 24 contained in the SBs, amen to that. 25 MR TER HAAR: That's certainly the intent.</p> <p style="text-align: center;">Page 8</p>

<p>1 MR JUSTICE BLAKE: Right.</p> <p>2 MR TER HAAR: Sometimes the intent ...</p> <p>3 MR JUSTICE BLAKE: Quite, well, there's no iron rules but if</p> <p>4 that's the direction of travel that makes the enormous</p> <p>5 task that we all face somewhat a little less daunting.</p> <p>6 One of the problems being I don't think we actually have</p> <p>7 an index to what's in the library so it's a little bit</p> <p>8 of luck, a little bit of a steer, a little bit of</p> <p>9 something else. But I think insofar as in the course of</p> <p>10 the next few days that you are dealing with a topic</p> <p>11 where our pre-reading or our examination of the material</p> <p>12 before us suggests that there may be another paper or</p> <p>13 a report that's relevant, we will ask where it is, so</p> <p>14 you'll know about it.</p> <p>15 MR TER HAAR: Yes.</p> <p>16 MR JUSTICE BLAKE: Rather than have the frustration of</p> <p>17 discovering that the whole case turned upon something</p> <p>18 that you didn't know was in the frame.</p> <p>19 MR TER HAAR: I totally understand that.</p> <p>20 The intent is -- well, 24 volumes or whatever it is</p> <p>21 of supplementary bundles is bad enough, but it shouldn't</p> <p>22 be made worse by having to go to the archives.</p> <p>23 MR JUSTICE BLAKE: Yes, well, that's good. I think my box</p> <p>24 space is running out but I can manage that. Don't</p> <p>25 worry.</p> <p style="text-align: center;">Page 9</p>	<p>1 that Mr Justice Foskett, just down the corridor from me</p> <p>2 at the time, I've looked at his judgment simply for</p> <p>3 a skim reference to it all but there we are; it's</p> <p>4 a matter of history, I understand.</p> <p>5 What I didn't quite grasp, or I can't remember if</p> <p>6 I did grasp it, is when these civil proceedings were</p> <p>7 first issued or intimated.</p> <p>8 MR TER HAAR: The limitation -- the negligence action.</p> <p>9 2008, I believe.</p> <p>10 MR JUSTICE BLAKE: 2008.</p> <p>11 MR TER HAAR: I may have the date wrong but it was about</p> <p>12 then. Certainly before this, before these proceedings.</p> <p>13 MR JUSTICE BLAKE: Quite. So around about 2008, either</p> <p>14 a letter before action or a claim for something --</p> <p>15 MR TER HAAR: I think --</p> <p>16 MR JUSTICE BLAKE: -- and that triggered what is going to be</p> <p>17 Mr Justice Foskett's decision in AB which works its way</p> <p>18 to the Supreme Court.</p> <p>19 MR TER HAAR: That's absolutely right. Again, just for the</p> <p>20 benefit of the two non-legal members of the Tribunal,</p> <p>21 Mr Justice Foskett decided in favour of the veterans</p> <p>22 that the time limit should be opened up on the basis</p> <p>23 that matters only came to their attention relatively</p> <p>24 recently as it then was. One of the most important</p> <p>25 things on which he relied was the Wahab and Rowland</p> <p style="text-align: center;">Page 11</p>
<p>1 MR TER HAAR: Whatever we can do to assist with the</p> <p>2 practicalities --</p> <p>3 MR JUSTICE BLAKE: Yes, yes, we'll get there.</p> <p>4 Right. Okay. So those are the two steps.</p> <p>5 MR TER HAAR: Again I was going to start by just reminding</p> <p>6 the Tribunal of the journey to take us here.</p> <p>7 The first proceedings were not War Pension</p> <p>8 proceedings but were the litigation where a number of</p> <p>9 war veteran -- of veterans of the tests -- were seeking</p> <p>10 damages for negligence.</p> <p>11 MR JUSTICE BLAKE: Yes.</p> <p>12 MR TER HAAR: They were looking back, the claimants were</p> <p>13 obviously looking back half a century and the Government</p> <p>14 as the defendant in those proceedings look a limitation</p> <p>15 point. In other words, they said that the claim had</p> <p>16 been brought so late that under statute it should be</p> <p>17 struck out.</p> <p>18 MR JUSTICE BLAKE: Yes.</p> <p>19 MR TER HAAR: Whilst my Lord may know -- maybe your</p> <p>20 colleagues do or do not know -- under the Limitation Act</p> <p>21 in this country there are exclusions the effects --</p> <p>22 MR JUSTICE BLAKE: Yes.</p> <p>23 MR TER HAAR: -- if you discover late that you have a right</p> <p>24 to claim, to put it very shortly.</p> <p>25 MR JUSTICE BLAKE: I can tell you that apart from the fact</p> <p style="text-align: center;">Page 10</p>	<p>1 report. He had a hearing at which much of the evidence</p> <p>2 that you now have in your bundles was adduced for the</p> <p>3 purpose of deciding whether there was a viable case and</p> <p>4 when it had come into existence. That's why, as</p> <p>5 Mr Heppinstall quite rightly said last week, many of the</p> <p>6 reports are not framed in terms of the War Pension</p> <p>7 legislation test but are reports taken from the previous</p> <p>8 proceedings.</p> <p>9 MR JUSTICE BLAKE: Yes.</p> <p>10 MR TER HAAR: The war veterans having been successful, some</p> <p>11 of them, it went, as my Lord said, to the</p> <p>12 Court of Appeal and then to the Supreme Court where the</p> <p>13 Supreme Court held that the claims could not proceed.</p> <p>14 So that was the end of the litigation action, of the</p> <p>15 negligence action.</p> <p>16 Meanwhile, at a functional level, a practical level,</p> <p>17 claims for war pensions have been put in. Then before</p> <p>18 the First Tier Tribunal, the first First Tier Tribunal,</p> <p>19 the claims for war pensions were considered. They were</p> <p>20 broadly unsuccessful before the First Tier Tribunal.</p> <p>21 The claims therefore were pursued on appeal to the</p> <p>22 Upper Tribunal and the Upper Tribunal -- that's</p> <p>23 Mr Justice Charles -- decided that the</p> <p>24 First Tier Tribunal had in a large number of respects</p> <p>25 got it wrong on the law and therefore set aside the</p> <p style="text-align: center;">Page 12</p>

<p>1 existing decision and sent the case back here for 2 a rehearing.</p> <p>3 So it's very unusual because ordering a rehearing in 4 civil claims is a fantastically rare event, certainly in 5 something as complex as this. I've never experienced 6 it. I've been hanging around the Bar for 40 years, it's 7 an extremely rare event. And one of the problems that's 8 faced -- I think my Lord knows all this but this is just 9 setting the scene for the members of the Tribunal. One 10 of the problems we faced is: were we are going to have 11 a complete rerun not only in respect of what the 12 First Tier Tribunal had done but also what had gone on 13 in front of the judge in the negligence action?</p> <p>14 MR JUSTICE BLAKE: Did he hear live evidence? 15 MR TER HAAR: Yes, he did. 16 MR JUSTICE BLAKE: Well -- 17 MR TER HAAR: He heard the claimants ... Mr Heppinstall may 18 be better able to assist. 19 MR HEPPINSTALL: Your question was: did Mr Justice Foskett 20 hear? 21 MR JUSTICE BLAKE: Yes. 22 MR HEPPINSTALL: Yes, but only on the question of knowledge 23 so the claimants gave evidence as to their knowledge. 24 The expert evidence was all written in. 25 MR JUSTICE BLAKE: Yes. So he didn't even -- that's what</p> <p style="text-align: center;">Page 13</p>	<p>1 discharge of legal duties by a judge required him or her 2 to engage with any forensic issues that were at large.</p> <p>3 MR TER HAAR: For reasons which I'm going to come on to in 4 a moment, this history is important in considering the 5 way in which the Secretary of State now puts its case. 6 So the matter having been heard by Mr Justice 7 Charles in the Upper Tribunal, the appeal was 8 successful.</p> <p>9 MR JUSTICE BLAKE: Yes. He heard some oral evidence? 10 MR TER HAAR: Well, not on this. He had oral evidence on 11 whether Dr Busby should be -- 12 MR JUSTICE BLAKE: On that issue. 13 MR TER HAAR: On that issue. 14 MR JUSTICE BLAKE: I had to navigate through that earlier. 15 But only on that issue? 16 MR TER HAAR: Only on that issue. Not on, so to speak, the 17 merits of dosimetry and fallout. 18 MR JUSTICE BLAKE: Professor Regan didn't repeat himself. 19 MR TER HAAR: No, he didn't. I am going to take the 20 Tribunal, with some apologies, to Mr Justice Charles' 21 decision in some detail because I think it's important 22 to see what was going on there. But after that, his 23 emphasis was -- putting it shortly, there's more to be 24 seen -- the original Tribunal had got itself into 25 a mindset -- a very broad summary -- a mindset where</p> <p style="text-align: center;">Page 15</p>
<p>1 I rather assumed -- he didn't seek to make any 2 exploration of the expert evidence other than: when did 3 it first come to the attention of the claimants for 4 the --</p> <p>5 MR HEPPINSTALL: Ah, save that the merits of the action are 6 relevant under section 33. 7 The merits of the action are relevant under 8 section 33, and in fact when you read the Supreme Court 9 judgment they became front and centre. It's one of the 10 reasons why the claimants failed under section 33. 11 MR JUSTICE BLAKE: I haven't actually read the Supreme Court 12 judgment in terms of my reading around the 13 historiography of this case. 14 MR HEPPINSTALL: No, but Mr Justice Foskett had to make some 15 assessment of the expert evidence in order to say 16 whether the claimants had a real prospect of success for 17 the purposes of section 33. 18 MR JUSTICE BLAKE: And I think Mr ter Haar is right that the 19 Wahab/Rowland study was significant both as to its date, 20 to knowledge, and possibly to the merits, is that right? 21 MR HEPPINSTALL: Yes, although the Court of Appeal and the 22 Supreme Court took it very differently. 23 MR JUSTICE BLAKE: Okay. Nothing is decided, 24 Mr Heppinstall. We're simply looking at the archaeology 25 of the documentation and the extent to which the</p> <p style="text-align: center;">Page 14</p>	<p>1 they were approaching the matter on the balance of 2 probabilities, which is incredibly easy to do, certainly 3 if you are a civil practitioner of the law --</p> <p>4 MR JUSTICE BLAKE: It's a very counter-intuitive test. 5 MR TER HAAR: That's exactly the point. You spend your life 6 as a civil practitioner saying "On a balance of 7 probability is this established?" and going through 8 a legal, as a lawyer, process of: have I established 9 this fact, that fact, that fact? 10 Equally as a scientist, and Dr Rayner will know 11 better than me, but as a scientist you are always 12 looking at a process which may go from a hypothesis to 13 establishing that the hypothesis may have some legs, if 14 I can put it that way, moving on to "I can bank that as 15 the consensus view on a particular area," and then you 16 may have to go back and reconsider it. But again the 17 scientific process also tends to go stage by stage 18 trying to establish this, then that, then that, then the 19 other. Obviously the scientists are different from the 20 lawyers in that you often will go back to reconsider 21 what seems to be a consensus in the way lawyers, subject 22 to appeals, try to draw a line. So it's a different 23 philosophy. 24 But both as scientists and as lawyers it's very 25 easy, unless one is careful, to fall into the mindset of</p> <p style="text-align: center;">Page 16</p>

1 balance of probabilities: "That just doesn't seem very
 2 probable; I don't think that makes sense." That's, for
 3 reasons I'll go into in more depth, not the right
 4 approach here.
 5 So Mr Justice Charles in the Upper Tribunal said
 6 that the First Tier Tribunal had fallen into error and
 7 said it must go back, which is why this Tribunal has
 8 been the hapless victims of the process of dealing with
 9 that.
 10 MR JUSTICE BLAKE: Because it was impossible for the AAC to
 11 remake the decision on the materials before him,
 12 or because he didn't fancy it?
 13 MR TER HAAR: He probably didn't fancy but he felt that
 14 would be wrong as a matter of approach.
 15 We were floating it, but it was when you delved into
 16 the reasons quite difficult, actually, not least because
 17 part of the appeal was allowed on a reasons basis so
 18 it's difficult to decide on an appeal basis.
 19 So the emphasis was that this Tribunal has to look
 20 at the possibilities, probabilities and certainties and
 21 weigh them up. I'll come back to his decision to show
 22 you what that means.
 23 MR JUSTICE BLAKE: But in certainties one can, as long as
 24 one doesn't err from the direction given us by
 25 Mr Justice Charles, say, "Well, in order to sort of fill

Page 17

1 in the jigsaw puzzle I'm satisfied on balance that this
 2 is a sound fact, that's a certainty".
 3 MR TER HAAR: No, you can't say "I'm satisfied on balance."
 4 You can say "I'm certain and I have no doubt about
 5 this."
 6 MR JUSTICE BLAKE: Well, but that -- how else in civil
 7 proceedings does one become certain?
 8 MR TER HAAR: The answer is you could -- I'll give you
 9 an example. Let's assume that one of the claimants said
 10 that he had a broken leg as a result of an accident on
 11 Christmas Island, a car or a lorry accident. And in
 12 fact evidence came in which said that actually his
 13 accident was caused by a lorry hitting him on Fleet
 14 Street. Then you would be certain that the
 15 attribution -- that he has a broken leg but it wasn't
 16 attributed to war service. In that simple example you
 17 can be certain as to attribution.
 18 Now along the scale, you have to deal with this on
 19 reliable evidence and as I understand the
 20 Secretary of State's submission taking, for example, the
 21 witnesses called by Dr Busby in the first week of this
 22 hearing, he's going to submit that for example you can
 23 reject the evidence completely of Professor Hooper, that
 24 it was not reliable.
 25 MR JUSTICE BLAKE: Yes.

Page 18

1 MR TER HAAR: Therefore, if for example he was the only
 2 witness you would say: "There's nothing left. There's
 3 nothing to raise a reasonable doubt."
 4 MR JUSTICE BLAKE: There's nothing that goes into the
 5 assessment, the evaluation part of the exercise. So
 6 there's some threshold as to whether you go into the
 7 overall assessment but it's a very limited threshold,
 8 it's not: I am satisfied it's more probable than not,
 9 therefore it goes into the pot. It's everything goes in
 10 save things which you can exclude as certain, as being
 11 unreliable.
 12 MR TER HAAR: You may come to a conclusion when you get to
 13 the end of it that what is left, there's not
 14 a reasonable doubt: "The only doubts suggested are so
 15 fanciful I can actually exclude them."
 16 MR JUSTICE BLAKE: Well, so there is -- you'll help me or
 17 help us as you go through this, but although we'll not
 18 be able to do justice to a sophisticated and complicated
 19 judgment in the course of an exchange of this sort, it
 20 might be possible to see it as at least a two-stage
 21 process: what goes into the evaluation of the real
 22 question, which is whether there's a reasonable doubt as
 23 to causation, which would permit or require us to reject
 24 things which we are certain don't meet that standard;
 25 but then assuming that the doubts, whatever they may be,

Page 19

1 don't reach that standard and so in it goes, we then
 2 have to make an overall assessment of everything that is
 3 in the assessment basket or frame or scale, whatever it
 4 may be called, to see whether our overall conclusion is
 5 whether there is or is not reasonable doubt as to
 6 causation.
 7 MR TER HAAR: Except you must be very careful, as Mr Justice
 8 Charles said, about regarding it as a two-stage process.
 9 That's exactly what the Secretary of State argued in
 10 front of the Upper Tribunal and it was rejected. One
 11 reason I am going through the history is that they are
 12 in a large number of respects reinstating a wide range
 13 of arguments that they put before Mr Justice Charles and
 14 which were rejected.
 15 MR JUSTICE BLAKE: Well, I don't understand how we -- this
 16 is where you may need to give us some help. I don't
 17 understand how you can make that overall evaluation
 18 without first deciding what you are going to evaluate.
 19 MR TER HAAR: You do. You do exactly that. First of all
 20 you put in all the evidence -- what you don't do --
 21 MR JUSTICE BLAKE: But isn't that a step or a part, an
 22 independent part of the process? If you don't like
 23 "stage", I'll delete that, but you see what I am trying
 24 to do --
 25 MR TER HAAR: Of course. The way in which Mr Justice

Page 20

1 Charles puts it is you put it all into the mix, you
 2 exclude anything on the way through you say "I simply
 3 don't accept that evidence at all".
 4 MR JUSTICE BLAKE: Yes.
 5 MR TER HAAR: That could be purely factual evidence or
 6 expert evidence, whatever it may be.
 7 MR JUSTICE BLAKE: Yes.
 8 MR TER HAAR: You then get the mix together and you do
 9 a final -- and by definition you will then have a mass
 10 of bits of --
 11 MR JUSTICE BLAKE: A mass of bits of conflicting opinions,
 12 evidence, hypotheses, scientific supported, not
 13 supported, whatever.
 14 MR TER HAAR: Then once you get to that point you almost
 15 certainly -- almost certainly -- would be driven to
 16 findings of reasonable doubt. But you carry out a final
 17 common sense check and you step back and say: "Okay,
 18 I've got what appears to be a basket which has a large
 19 number of uncertainties. I can't add all those
 20 uncertainties and in my mind think that there's
 21 a reasonable doubt." So you do have to step back at the
 22 end as a matter of common sense but what you don't do is
 23 what the Secretary of State you'll see when you get to
 24 his submissions is trying to do, you don't say: "I'm
 25 going to reject that, I'm going to reject that, I'm

Page 21

1 going to reject that. Ah, that just leaves me with
 2 this", at each stage falling into the error of comparing
 3 one witness with another which is exactly the process in
 4 a civil claim normally and the Secretary of State is
 5 constantly trying to get back to two things. One says
 6 a minimum threshold overall which has to be passed in
 7 relation to dose. That was an argument which was run
 8 before the First Tier Tribunal before and as a concept
 9 was rejected by Mr Justice Charles. Secondly, you do
 10 not fall into the trap of saying "I prefer this witness
 11 to another". You have to ask yourself a different
 12 question: "Do I reject this evidence altogether?" --
 13 that's the important thing -- "Or do I put the evidence
 14 into the mix?" I'll take you back to the decision to
 15 show you how this works. But let me give you
 16 an example.
 17 One of the areas which we'll come back to in detail,
 18 but just dealing with it conceptually, is the question
 19 of: what do you do with a hypothesis? If you are
 20 running an ordinary civil claim of negligence, simply
 21 coming to the court and saying -- I've got a scientific
 22 witness who says: "There's something here which needs to
 23 be investigated. I can't tell you what the result of
 24 the investigation will be but it needs to be
 25 investigated. I've got a logical hypothesis that needs

Page 22

1 to be tested in due course," that wouldn't get you
 2 anywhere near a judgment in a civil claim.
 3 But in this case, under this legislation, if you
 4 think that actually there is something to be
 5 investigated but time hasn't yet shown whether it's true
 6 or not, but it might be leading somewhere, that is
 7 capable of founding a reasonable doubt.
 8 MR JUSTICE BLAKE: Well, we'll hold with hypothesis.
 9 I would like to ask you the question whether there are
 10 hypotheses which have some internal or even preliminary
 11 evidence base for it or hypotheses which don't have
 12 anything at all behind them.
 13 MR TER HAAR: It depends what you mean by "don't have
 14 anything at all behind them".
 15 MR JUSTICE BLAKE: No material evidence which --
 16 MR TER HAAR: It's sufficient in our submission for somebody
 17 to come and say -- we're dealing with a scientific area
 18 --
 19 MR JUSTICE BLAKE: Yes.
 20 MR TER HAAR: -- "I've been looking at this and I actually
 21 think there is real doubt as to whether the consensus is
 22 right. I have the following logical reasons for
 23 questioning it. I don't yet know whether it's right but
 24 I have really solid grounds for questioning it."
 25 Could I give you --

Page 23

1 MR JUSTICE BLAKE: Solid grounds?
 2 MR TER HAAR: I will give you an example.
 3 MR JUSTICE BLAKE: I would love to touch solid ground
 4 somewhere in this case. Whether we ever will, I don't
 5 know.
 6 MR TER HAAR: I will give you a hypothesis which is later
 7 proved. My father was a theoretical physicist and he
 8 many years ago calculated by mathematics that there was
 9 a moon, as yet unspotted by the astronomers, by one of
 10 the outer planets. He calculated exactly where it was
 11 and says he has a hypothesis. Some years later it is
 12 still not visible by any telescope, off went the rocket
 13 across space, it passed by the planet and they found
 14 that he was within -- I can't remember -- 2,000 miles
 15 right. There was a moon which hadn't yet been
 16 identified. He worked it out mathematically. Don't ask
 17 me how.
 18 MR JUSTICE BLAKE: No.
 19 MR TER HAAR: Now, that's an example of a hypothesis. He
 20 had a logical basis for it, couldn't prove it --
 21 MR JUSTICE BLAKE: No, no. Well, I recognise a hypothesis
 22 is something which is not proven. So I absolutely have
 23 that concept. But a hypothesis may need to have some
 24 solid ground, either in the cogency of its internal
 25 logic if it's entirely -- if the world of mathematics or

Page 24

<p>1 algorithms or the understanding of the universe is 2 capable of being understood by those means, or because 3 there's a piece of data which is an indicator which is 4 contrary to the current understanding and which requires 5 analysis and a response. 6 MR TER HAAR: I think the word which you used is "cogeny". 7 In other words, it must be something which it not so 8 wildly eccentric that it could never be regarded as 9 being the start of a hypothesis. But in the context of 10 war pensions the justice of it is this. If I'm 11 a veteran I may be placed, because of the ingenuity of 12 mankind in warfare, in a situation where nobody actually 13 knows what the results are going to be and yet it may 14 take 10, 20, 30 or 40 years to find out. 15 That is in fact exactly the situation that the young 16 servicemen on Christmas Island were in. There had been 17 two nuclear bombs which had gone off in Japan. Nobody 18 by definition knew what the effects of such bombs were 19 for anybody after 13 years because there had only been 20 13 years and we're talking now about what the effects 21 might be after 40 years. So in terms of the thinking of 22 the War Pension provision, would it be right for 23 somebody to be denied -- let's assume that two years 24 after the tests somebody came down with a very rare 25 condition which we could now tell was actually</p> <p style="text-align: center;">Page 25</p>	<p>1 microbiology may go down this path", because I do not 2 have the scientific basis for doing so. If I'm 3 a microbiologist saying "This is where microbiology may 4 go" then one would have to, so far as you can, examine 5 it from the point of view of a microbiologist: is this 6 a hypothesis that he has any knowledge of? It may be 7 you're making assumptions, for example, as to how DNA 8 works in a cell which other research shows simply could 9 not be right. There may be some reasons why it could 10 not be right. If you came to that conclusion then you 11 could be certain that theory was never going to be 12 proven. 13 And every area you have to examine. 14 Let me go if you like to one of the most important 15 areas in this case. When we get to look at the evidence 16 relating to the Wahab/Rowland, and I'll be making other 17 comments, but you heard some evidence from 18 Professor Thomas that she doesn't like the mFISH 19 methods, she says genome research has made a difference 20 in that area. 21 But actually again you go back to the bulk of the 22 evidence, the Secretary of State's own experts say that 23 the Wahab/Rowland survey, report, raises questions which 24 need to be explored. 25 MR JUSTICE BLAKE: Mm-hm.</p> <p style="text-align: center;">Page 27</p>
<p>1 connected, attributable to being in the vicinity of the 2 explosion. But nobody knew at the time whether it would 3 or not. The scientists said: "All I can tell you is 4 that we are in totally uncharted territory. We know 5 there are radiation effects. We simply don't know what 6 the effects are after two years or 5 years or ten years. 7 All I can tell you is that there is a world of 8 unpredictability and this seems to me to be something 9 which may be caused" -- now that's sufficient -- "may be 10 caused by the explosion." 11 So how cogent the evidence is is a matter for 12 assessment by the Tribunal. 13 Sometimes you may, having heard all the evidence, 14 say that hypothesis simply doesn't have any cogency at 15 all. 16 Other hypotheses, you say: "This seems to me to be 17 the beginnings of something that may turn out to be 18 completely a false dawn but may also have some real 19 strength in it." If you are in that territory then it's 20 feeding into the decision of the Tribunal, you would 21 take it into account as giving rise to a doubt. You'll 22 see how Mr Justice Charles expressly dealt with that 23 when we get to his decision. 24 But I totally accept that I can't, for example, as 25 a lawyer, write a paper saying "I think that</p> <p style="text-align: center;">Page 26</p>	<p>1 MR TER HAAR: So there we're a long way off the balance of 2 probabilities. 3 MR JUSTICE BLAKE: Yes. 4 MR TER HAAR: And it's one of the area I was going to come 5 on to as an example, that for the purposes of the 6 previous litigation in the negligence action that would 7 have to be proved on a balance of probabilities. So the 8 expert evidence is saying: we're a long way off the 9 balance of probabilities. The Secretary of State has 10 taken the same evidence here, not reprocessed it to ask 11 the question "Does it give rise to a reasonable doubt?" 12 but then relies upon it as though it does rule out 13 a reasonable doubt. We'll come to that in more 14 detail -- 15 MR JUSTICE BLAKE: Someone is going to have to make 16 an examination of that proposition. 17 MR TER HAAR: Yes. 18 MR JUSTICE BLAKE: It's going to be us. 19 MR TER HAAR: Unfortunately it is going to be you, yes. 20 MR JUSTICE BLAKE: So a trip into the unknown because that's 21 what we have to do. 22 MR TER HAAR: It is not entirely a trip into the unknown 23 because in that example actually you'll see -- we've 24 referred to it in our written submissions -- 25 MR JUSTICE BLAKE: There's a great many papers, and we might</p> <p style="text-align: center;">Page 28</p>

1 have discovered a few more that we'll mention to you on
 2 that topic, but no one has, for reasons you've
 3 explained, finally made a call on this, have they?
 4 Mr Justice Foskett didn't have to. I don't know what
 5 the First Tier Tribunal did because I haven't read their
 6 decision because it was irrelevant.
 7 MR TER HAAR: It's only relevant because as I go through
 8 Mr Justice Charles' decision I need to explain to you
 9 the way in which Mr Heppinstall is taking arguments
 10 which he ran there with moderate success and now which
 11 were stamped on, if I can put it that way, by Mr Justice
 12 Charles and he has now come back to the same arguments
 13 all over again, and that was where I was going. Can
 14 I come back to the concepts when I go to the judgment?
 15 MR JUSTICE BLAKE: The thing that is puzzling is I can see
 16 amongst the whole spectrum of responses to the data that
 17 you are going to help us with, that we know about in
 18 this case, one could say: well, (1), there's no such
 19 thing as a safe limit; (2) therefore, if anyone has ever
 20 been exposed to anything other than background radiation
 21 and one has a medical condition which is or may be
 22 related to, is a consequence of such exposure, there's
 23 a reasonable doubt, end of doubt.
 24 MR TER HAAR: Yes, and you should.
 25 MR JUSTICE BLAKE: Well, quite. But if the test, if it's

Page 29

1 simply those three steps, then it's inconceivable why
 2 Mr Justice Charles didn't do that for himself.
 3 MR TER HAAR: Because --
 4 MR JUSTICE BLAKE: Because he had all the material. But it
 5 sounds like there's something that needed to be
 6 examined.
 7 MR TER HAAR: Part of his decision was that he was saying
 8 there wasn't adequate reasoning for --
 9 MR JUSTICE BLAKE: Well, he has the material -- go and do it
 10 yourself.
 11 MR TER HAAR: He took the view that wasn't the right
 12 approach.
 13 MR JUSTICE BLAKE: Yes, well, why not, I wonder?
 14 MR TER HAAR: Because if you have what we call in the
 15 administrative courts a reasons challenge it's not right
 16 for the Tribunal, in that case the Upper Tribunal, to
 17 substitute its view.
 18 MR JUSTICE BLAKE: Of course in the administrative court but
 19 the Upper Tribunal, as I know, does not operate in that
 20 field of law at all and remaking even difficult
 21 decisions, depending upon the context, is one of the
 22 whole purposes of the Tribunal rules. Obviously there
 23 are certain things which so depend upon the primary
 24 response to the narrative that you are being provided,
 25 scientific or otherwise, that if something has gone so

Page 30

1 seriously wrong you do have to start all over again.
 2 But one would only usually start all over again if
 3 examining the process might lead one way or the other.
 4 If it could only have led one way, and as you point out
 5 this is a very unusually sensitive final test,
 6 a reasonable possibility, but there must have been some
 7 doubt or some basis for forensic persuasion as to
 8 whether the evidence taken as a whole --
 9 MR TER HAAR: No.
 10 MR JUSTICE BLAKE: -- created a reasonable doubt test,
 11 otherwise it seems like --
 12 MR TER HAAR: No, I think rightly or wrongly his view was
 13 that he shouldn't be trampling on the territory of the
 14 First Tier Tribunal to make the decision as to whether
 15 or not attributability was made out on the right and
 16 appropriate standard and because he was dealing with the
 17 matter in part, not entirely but in part on a reasons
 18 basis he took the view that he would be carrying out --
 19 MR JUSTICE BLAKE: The Upper Tribunal can and often must
 20 when it finds a flaw redetermine for itself.
 21 MR TER HAAR: Well --
 22 MR JUSTICE BLAKE: But anyway --
 23 MR TER HAAR: You may not be surprised that that was what we
 24 were urging upon him but anyway, we lost that argument.
 25 MR JUSTICE BLAKE: Sorry to hear that.

Page 31

1 MR TER HAAR: Can I just give you an example of where this
 2 in fact plays out in terms of a practical example of the
 3 evidence. Could you please take up bundle SB11 if you
 4 have that to hand.
 5 If you go to the first divider in SB11 you are
 6 looking at Dr Brenner's report to the previous Tribunal.
 7 MR JUSTICE BLAKE: Yes.
 8 MR TER HAAR: This is on the Wahab and Rowland test. Just
 9 an example of the process that we say --
 10 MR JUSTICE BLAKE: Yes, I think we've read and we've looked
 11 at this with some care.
 12 MR TER HAAR: Yes. If we take page 3, you'll see in italics
 13 at the top a couple of paragraphs cited by Dr Brenner
 14 from a report by Professor Kaldor, Professor Kaldor
 15 being an expert called by the Secretary of State, or his
 16 evidence was put in my the Secretary of State.
 17 In relation to the Wahab study he concluded -- this
 18 is Professor Kaldor's conclusion at paragraph 48:
 19 "The Wahab study was based on a small group of
 20 atomic bomb test participants and used dose
 21 reconstruction methods that are not yet considered to be
 22 fully validated and are unlikely to be so for the
 23 foreseeable future. Nevertheless, the results of the
 24 study raise a question about the validity of the dose
 25 levels that were measured and recorded for the

Page 32

1 participants at the time of the Pacific tests."
 2 Now that paragraph neatly summarises the difference
 3 between the negligence litigation and this, because for
 4 the purpose of the negligence litigation the question
 5 was whether or not the veterans would be able to rely
 6 upon the Wahab study in order to overcome the burden of
 7 proof they had there, which was balance of
 8 probabilities.
 9 In these proceedings we don't have to get over that
 10 and it is sufficient to put forward a hypothesis which
 11 may not be proved in the foreseeable future because it's
 12 sufficient for our purposes the final sentence:
 13 "Nevertheless, the results of the study raise
 14 a question about the validity of the dose levels that
 15 were measured and recorded for the participants at the
 16 time of the Pacific tests."
 17 Now the Secretary of State cannot say that
 18 Professor Kaldor is an unreliable witness or outside his
 19 experience. He cannot say, therefore, that there can be
 20 no doubt raised by the Wahab and Rowland study because
 21 a credible body of expert evidence, including his own
 22 witness, regarded it as raising a question. And then it
 23 goes further.
 24 Even if that sentence had said "The results of the
 25 study do not raise a question" -- let's assume

Page 33

1 Professor Kaldor put forward the opposite view from what
 2 in fact he put forward -- Dr Brenner, who is described
 3 in the Secretary of State's own expert reports as
 4 eminent and very well respected, he puts forward the
 5 view that the Wahab and Rowland study does have
 6 consequences -- I'll come back to what those
 7 consequences are -- and unless the Secretary of State
 8 were to be able to say Dr Brenner is not an expert in
 9 the field, or is lacking the credibility for some other
 10 reason, or is putting forward a theory that is so
 11 completely out that it cannot be taken into account, if
 12 you had a conflict between on this hypothesis a Kaldor
 13 view and a Brenner view, it's only if the Tribunal
 14 rejected the Brenner view root and branch as being
 15 fanciful that you would not take it into account.
 16 MR JUSTICE BLAKE: Well, I fully accept that what is said in
 17 the indented quote, even if you just close the quotation
 18 at the words "foreseeable future", stop, and didn't deal
 19 with the sentence which you point out is helpful to you,
 20 that that does not begin to eliminate the Rowland/Wahab
 21 study from material of importance which has some cogency
 22 that needs to fall into the overall assessment.
 23 Where I would personally welcome your help, if you
 24 are going to mention that particular study, is what we
 25 do as a Tribunal. At the moment, sadly, I have the

Page 34

1 sense that I'll want to look to see what was done. Did
 2 it depend upon epidemiology in some respects? Did it
 3 have a good control group? Did it have a good results
 4 basis? Does a dose administered in laboratory
 5 conditions in acute conditions help about dose in these
 6 circumstances? Is there a difference?
 7 I mean, a series of questions. They are open
 8 questions, they're not closed questions. But they are
 9 open questions and then we need to then see, given what
 10 is all there, how far that creates a reasonable doubt on
 11 the issues that we have to decide.
 12 Now, is that a journey which is pointless?
 13 MR TER HAAR: It's not pointless, it's just wrong because
 14 you are, with the greatest of respect, falling into
 15 exactly the trap --
 16 MR JUSTICE BLAKE: Then it would be pointless.
 17 MR TER HAAR: No, it's not pointless in this sense, but
 18 obviously you have to analyse it. What the
 19 Secretary of State I think is going to say is the Wahab
 20 and Rowland study is so badly structured that you just
 21 throw it out of the window effectively. And
 22 Mr Heppinstall therefore forces you to address that
 23 question because it's part of his submissions and you
 24 must obviously in the decision-making process take into
 25 account those arguments.

Page 35

1 But assume you went through all those questions, and
 2 there's an open question here, an open question here,
 3 an open question here.
 4 Let's take the control sample point. Let's assume
 5 you came to the conclusion that these were competent
 6 scientists carrying out the survey in the first place.
 7 However, it can be criticised but there's sufficient
 8 here which would justify, if money was no object,
 9 redoing the exercise with a better control group.
 10 If you were dealing with the matter on the balance
 11 of probabilities you would say that: you've had the
 12 opportunity to call the evidence, you had to prove it,
 13 all you have done is refer to a report which has many
 14 questions hanging over it.
 15 Many questions hanging over it is not sufficient to
 16 reject it in this Tribunal. You have to go much further
 17 if you are to reject this evidence, saying: "I simply
 18 cannot accept this", and you would have to give your
 19 reasons that you would have to say "I cannot reject it"
 20 despite the fact that a very eminent epidemiologist, one
 21 of the most eminent in the world, Professor Kaldor, says
 22 it raises questions, despite the fact one of the most
 23 experienced radiobiologists in the world --
 24 Dr Brenner -- says it raises serious questions,
 25 despite -- you go on.

Page 36

<p>1 Now, putting it bluntly, I wouldn't want to be the 2 person who is trying to write a decision which came to 3 that conclusion because actually it would be so 4 fundamentally wrong and it's so different -- 5 MR JUSTICE BLAKE: If we? 6 MR TER HAAR: It would be so fundamentally wrong on the 7 test. 8 MR JUSTICE BLAKE: If we? 9 MR TER HAAR: If you were to write a decision which said: 10 "This is not a credible theory despite this expert, that 11 expert, that expert, that expert." 12 MR JUSTICE BLAKE: That suggests there's no evaluation for 13 us to do at all. You just add up a quote here and 14 a quote there -- 15 MR TER HAAR: It's not a question of a quote here and a 16 quote there. 17 MR JUSTICE BLAKE: Well, it is, actually. 18 MR TER HAAR: No, it's evidence which is not fanciful -- 19 MR JUSTICE BLAKE: Behind all this lies -- sadly -- I don't 20 say it with enthusiasm -- behind any one of these things 21 is a trail of learning and discovery, very intense 22 learning and discovery for us personally, as to: I see 23 how this piece of data connects to the next piece of 24 data and the next piece of data and everything else. 25 I mean we've gone to what is evidently,</p> <p style="text-align: center;">Page 37</p>	<p>1 is, and then we toss up our hands and say "Ergo there's 2 a doubt," or do we then seek to put it all together and 3 make an evaluation? 4 MR TER HAAR: You say "Ergo there's a doubt," because then 5 you've got to the point where you have a basket of 6 reasons why there is a doubt. 7 Now let me -- 8 MR JUSTICE BLAKE: So there's only one stage -- that does 9 suggest there is only one stage. 10 MR TER HAAR: Yes. 11 MR JUSTICE BLAKE: Well, I remain open but not yet certain 12 that that is the correct approach. 13 MR TER HAAR: We've gone down into a part of my submissions 14 which I was going to come to later. I was actually on 15 the history. 16 MR JUSTICE BLAKE: I am sorry if I have taken you out of 17 your course but in a sense the enthusiasm to engage with 18 your submissions -- 19 MR TER HAAR: But this is really important, what is 20 illustrated by this. 21 MR JUSTICE BLAKE: Yes. 22 MR TER HAAR: Coming back to the history and why I was 23 starting with the history. 24 At the end of Mr Justice Charles' process we had 25 a directions hearing at which we were directed to plead</p> <p style="text-align: center;">Page 39</p>
<p>1 unsurprisingly, going to be a central piece of the 2 material in your submission. We recognise that from 3 your skeleton, thank you, and from Mr Justice Foskett -- 4 thank you to him -- and from the way in which this 5 particular study has been approached with reasonable 6 caution and care. 7 But (a) the process didn't freeze in 2009, 2010, 8 2011, 2012 or 2013, it's been ongoing and then there are 9 other bits of information which have come together. Now 10 if you are telling me: just don't go there, it's 11 a useless task, stop it now -- 12 MR TER HAAR: In a sense, I do so -- 13 MR JUSTICE BLAKE: If it's the calibration of -- I am still 14 left with this idea -- and if it's the wrong idea you're 15 going to have to help me and us eliminate that -- we are 16 still left with this idea that one eliminates at a part 17 in the reasoning process material which is so wild and 18 incapable of being relevant, and one is left with all 19 sorts of bits and pieces -- hard fact, proven fact, fact 20 which is almost certainly true but one can't ask any 21 higher test to it, material which is a credible 22 hypothesis even though it hasn't yet influenced 23 mainstream opinion, and material which might be 24 something less than that, just for the sake of argument. 25 Does the analysis end there, saying that's what there</p> <p style="text-align: center;">Page 38</p>	<p>1 what we said were the possibilities and certainties on 2 which we relied. And we did so at great length, which 3 included the possibility that the Wahab and Rowland 4 study shows X, Y, Z, and we pleaded that all out. And 5 the direction by the judge, by Mr Justice Charles, was 6 that the Secretary of State should engage with that and 7 say which of those probabilities and certainties he 8 accepted or did not accept. 9 He did not do so. He actually breached the order, 10 In lawyers' language, because he now says this Wahab and 11 Rowland theory doesn't pass muster. He did not say that 12 in his pleading, he did not say that in his written 13 opening statement. It first emerged in 14 cross-examination -- 15 MR JUSTICE BLAKE: I don't think he was cross-examining 16 anybody. 17 MR TER HAAR: Sorry, first emerged in questions of 18 Professor Thomas. 19 MR JUSTICE BLAKE: Yes. 20 MR TER HAAR: So he is seeking now to persuade you that the 21 theory which was established as at least a theory, and 22 argued about in front of Mr Justice Charles as being one 23 of the possibilities, should be rejected without having 24 set out his case. 25 Now that's not an idle point because attention</p> <p style="text-align: center;">Page 40</p>

1 having been drawn to the fact that actually the
 2 Secretary of State had wrongly persuaded the previous
 3 Tribunal to go into the world which was truly one of the
 4 balance of probabilities and he tried to persuade the
 5 Upper Tribunal that that was sustainable, the
 6 Upper Tribunal said "No, it's not sustainable, you go
 7 back and you think about possibilities," he has not done
 8 what he needed to do. If he wanted to say that the
 9 Wahab and Rowland study is out of court as being
 10 unreasonable or untenable, or whatever expression you
 11 want to use, he has not called evidence to establish
 12 that.

13 So, for example, going back to the passage from
 14 Professor Kaldor's report, he relies upon that as his
 15 evidence. So now he is seeking, without having set out
 16 his case as he was ordered to do, to go back and unpick
 17 what his own expert said in the previous proceedings and
 18 litigation. That is what he is doing and it's quite
 19 wrong.

20 So I start partly with what we lawyers call
 21 a pleading point, but it's much more fundamental than
 22 that. The Secretary of State has not engaged with the
 23 process that he was ordered to engage on.

24 MR JUSTICE BLAKE: Yes, but I, with perhaps a limited degree
 25 of knowledge compared to what I have now, intervened in

Page 41

1 that process last year when I accepted the
 2 Secretary of State's submissions that there was a useful
 3 forensic purpose in getting fresh evidence. Until that
 4 process had done, there was a limit to what he should be
 5 required to do in terms of discharging that order. So
 6 my order has to be seen alongside and possibly varying
 7 Mr Justice Charles' order, and I'll take responsibility
 8 for that, don't worry. But that's what happened.

9 MR TER HAAR: That's okay.

10 MR JUSTICE BLAKE: So the pleading may have been deferred --

11 MR TER HAAR: It was deferred.

12 MR JUSTICE BLAKE: -- to some extent until that process was
 13 out of the way. I was, as you probably remember, with
 14 the limited knowledge that I had, persuaded that if this
 15 had started off with experts looking at a different
 16 test, and that was clearly wrong --

17 MR TER HAAR: It wasn't wrong --

18 MR JUSTICE BLAKE: -- there may be some useful purpose in
 19 doing that, without obviously knowing what the outcome
 20 of that material would be. You can remain unhappy with
 21 what I did last June, it won't be a great deal of
 22 assistance to us now, I think, but assuming that we see
 23 that as a further supplementary inquiry, did the
 24 Secretary of State spell out his stall before we began
 25 the oral submissions in this case?

Page 42

1 MR TER HAAR: No, he didn't. That's the point.

2 MR JUSTICE BLAKE: Okay. So it's not so much what he didn't
 3 do at the time in May of 2015 but what he didn't do
 4 by May 2016.

5 MR TER HAAR: And the point, if I can put it like this,
 6 I wouldn't care a hoot -- I might have rejected it at
 7 the time -- I wouldn't care a hoot now if what he had
 8 done was to provide expert evidence saying "This is the
 9 true view on Wahab and Rowland", for example, and then
 10 I would have cross-examined whoever had come forward to
 11 put that.

12 I'm not really tied up with whether or not he put it
 13 on paper last year or this year. But what is absolutely
 14 clear was he had an obligation to make sure that this
 15 Tribunal, and myself on behalf of my clients, knew what
 16 his case was, and insofar as he wanted to run a case
 17 that the Wahab and Rowland studies were outside the
 18 realm where reasonable scientists could if you like hold
 19 that as a hypothesis, he had the opportunity through
 20 my Lord's order to call whatever expert evidence he
 21 wanted to deal with that and he has chosen not to.

22 What he has chosen to do, and I do say it is quite
 23 wrong, is he has chosen to take, for example this,
 24 potshots at it through evidence without addressing the
 25 fact that, as told by Mr Justice Charles, if there's

Page 43

1 a credible body of evidence it has to be taken into
 2 account. What he is trying to do is say there is no
 3 credible body of evidence, even though his own experts
 4 say that it raises questions.

5 So going back to page 3, paragraph 48, it would have
 6 been open to him, he might have had practical
 7 difficulties, to say "That's what Professor Kaldor says
 8 in his report. Actually here is somebody who
 9 specialises in genome technology who can say that there
 10 is now no question."

11 He didn't do that. He could have given notice of
 12 wishing to call such evidence. He would have had to
 13 explain why the epidemiologist was holding a view which
 14 nobody could credibly hold. He hasn't tackled that
 15 through his expert evidence at all.

16 Now I've kept my powder dry in this sense. I came
 17 to deal with the case as pleaded, because there are
 18 pleadings on behalf of the Secretary of State, and to
 19 deal with the evidence that he adduced. I did not
 20 expect to come here to deal with the late rerunning of
 21 a case that he had been told in terms by the
 22 Upper Tribunal that he could not run. That I do on
 23 behalf of my clients fundamentally object to and it
 24 permeates the whole of his submissions. You'll see it
 25 when we get to his submissions time and time again.

Page 44

<p>1 He's ignored completely the whole process in front of 2 the Upper Tribunal. 3 So you are left with this position. You have at 4 considerable length, with great care, a document 5 produced by my team. I don't claim authorship of it but 6 those around me took a great deal of care to set out the 7 possibilities, or certainties as we say they are, in 8 every single area we are concerned with -- factual, 9 where each individual went, what they were doing on the 10 Island, what they might have been doing, what level of 11 radiation they might have been exposed to -- that's been 12 dealt with in evidence -- and also what the impact is of 13 theories such as this study. 14 Let me give you another example. 15 Before the First Tier Tribunal there was evidence 16 from Professor Mothersill. I took Dr Haylock to it. 17 MR JUSTICE BLAKE: Yes, I noted her evidence. 18 MR TER HAAR: That evidence is referred to in 19 Mr Justice Foskett's decision and the Secretary of State 20 is there recorded as making criticisms of that science 21 as being her theories. 22 Before the last Tribunal there was criticism of 23 Dr Mothersill by the Secretary of State in 24 cross-examination. 25 MR JUSTICE BLAKE: Yes.</p> <p style="text-align: center;">Page 45</p>	<p>1 raised by the Secretary of State. 2 MR JUSTICE BLAKE: Listening as I've done to the approach 3 that you've taken in this case it became apparent to me 4 in the course of last week that that was evidence of 5 some very considerable importance. So I've looked at 6 it. I've looked at it. 7 What do you suggest, having looked at it, we do? 8 Supposing off our own analysis we think that it's not 9 credible, what do we do? If we think that it is, I well 10 understand what the implications are. But are you 11 saying it's unfair for us to do this now? 12 MR TER HAAR: Certainly I'd say it's unfair for the 13 Secretary of State to ask you to do this, and I also say 14 that it's -- 15 MR JUSTICE BLAKE: It sounds like you are telling us in more 16 than one way that this is a weighing-up exercise which 17 is simply seeing what's there rather than what it 18 actually means. 19 MR TER HAAR: No, absolutely not. Of course you have to 20 look at what it means, but the Tribunal has been 21 directed by the Upper Tribunal to take into account 22 evidence unless it is fanciful. 23 MR JUSTICE BLAKE: Yes. 24 MR TER HAAR: Here what is being put forward is partly 25 an attack on Professor Mothersill's credibility.</p> <p style="text-align: center;">Page 47</p>
<p>1 MR TER HAAR: In this Tribunal the first time the 2 Secretary of State has suggested that her evidence 3 should be totally rejected was in the written 4 submissions delivered last night. That's the first time 5 he's gone to one of the most crucial witnesses and said, 6 "You should totally reject it." 7 MR JUSTICE BLAKE: Yes. 8 MR TER HAAR: That is not compliance with the orders of this 9 Tribunal, through my Lord, or Mr Justice Charles, nor 10 I apprehend is it what you expected in giving 11 directions. You expected that when we walked into this 12 Tribunal, I assume, that we would know that the 13 Secretary of State was saying: this expert is so out of 14 her area that it's not credible. 15 It is quite wrong for a Government, with 16 a responsibility for giving war pensions to deserving 17 pensioners, to keep their cards up their sleeve and then 18 to launch, as you'll see when you get to his 19 submissions, a really fierce attack on the whole 20 credibility of a scientist. 21 MR JUSTICE BLAKE: Yes. Let's take this problem. As it 22 happens in my further reading I haven't got to the 23 cross-examination of Professor Mothersill. That's 24 a delight in store if it's relevant. 25 MR TER HAAR: It's certainly relevant now because it's been</p> <p style="text-align: center;">Page 46</p>	<p>1 MR JUSTICE BLAKE: Yes. 2 MR TER HAAR: You are, with the greatest of respect, not in 3 a position to do that because you haven't seen her and 4 heard her evidence but particularly you should not be 5 doing so where no prior notice of such an attack has 6 been given in accordance with the directions of this 7 court. 8 MR JUSTICE BLAKE: It was your decision not to call these 9 people. 10 MR TER HAAR: Well, we make that decision partly -- 11 MR JUSTICE BLAKE: Not in response to a decision in May 12 because that was closed by then. That's why the 13 chronology is important. I'd understood that everyone 14 was going to go on the basis that the witnesses who had 15 given evidence before, we would receive the transcript, 16 we would have the benefit of that, and whatever thing we 17 have to do we would be entitled to take into account 18 what the end product of that evidence was by the time it 19 was cross-examined. 20 MR TER HAAR: But there are different approaches for 21 different parts of the evidence. If what is being done 22 is to launch an attack on credibility we would certainly 23 have considered what the practical steps might be to 24 enable that to be answered. Would we have asked for 25 leave to call her? Would we --</p> <p style="text-align: center;">Page 48</p>

<p>1 MR JUSTICE BLAKE: When?</p> <p>2 MR TER HAAR: Well, when that attack had been put forward.</p> <p>3 It should have been put forward -- when the matter came</p> <p>4 before my Lord and you gave the directions, the</p> <p>5 Secretary of State was already in breach of the order of</p> <p>6 Mr Justice Charles. He hadn't responded. He came and</p> <p>7 said "I don't wish to respond because we've got a better</p> <p>8 idea, which is we are going to go away and get expert</p> <p>9 evidence". But by then at the latest he should have</p> <p>10 declared an attack. He should in front of you have</p> <p>11 said: "These are the issues. I am going to be attacking</p> <p>12 the credibility of an accredited professor and</p> <p>13 specialist." You need to know that, my Lord, so that</p> <p>14 you can decide what the right directions are. I should</p> <p>15 have known it so I could say what the right directions</p> <p>16 were.</p> <p>17 That's why I say it's quite wrong for a Government</p> <p>18 body to keep its cards up its sleeve in this way and</p> <p>19 then come back at the end of the hearing, not even</p> <p>20 during the hearing, not even raising the question</p> <p>21 through the permission of the Tribunal with one of his</p> <p>22 experts, simply not to mention it.</p> <p>23 MR JUSTICE BLAKE: You are, as always, several streets ahead</p> <p>24 of me personally. I don't speak for my colleagues who</p> <p>25 I know their reading has been different to mine.</p> <p style="text-align: center;">Page 49</p>	<p>1 to your helpful scenario, we had what we may call the</p> <p>2 Foskett PI litigation; we all know that was balance of</p> <p>3 probabilities. (2) we then have the War Pensions claim</p> <p>4 and at least we know -- I think we knew, because the</p> <p>5 legislative instrument directs the Tribunal to ask</p> <p>6 a different question, "reasonable doubt based upon</p> <p>7 reliable evidence", to put a phrase.</p> <p>8 I appreciate that there was a flaw in the Tribunal's</p> <p>9 approach because too much was eventually considered to</p> <p>10 have been tainted by "I prefer this, I prefer that,</p> <p>11 therefore I don't have a reasonable doubt approach".</p> <p>12 And that is the approach which, you are absolutely</p> <p>13 right, is wrong and we would be very careful not to do</p> <p>14 so.</p> <p>15 But if in the course of the War Pension one, a root</p> <p>16 and branch attack was made upon a hypothesis of</p> <p>17 an expert, aren't we required to examine that?</p> <p>18 MR TER HAAR: It depends -- there are two different areas of</p> <p>19 attack.</p> <p>20 MR JUSTICE BLAKE: In some respects, of course, your</p> <p>21 submissions, if they are right in law, reduce the kind</p> <p>22 of formidable task that lies ahead of us.</p> <p>23 MR TER HAAR: There are two different points which need to</p> <p>24 be taken into account. One is an attack based upon her</p> <p>25 credibility, which effectively is saying the way in</p> <p style="text-align: center;">Page 51</p>
<p>1 So you will have known what we may be hearing from</p> <p>2 Mr Heppinstall during the course of this week and you'll</p> <p>3 also know what was the case that was put to this witness</p> <p>4 for example in 2013. Two blanks as far as I'm concerned</p> <p>5 at the moment. Although perhaps a little trailer as</p> <p>6 to --</p> <p>7 MR TER HAAR: Certainly the second, Mr Heppinstall's</p> <p>8 submissions take you to the cross-examination.</p> <p>9 MR JUSTICE BLAKE: Yes, right.</p> <p>10 I suppose I was going to ask two questions, but only</p> <p>11 in order to understand the process rather than</p> <p>12 understand the details. Has Mr Heppinstall gone further</p> <p>13 in 2016, June 2016, than he went or whoever was acting</p> <p>14 on behalf of the Secretary of State in the</p> <p>15 cross-examination of Professor Mothersill? Secondly, if</p> <p>16 no, and therefore a challenge, a root and branch</p> <p>17 challenge was put then, and is put now, is that --</p> <p>18 well --</p> <p>19 MR TER HAAR: The answer is certainly I am not going to say</p> <p>20 there was not a challenge to her evidence before, but</p> <p>21 that's in a different context because the challenge then</p> <p>22 was on every level this is to do with the balance of</p> <p>23 probabilities, can you -- you have to --</p> <p>24 MR JUSTICE BLAKE: Well, I didn't think -- I mean,</p> <p>25 I appreciate this is a difficult area, but in going back</p> <p style="text-align: center;">Page 50</p>	<p>1 which she gave evidence was wrong, she went too far in</p> <p>2 this respect.</p> <p>3 MR JUSTICE BLAKE: Misusing scientific data. She is</p> <p>4 misusing models, she is misusing the studies of X and Y,</p> <p>5 she's doing something wrong. I mean, I'm not saying</p> <p>6 that's -- because I haven't looked at it --</p> <p>7 MR TER HAAR: Those are the accusations.</p> <p>8 MR JUSTICE BLAKE: Right, okay. I don't want to personalise</p> <p>9 it to any witness. I am using this exchange, if I may,</p> <p>10 simply to ask for your assistance as to the general</p> <p>11 approach.</p> <p>12 MR TER HAAR: Absolutely. It is helpful to do so. There</p> <p>13 are two attacks. One is she used methods which are</p> <p>14 questionable, her evidence went too far, therefore you</p> <p>15 should reject her evidence completely on the basis she's</p> <p>16 not a credible witness.</p> <p>17 MR JUSTICE BLAKE: Right, yes. On the issues that she's</p> <p>18 giving evidence about.</p> <p>19 MR TER HAAR: Yes.</p> <p>20 There's a second question, a second attack, which is</p> <p>21 on the evidence that she gave it is not scientifically</p> <p>22 credible. Now that's a different issue. It's possible</p> <p>23 even for people who come across as being unreliable in</p> <p>24 some parts of their evidence still being correct in</p> <p>25 other parts of their evidence. What is attempted by the</p> <p style="text-align: center;">Page 52</p>

1 Secretary of State, not only in relation to her but in
 2 relation to other witnesses, is to say: just rule it out
 3 completely on an ad hominem or feminem --
 4 MR JUSTICE BLAKE: Do you unpack your two roots in this
 5 written document?
 6 MR TER HAAR: No, because I hadn't seen this attack.
 7 MR JUSTICE BLAKE: Okay. It's not a complaint, it's
 8 an enquiry. If not, could you just do that again?
 9 Because I'd better take a note.
 10 MR TER HAAR: Yes, I'm sorry. What I say is you can
 11 distinguish two different attacks. One is ad feminem,
 12 as I say, the equivalent of ad hominem, ie an attack
 13 upon the person.
 14 MR JUSTICE BLAKE: We can keep our expert gender neutral.
 15 This for my purposes at least --
 16 MR TER HAAR: It's a general principle.
 17 MR JUSTICE BLAKE: -- is a general principle that I am
 18 exploring rather than whether X or Y is dead in the
 19 water before we get going.
 20 MR TER HAAR: There is an attack in her case on her
 21 credibility on the basis that she gave evidence in a way
 22 that makes her partisan.
 23 There's a second attack which is that when you look
 24 at her theories they are not scientifically credible.
 25 The two points raise different problems for this

Page 53

1 Tribunal.
 2 As to the credibility, you are not in a position of
 3 seeing how those questions were asked in
 4 cross-examination, what her body language was, whether
 5 it was under pressure from aggressive questioning or
 6 subtle gentle questioning, whether it was a matter of
 7 scientific bullying or scientific inquiry. And we say
 8 you should not accept attacks on somebody's credibility
 9 in this Tribunal without certainly proper notice having
 10 been given because you are being asked to write a public
 11 judgment about somebody's scientific qualifications,
 12 scientific -- not qualifications -- credibility, which
 13 is slightly different from qualifications, about
 14 a witness who you have not seen and about which no
 15 notice has been given. That would be a fundamentally
 16 unfair process.
 17 It's a separate matter where there's an attack on
 18 the scientific credibility of her theory. That's
 19 different from her personal credibility.
 20 MR JUSTICE BLAKE: So personal credibility and scientific
 21 credibility.
 22 MR TER HAAR: Yes, there are two different aspects.
 23 MR JUSTICE BLAKE: Right. Again, I don't want to
 24 personalise this to any of the witnesses because that
 25 would be wrong, premature, ill-founded, et cetera. But

Page 54

1 isn't there a nexus between if the scientific theory is
 2 so seriously faulty upon analysis -- I am only putting
 3 this as a hypothesis to see how we go -- but the person
 4 nevertheless sticks to it in the witness box, and we
 5 have a record of it, does one move into the other?
 6 MR TER HAAR: It's important which way you're moving.
 7 MR JUSTICE BLAKE: At the moment, I mean I've got those two
 8 points down and I'll review the transcript to make sure
 9 I've got them accurately and any subtleties that you've
 10 built in --
 11 MR TER HAAR: It is important which way you're moving.
 12 MR JUSTICE BLAKE: Well, moving from scientific credibility
 13 to personal credibility.
 14 MR TER HAAR: Can I first of all deal with it the other way
 15 round? What the Secretary of State wants you to do is
 16 start with personal credibility and cut out the witness
 17 on that basis, so you don't get to scientific
 18 credibility.
 19 MR JUSTICE BLAKE: I see. I can see if that is the journey
 20 which we're invited to make, I can see some --
 21 MR TER HAAR: Now the other way --
 22 MR JUSTICE BLAKE: I'm receptive at least in principle to
 23 that trajectory.
 24 MR TER HAAR: Let me put it the other way round, which
 25 my Lord is asking me about.

Page 55

1 MR JUSTICE BLAKE: Yes.
 2 MR TER HAAR: If you start with scientific credibility and
 3 you come to the conclusion on -- you would have to have
 4 a rational basis to do so, i.e. other evidence --
 5 MR JUSTICE BLAKE: Oh quite. Yes, yes.
 6 MR TER HAAR: If you come to the conclusion that there is no
 7 scientific credibility at all, then actually the
 8 question of personal credibility is academic, but I can
 9 see you could then say "It leads me to doubt her
 10 credibility".
 11 MR JUSTICE BLAKE: Right. So if I make a note saying: route
 12 2, science first, if the analysis is that it doesn't
 13 have scientific credibility, that is still a task that
 14 we can legitimately be engaged upon. But you can't do
 15 the reverse which is to say --
 16 MR TER HAAR: It's the right way of putting it. You can
 17 legitimately engage with it, subject to all the caveats
 18 about how you deal with expert witnesses in this
 19 jurisdiction. But yes, you can go from that direction.
 20 That's why it becomes important, and taking her as
 21 a practical example, when you look at her evidence you
 22 remember there's the old paradigm and the new paradigm
 23 and there's a history.
 24 MR JUSTICE BLAKE: Yes.
 25 MR TER HAAR: First of all, do you accept her description,

Page 56

<p>1 whether you use the expression "old paradigm", do you 2 accept her description of, if you like, the consensus 3 theory to be correctly stated? Actually, so far as 4 that's concerned nobody has actually doubted that as 5 a correct statement of the consensus theory. 6 She then deals with a historical review of papers, 7 and I may be corrected by Mr Heppinstall, but I do not 8 believe there is any attack upon the historical review 9 which she carries out as to what has been going on by 10 way of people producing reports and papers in that area. 11 MR JUSTICE BLAKE: Mm-hm. 12 MR TER HAAR: So, so far I say you would not reject her 13 evidence of how history has been moving in the area of 14 cell research and microbiology simply because of 15 a personal attack upon her credibility. That would be 16 wrong. 17 She then comes, if you remember, to four 18 conclusions. And in my submission what you should do is 19 test each conclusion to see whether or not it is 20 established by the scientific evidence, ie the papers, 21 on which she relies to get to the proposition. 22 MR JUSTICE BLAKE: Right. 23 MR TER HAAR: Now it would be perfectly rational for this 24 Tribunal first of all to say "She purports to reach 25 conclusion 1 or 2 or 3 on the basis of these papers.</p> <p style="text-align: center;">Page 57</p>	<p>1 one knew about or one thought was solid, it may be best 2 to take this jurisdiction and its antithetical test at 3 face value and seek to apply the straight line. 4 MR TER HAAR: Going back to ... 5 As you go through the report you may say, "Okay, 6 I've accepted the historical survey." You may have 7 sufficient knowledge and the Tribunal would say "There 8 are some other papers I would have put into the mix but 9 I accept there's a credible basis for where she's gone." 10 Then you may say she then reaches conclusions based 11 on that, you know, because she then moves on to what she 12 calls the new paradigm, and you might say "I don't 13 accept as correct the new paradigm." 14 MR JUSTICE BLAKE: Yes. 15 MR TER HAAR: "But I can see how she's got there and I can 16 see that some people could hold that view." That's 17 where you get into really unusual territory for 18 a scientist or a lawyer. 19 MR JUSTICE BLAKE: Yes. 20 MR TER HAAR: That's why in my submission it's so important 21 to distinguish the process of not if you like throwing 22 out the baby with the bath water but making sure you 23 understand what there is in the bath water. 24 The same process, although he's not one of my 25 witnesses, reading the Secretary of State's submissions</p> <p style="text-align: center;">Page 59</p>
<p>1 We've gone through the papers, we cannot find support 2 for that theory." That would be a rational approach and 3 you would be entitled to do that. But you might come to 4 the conclusion: "I've been through that and if I were 5 the scientist making the decision I would actually 6 prefer and rely upon the consensus that I can see that 7 there is a credible body which may be a minority view 8 but is taking a different viewpoint." 9 Now, that's where in the traditional civil 10 litigation you would almost certainly say: "I go with 11 majority, I go with the consensus." 12 MR JUSTICE BLAKE: A Bolam approach. 13 MR TER HAAR: Sort of, yes. 14 MR JUSTICE BLAKE: We can leave all that behind. It is 15 probably best if I clear my head personally. 16 MR TER HAAR: I'm not sure, because actually the Bolam test 17 is useful in saying: is this a view which at least 18 somebody credible holds? 19 MR JUSTICE BLAKE: Yes, quite. So it's not completely 20 irrelevant. 21 MR TER HAAR: Of course the trouble is then you are starting 22 to get into the -- 23 MR JUSTICE BLAKE: That's the problem. Given the 24 temptations to lure one off the straight and narrow into 25 things that one thinks one knows about or one thought</p> <p style="text-align: center;">Page 58</p>	<p>1 he puts forward a really fierce attack upon all 2 Professor Busby's witnesses but includes a slightly 3 muted attack upon Professor Sawada, saying he's not 4 a reliable witness. 5 Now it's perfectly possible that this Tribunal would 6 come to the conclusion that Professor Sawada comes to 7 this area obviously with a personal history which none 8 of us would want to have and he has devoted himself to 9 studying in enormous depth the statistical matters 10 relating to Hiroshima and Nagasaki. 11 "I have to take his evidence with a degree of 12 caution because of that, but nevertheless there are 13 points there which he has raised which really do start 14 me thinking. You know, the mortality rate point, for 15 example, or the epilation point. You know, there seems 16 to be something there which requires thought and gives 17 rise to a doubt in my mind. I have to accept that" -- 18 so this thought process of the Tribunal might go -- 19 "Dr Haylock found his epilation theory difficult to 20 follow." He didn't say it was ruled out in court he 21 just said he couldn't -- it raises all sorts of 22 complications. 23 Now the Secretary of State's approach to 24 Professor Sawada, just to illustrate this, although he 25 has had notice of that report for some time, he hasn't</p> <p style="text-align: center;">Page 60</p>

1 chosen to put it to Dr Haylock and say "Look at this
 2 epidemiological evidence, study what he says about
 3 epilation and do an analysis." What he has done is to
 4 say: "Don't touch any of that evidence at all, just
 5 throw it out."
 6 Now --
 7 MR JUSTICE BLAKE: To us or to his expert?
 8 MR TER HAAR: That is what he is saying to you.
 9 MR JUSTICE BLAKE: Well, yes, I understand -- I haven't seen
 10 it but --
 11 MR TER HAAR: Now he had a choice. He could grapple with
 12 the theory and show it, if it's possible to show it, to
 13 be fallacious.
 14 MR JUSTICE BLAKE: Yes. I think there are other problems
 15 about Professor Sawada's evidence but nevertheless
 16 I recognise the difference but probably since that's --
 17 we'll probably hear from Mr Busby on this topic.
 18 MR TER HAAR: And you'll certainly hear from Mr Heppinstall.
 19 MR JUSTICE BLAKE: Yes.
 20 MR TER HAAR: So can I -- it's been a rather lengthy --
 21 MR JUSTICE BLAKE: I'm sorry to have in a sense taken you
 22 out of your course but for my purpose this exchange at
 23 a hypothetical level is helpful.
 24 MR TER HAAR: You haven't taken me out of my course at all
 25 in this sense: what I started was a preamble to going to

Page 61

1 the Upper Tribunal's decision and in a sense I am going
 2 to be coming to those sorts of issues as I go through
 3 the Upper Tribunal's decision because what we have done
 4 is to have --
 5 MR JUSTICE BLAKE: Yes. I have just realised, as
 6 fascinating as having the exchange with you,
 7 Mr ter Haar, that I should be looking after other
 8 people.
 9 MR TER HAAR: I sometimes speak quickly ...
 10 What I say is I find it helpful to have this
 11 discussion because it's actually a preamble to taking
 12 you to the Upper Tribunal's decision because we've gone
 13 through this hearing in -- and just going back to the
 14 procedural history, as I say, we set out what we say is
 15 exactly what was needed following the Upper Tribunal
 16 decision. The Secretary of State had an option. He
 17 could have engaged in that in that way. What he has
 18 chosen to do instead is to say: "I can sidestep all of
 19 that, I am going to put in Mr Hallard to establish
 20 a dose. That dose is then taken to be absolutely
 21 correct as a maximum. Then I go to Professor Thomas who
 22 says: if that dose is correct I can tell you this might
 23 be attributable and this might not. Then I go to
 24 Dr Haylock to work out the statistical probabilities of
 25 it being connected."

Page 62

1 That process actually doesn't address the
 2 Upper Tribunal test at all because take, for example,
 3 Professor Thomas. I'm not blaming her because she took
 4 her instructions from the Secretary of State. She was
 5 not asked to say: "Are there any alternative theories
 6 which have credibility? Is my view the only view or
 7 could other people disagree?" She was asked simply to
 8 set out what her own view was.
 9 Similarly, Dr Haylock was not asked to set out
 10 a range of views which might be held by reasonable
 11 scientists. He was asked to set out what his view was.
 12 So the Secretary of State has quite deliberately
 13 gone down a path in which it ignores exactly what was
 14 originally ordered by Mr Justice Charles to do and which
 15 was the expectation I apprehend of this Tribunal when
 16 directions were given for expert evidence.
 17 If the end result is that he does not have evidence
 18 in relation to the test as set out by the
 19 Upper Tribunal, that is as a result of his deliberate
 20 decision not to address it.
 21 So, for example, I took you to that extract from
 22 Professor Kaldor. He has chosen not to go back to the
 23 reports, for example, of Professor Kaldor and see
 24 whether Professor Kaldor on reasonable doubt rather than
 25 a balance of probabilities test would have something

Page 63

1 further to say.
 2 You'll see it permeates everything that's happened
 3 in his approach to this case.
 4 When I said at the close of business last Thursday
 5 that I was worried that -- I'm not sure of the exact
 6 words I used but words to the effect of ships passing in
 7 the night, and indeed my Lord said you were also worried
 8 about that, it's exactly what I had in mind.
 9 I could see by the way the Secretary of State has
 10 conducted this hearing that he had made a deliberate
 11 decision not to engage with what the Upper Tribunal had
 12 said should be engaged in.
 13 Mr Heppinstall will doubtless characterise the
 14 Upper Tribunal's decision in a different way from me.
 15 So could I now take you to the Upper Tribunal decision
 16 in order to show you what certainly we say is the right
 17 approach.
 18 MR JUSTICE BLAKE: Right. Can we put --
 19 MR TER HAAR: Yes, that can go away.
 20 MR JUSTICE BLAKE: Yes.
 21 MR TER HAAR: For some time, I'm afraid, we are simply in
 22 bundle SB1.
 23 MR JUSTICE BLAKE: Right.
 24 MR TER HAAR: The Upper Tribunal decision is to be found at
 25 tab 1.10.

Page 64

<p>1 MR JUSTICE BLAKE: Yes.</p> <p>2 MR TER HAAR: Could I take up the citation at page 19,</p> <p>3 paragraph 58.</p> <p>4 MR JUSTICE BLAKE: Yes.</p> <p>5 MR TER HAAR: This is a section cross headed "The</p> <p>6 authorities on the article 41(5) test".</p> <p>7 MR JUSTICE BLAKE: Yes.</p> <p>8 MR TER HAAR: Your Lordship asked me when you are going to</p> <p>9 need the authorities bundle. Insofar as I refer to</p> <p>10 other authorities, all the extracts are helpfully to be</p> <p>11 found in this judgment.</p> <p>12 MR JUSTICE BLAKE: So he has done the legal archaeology for</p> <p>13 us, has he?</p> <p>14 MR TER HAAR: Yes. All these decisions, all these cases,</p> <p>15 are I think to be found in the archive, if necessary.</p> <p>16 We can obviously provide you with further copies. But</p> <p>17 for the moment I'm assuming it's accepted that the</p> <p>18 summary is accurate.</p> <p>19 MR JUSTICE BLAKE: Yes. I think Mr Justice Newman is --</p> <p>20 left his learning on this topic.</p> <p>21 MR TER HAAR: We'll get to him along the way. Can I first</p> <p>22 of all take you to page 20, paragraph 60. Here</p> <p>23 Mr Justice Charles is dealing with previous decisions,</p> <p>24 and he refers to a decision of Lord Justice Black in the</p> <p>25 case of Minister of Pensions v Greer. If you look at</p> <p style="text-align: center;">Page 65</p>	<p>1 there is a strong preponderance of probability that the</p> <p>2 entitlement of the conditions are not satisfied."</p> <p>3 Strong stuff, I submit.</p> <p>4 MR JUSTICE BLAKE: And I understand, abstractly, that must</p> <p>5 follow, because reasonable doubt is not the same as a</p> <p>6 strong preponderance of probability.</p> <p>7 MR TER HAAR: Yes.</p> <p>8 MR JUSTICE BLAKE: It's actually applying it that of course</p> <p>9 is the interesting challenge.</p> <p>10 MR TER HAAR: Can I go on in similar mode to page 23, the</p> <p>11 top of the page, paragraph 66. This is Mr Justice Drake</p> <p>12 in the case of Hunt, again the underlined passage:</p> <p>13 "I fully accept that the evidence to support the</p> <p>14 appellant's case is far from strong. However, having</p> <p>15 considered it with very great care, I do not think it is</p> <p>16 possible to say that any tribunal, properly directing</p> <p>17 itself on this evidence, could find beyond reasonable</p> <p>18 doubt that there was no causative connection between</p> <p>19 Mr Hunt's war service and the addiction to smoking which</p> <p>20 led to his death."</p> <p>21 It's a case where he said, "Life in the forces was</p> <p>22 so tough I took up smoking", and --</p> <p>23 MR JUSTICE BLAKE: We won't talk about the First World War</p> <p>24 when I would have thought that the opposite proposition</p> <p>25 was -- yes.</p> <p style="text-align: center;">Page 67</p>
<p>1 the bottom of the page you'll see that</p> <p>2 Mr Justice Charles underlines this passage right at the</p> <p>3 bottom of the page:</p> <p>4 "But I see nothing inconsistent in holding that</p> <p>5 notwithstanding the existence of a definite</p> <p>6 preponderance of probability or even a strong</p> <p>7 preponderance of probability there may also exist</p> <p>8 a reasonable doubt in the meaning of paragraph (4) of</p> <p>9 article 5 of the Royal Warrant, and if there is reliable</p> <p>10 evidence which could give rise to such a doubt the</p> <p>11 decision as to whether, having heard and weighed all the</p> <p>12 evidence and arguments, the tribunal should or should</p> <p>13 not think it proper to come to the conclusion that such</p> <p>14 a doubt exists is a matter essentially for the tribunal</p> <p>15 itself and not for this court."</p> <p>16 It goes on, Mr Justice Charles comments:</p> <p>17 "These are the passages in Greer that are cited by</p> <p>18 the FTT ... in their decision. On a proper reading,</p> <p>19 they show a clear and firm rejection of the argument</p> <p>20 that a 'reasonable doubt' will not be established if</p> <p>21 there is a preponderance of probability in favour of the</p> <p>22 conclusion that conditions in article 41(1) are not</p> <p>23 satisfied. It follows that on a proper reading, they</p> <p>24 establish that for the purposes of article 41(5)</p> <p>25 a reasonable doubt can exist even when, on the evidence,</p> <p style="text-align: center;">Page 66</p>	<p>1 MR TER HAAR: "In my judgment the evidence does raise a</p> <p>2 reasonable doubt in the appellant's favour."</p> <p>3 Again, you might think that's really quite -- if you</p> <p>4 come to look at it from the civil litigation, it's quite</p> <p>5 extraordinary, if you view it through that prism, but</p> <p>6 not under this legislation.</p> <p>7 MR JUSTICE BLAKE: Yes.</p> <p>8 MR TER HAAR: Busmer v Secretary of State for Defence in the</p> <p>9 decision of Mr Justice Newman to which my Lord referred</p> <p>10 to a moment ago, was a case of a condition said to be</p> <p>11 attributable to service on Christmas Island. So we're</p> <p>12 getting closer to our own --</p> <p>13 MR JUSTICE BLAKE: Just as a curiosity, do we have this</p> <p>14 decision somewhere in the materials? Or everyone thinks</p> <p>15 it's irrelevant?</p> <p>16 MR TER HAAR: It's certainly in the archive.</p> <p>17 MR JUSTICE BLAKE: It's not in your recent --</p> <p>18 MR TER HAAR: Mr Sage will just check.</p> <p>19 MR HEPPINSTALL: It's in the --</p> <p>20 MR TER HAAR: Yes, it's in the archive, but not in the SB</p> <p>21 bundles.</p> <p>22 MR JUSTICE BLAKE: Just in case my appetite for knowledge is</p> <p>23 not exhausted by all that I'm about to receive.</p> <p>24 MR TER HAAR: Authorities bundle 1, tab 14.</p> <p>25 MR JUSTICE BLAKE: Do we know what -- the archive will be</p> <p style="text-align: center;">Page 68</p>

<p>1 able to direct us to authorities. 2 MR TER HAAR: Series K, I'm told. 3 MR JUSTICE BLAKE: Thank you very much. Just in case. 4 MR TER HAAR: Again, looking at the underlying passages at 5 page 24, paragraph 24: 6 "Further, the PAT [that's the Pensions Appeal 7 Tribunal] do not appear to have approached this part of 8 the case by asking whether the evidence raised 9 a reasonable doubt. It dismissed its significance 10 because 'there is no evidence of the amount of any 11 contact by the appellant with those areas of the Island 12 affected whether temporarily or on a long-term basis by 13 those measured amounts of radioactivity'. Thus it 14 appears to have concluded that the cases for exposure to 15 radiation from 'dispersion radiation' depended upon the 16 validity of a reading which supported its existence and 17 further evidence that the appellant had been in the 18 vicinity of the recorded fallout. But this was not the 19 appellant's case. If this is the approach which was 20 adopted, it amounted to a rejection of the appellant's 21 case which relied upon other facts with the inference 22 that fallout had occurred. His case was that his 23 activities on the Island exposure to possible sources of 24 contamination by various means raised a reasonable doubt 25 in relation to the contention that he was not exposed to</p> <p style="text-align: center;">Page 69</p>	<p>1 obtained jurisdiction on appeal, the President of the 2 PAT would state a case to the -- well, it was the single 3 judge of the Crown Office. 4 MR JUSTICE BLAKE: Of the Crown Office. 5 MR HEPPINSTALL: Yes. 6 MR JUSTICE BLAKE: So that would be a Judicial Review test. 7 It will be a case stated test. Appeal by way of case 8 stated on a point of law. 9 MR HEPPINSTALL: Indeed, on the law only. 10 MR JUSTICE BLAKE: On the law only, I mean, yes. 11 MR TER HAAR: Then the next paragraph of Mr Justice Charles 12 says: 13 "I now turn to consider two cases that were not 14 before the FTT, namely Westcott ... and Roche." 15 He -- I am missing the next page -- and in Westcott, 16 at the bottom of the page, you'll see a passage 17 underlined there: 18 "It's the duty of the nominated judge to see whether 19 there was any material on which the tribunal could 20 properly reach the decision it did, and for the reasons 21 I have given I find in this case that the tribunal erred 22 in that they had no material on which they could reject 23 this claim as one in which there was no reasonable doubt 24 raised in favour of the claimant. I think they fell 25 into an understandable trap here and relied almost</p> <p style="text-align: center;">Page 71</p>
<p>1 any radiation whilst on the Island. Or put another way, 2 that all the evidence of reasonable doubt had been 3 raised. 4 "It may be open to the PAT to conclude that this 5 evidence raised no reasonable doubt, but I am bound to 6 say that in placing weight on the 'absence of evidence 7 of any contact by the appellant' there is a risk that 8 the PAT was looking to be 'convinced' by the evidence 9 rather than simply asking whether there was a reasonable 10 doubt raised by the evidence which was before it..." 11 Then Mr Justice Charles commented: 12 "Perhaps unsurprisingly this case has close overlaps 13 with the issues which arise in these appeals concerning 14 exposure to radiation, measurements and hotspots. In it 15 Mr Justice Newman J allowed the appeal and remitted the 16 case to a differently constituted tribunal to consider 17 on all the evidence whether reasonable doubt had been 18 raised. I am allowing these appeals on very similar 19 grounds." 20 MR JUSTICE BLAKE: I don't want to take you out of your 21 course, but I think there's a reference to "case stated" 22 in that passage, is there? Was that the jurisdiction 23 that was before Mr Justice Newman? "Case stated", 24 paragraph 23, last sentence. 25 MR HEPPINSTALL: Before the Social Security Commissioners</p> <p style="text-align: center;">Page 70</p>	<p>1 exclusively upon the medical division's report without 2 realising that that report itself did not reject the 3 appellant's claim on the basis there was no reasonable 4 doubt in favour of the claimant at all." 5 Over the page: 6 "As I have indicated, the evidence in this case, on 7 the balance of probabilities, points against the 8 appellant's claim. It may be that many would therefore 9 consider this appellant to be fortunate to be entitled 10 to a pension in all the circumstances of this case. But 11 it's not a case of being sympathetic and saying that he 12 is fortunate: he is entitled on the law as it stands, 13 which does weigh matters heavily his favour." 14 Now, what we see again and again in all these 15 decisions is the tribunals falling into the error of 16 deciding matters on a reasonable probability basis. 17 Very easy to do so. 18 In Roche, which is the next paragraph, here there 19 was a question about how to approach expert evidence. 20 If we go right to the bottom of the page, paragraph 56: 21 "First, the generalised evidence contained in the 22 various studies and reports, which the Tribunal 23 expressly did not reject as unreliable, lend some 24 support, at least potentially, to Mr Roche's case, at 25 least with regard to mustard gas; and at all events</p> <p style="text-align: center;">Page 72</p>

<p>1 those reports were not inconsistent with Mr Roche's 2 case. 3 "Secondly, there are various references in the 4 decision of the Pensions Appeals Tribunal itself which 5 perhaps indicate that on occasions the Tribunal may have 6 been engaging in a balancing exercise. For example, it 7 refers to the 'significant probative weight' which is 8 attached to Professor Hay's report. It said that it 9 'preferred' that evidence to other evidence. It said, 10 by way of example, that the 'compelling weight' of the 11 evidence was that Mr Roche had not receive dosages 12 likely to have long term effects. It had referred to 13 the evidence of Professor Hay to the effect that he 14 deemed it 'unlikely' that mustard gas was a cause. 15 These points perhaps would not in themselves suffice to 16 invalidate the decision of the Tribunal. But they do 17 seem to me to lend at least some further support for the 18 view that, quite simply, the wrong answer may have been 19 reached given the approach that needed to be applied 20 under article 5(4). In that regard I would reiterate 21 the point raised by reference to paragraph 5 of the 22 conclusions: if the recording of the evidence was that 23 the mustard gas was 'unlikely' to be a cause then that 24 would seem to give rise to an acceptance that there was 25 a possibility that it was the cause."</p> <p style="text-align: center;">Page 73</p>	<p>1 consequence was that he wasn't saying it could not be, 2 he wasn't saying there is no evidence for a connection 3 whatever -- 4 MR JUSTICE BLAKE: Well, any scientist who says "never" is 5 usually -- 6 MR TER HAAR: No, you can get it, because you can get 7 a situation where you can say there never has been any 8 statistical evidence whatsoever to show any connection 9 ever ever ever. That's not his position. His position 10 is that it's unlikely, maybe even stronger than 11 unlikely, he didn't use that language, but he's not 12 saying it's not possible. That's why the 13 Secretary of State is in a difficult position., 14 MR JUSTICE BLAKE: There has to be a reasonable possibility. 15 The doubt has to be reasonable. There's got to be some 16 test here. 17 MR TER HAAR: No, but the test is very simple -- 18 MR JUSTICE BLAKE: Reasonable doubt -- 19 MR TER HAAR: -- if it's possible you cannot rule it out. 20 MR JUSTICE BLAKE: Is that your submission? If it's 21 possible then it's reasonable doubt? 22 MR TER HAAR: Yes. 23 MR JUSTICE BLAKE: Not reasonable possibility. Not 24 a fanciful possibility, a hypothetical possibility, 25 a possibility flying in the face of all human knowledge</p> <p style="text-align: center;">Page 75</p>
<p>1 Stopping there, there's an echo of that in 2 Dr Haylock's evidence, because he accepted from me that 3 the converse of his saying 99.9 per cent chance that 4 various conditions were not caused by radiation, that he 5 has accepted that it's obvious that that left a chance 6 that it was caused by radiation. 7 MR JUSTICE BLAKE: Is reasonable doubt a statistical matter? 8 MR TER HAAR: No. But logically, it's exactly the point 9 raised here, if the epidemiology points to a possibility 10 that it was so caused, then the fact that you may regard 11 it as unlikely is not sufficient. 12 MR JUSTICE BLAKE: Yes. Unlikely is not sufficient. I have 13 that, and it will be written on the top of my forehead 14 as we plunge into all this. But one still needs to see 15 whether the evidence is credible in a scientific 16 concept, not in a personal, and that it hangs together 17 to create such a doubt. 18 MR TER HAAR: Well, let me just stop the citation and deal 19 with that. 20 If the evidence put forward by the 21 Secretary of State gives rise to there being 22 a possibility it cannot be said not to be credible, it 23 cannot be said by the Secretary of State not to be 24 credible. We can go to the transcript to see the 25 acceptance by Dr Haylock, but he did accept that the</p> <p style="text-align: center;">Page 74</p>	<p>1 to date? 2 MR TER HAAR: At the moment I am specifically on Dr Haylock. 3 He did not say it's a fanciful -- 4 MR JUSTICE BLAKE: I am sorry, I am taking you back to the 5 test. 6 MR TER HAAR: No, if it's fanciful, i.e. no credible 7 scientist could say there was any possibility, then you 8 haven't got a doubt, or in fact you're in a 100 per cent 9 position, not a 99 -- 10 MR JUSTICE BLAKE: It's not unknown in jurisdictions where 11 reasonable doubt plays a more regular role when one is 12 summing up to a jury, and you get a note, "What does 13 reasonable doubt mean?" One is usually advised not to 14 engage in it, but you just repeat that the doubt has to 15 be reasonable, not fanciful. 16 MR TER HAAR: Yes. 17 MR JUSTICE BLAKE: Does that transpose in reverse? Or any 18 doubt, whatever its nature, is sufficient? 19 MR TER HAAR: It's any doubt so long as the doubt is not 20 fanciful is exactly the same test. 21 MR JUSTICE BLAKE: Therefore it's got to be reasonable. 22 MR TER HAAR: But the test of reasonableness is whether it 23 is fanciful or not. We'll come to see that that's what 24 Mr Justice Charles has held. I mean, the two sides of 25 the coin are if it's fanciful, it's out, if it's not</p> <p style="text-align: center;">Page 76</p>

<p>1 fanciful, it's in. Putting it simply. 2 MR JUSTICE BLAKE: Okay. 3 MR TER HAAR: Going back to the citation, I'd read the 4 bit -- the reference to whether it's unlikely to be 5 a cause: 6 "It may be, as Mr Lewis said, that that particular 7 answer is to be read in the answer previously given in 8 paragraph 3 of the finding of fact. But, again, as it 9 seems to me, there is some doubt as to that; and in any 10 event my fundamental reason for allowing this appeal is 11 that, on the approach adopted by the Pensions Appeal 12 Tribunal ... it simply was not entitled to reach the 13 finding of fact set out." 14 Then: 15 "This case [said Mr Justice Charles] has an overlap 16 with the approach taken and the decision made by Newman 17 J in Busmer. It again emphasises the need to look at 18 the impact of possibilities in light of the reliable 19 evidence taken as a whole and on that approach to 20 determine whether in light of all that evidence 21 a reasonable doubt has been raised. It also provides 22 important guidance to the effect that evidence that is 23 not fanciful or worthless is not to be categorised as 24 unreliable..." 25 That sentence is important, I'll read it again:</p> <p style="text-align: center;">Page 77</p>	<p>1 consideration the weight of evidence in favour of or 2 against a possibility, and so its effect in answering 3 whether a reasonable doubt has been raised. 4 "(iv) a score of 0 is only given to a factor, fact, 5 ingredient or stepping stone if it is based on 6 conclusions about which the decision maker has no 7 reasonable doubt, and so is effectively certain..." 8 MR JUSTICE BLAKE: Just pausing there, and I appreciate I 9 have interrupted you many times, but reading that 10 paragraph and re-reading it, it seems to me that the 11 score of 0 means you don't bring it forward. So that 12 (iv) is referring to what you don't bring forward. 13 MR TER HAAR: I agree. 14 MR JUSTICE BLAKE: But then (iii) is if it fails that test 15 therefore it's in the basket, you bring it forward, but 16 you've still got to exclude from later consideration (?) 17 the weight of the evidence in favour or against the 18 possibility. So bringing it forward is not the end of 19 the evaluation exercise, you've still got to do 20 something else. That's really what I was trying to, not 21 very elegantly, grasp when I said two stages, but two 22 steps, or whatever one wants to call it. 23 MR TER HAAR: Certainly it's described as a building block 24 approach. So you're taking this -- I can reject that. 25 MR JUSTICE BLAKE: Yes.</p> <p style="text-align: center;">Page 79</p>
<p>1 "It also provides important guidance to the effect 2 that evidence that is not fanciful or worthless is not 3 to be categorised as unreliable..." 4 So the test is fanciful or worthless. 5 "... and an approach that makes what are expressed 6 as findings based on a balancing exercise or preferring 7 one expert's evidence to another is incorrect." 8 Then I can move on a little to a section which 9 starts at page 30 headed "The general approach to fact 10 finding and decision making in the application of a 11 statutory test or standard of proof and its application 12 to the article 41(5) test by analogy". 13 After reference to some family law cases 14 Mr Justice Charles says this at page 33, paragraph 87: 15 "So, by analogy the application of his binary 16 approach and the approach to fact finding shown by the 17 cases of the Children Act, to article 41(5) test is 18 that: 19 "(i) possibilities based on evidence that is not 20 fanciful or worthless are carried forward. 21 (ii) neither side takes forward a score of 1 or 0 22 based on the normal civil standard (balance of 23 probabilities). 24 "(iii) the carrying forward of a possibility does 25 not convert it to a fact or exclude from later</p> <p style="text-align: center;">Page 78</p>	<p>1 MR TER HAAR: I put this. Now when I put all those building 2 blocks together. 3 MR JUSTICE BLAKE: What do I get? But it's that last still 4 requires consideration of the weight, but only directed 5 to whether, overall, the doubts exist or doesn't exist. 6 MR TER HAAR: I agree. Eventually you put it all 7 together -- 8 MR JUSTICE BLAKE: I am sorry if I've taken this long to get 9 that proposition. 10 MR TER HAAR: It may be it's my fault in seeing where 11 my Lord was going. 12 Let's go back to a witness that you reject as being 13 wholly incredible. 14 MR JUSTICE BLAKE: Yes. Or their scientific theories. 15 MR TER HAAR: Yes. You don't take that forward. But if you 16 say, going back to this interplay between scientific and 17 personal credibility, you say, "I have real doubts about 18 whether this witness was actually fully independent, but 19 there still seems to me to be something in what he or 20 she was saying", then you would take it forward. You'd 21 weigh it up and when you came to balance it you'd say, 22 "Well, I've taken it forward, but actually now I have 23 some doubts about the strength of the way it was put and 24 I'd weigh it up, everything, actually I've ended up 25 really thinking there is no reasonable doubt here."</p> <p style="text-align: center;">Page 80</p>

<p>1 You're entitled to do that. 2 MR JUSTICE BLAKE: Right. 3 MR TER HAAR: But you don't -- you don't do what you very 4 often do in a civil case, say, "I reject that evidence." 5 It's a different building block process. 6 Can I go back to this. At (v): 7 "A score of 1 is only given to a factor, fact, 8 ingredient or stepping-stone which is one about which 9 the decision maker has no reasonable doubt and so is one 10 about which he is effectively certain (and the fact that 11 a matter is accepted or undisputed may mean it should be 12 so treated), and. 13 "(vi) such possibilities and effective certainties 14 (and the matters on which they are based) are weighed in 15 determining whether the article 41(5) test is 16 satisfied." 17 Now (vi) is where -- and we'll see 91 reflects that 18 as well -- is where there is a question of pleading the 19 possibilities and certainties came in. It was that part 20 of Mr Justice Charles' reasoning which led to the order 21 that my clients should set out what they said were the 22 possibilities and certainties, and that was why the 23 expectation was that the Secretary of State would answer 24 saying what were possibilities and what were 25 possibilities, what were certainties and what were not</p> <p style="text-align: center;">Page 81</p>	<p>1 page: 2 "As was accepted in argument before me, the analysis 3 in paragraphs 72 to 92 above founds the view that it 4 would be wrong in law for a decision maker applying the 5 article 41(5) test to take an approach that: 6 "(i) determined factors, ingredients or stepping 7 stones and thus the matters that could give rise to 8 possibilities relied on to found a reasonable doubt by 9 reference to the normal civil standard, or any standard 10 other than 'reasonable doubt' and so, for example, 11 an approach that rejected evidence that was not fanciful 12 or worthless by preferring other evidence..." 13 Stopping there, in other words, unless the evidence 14 is fanciful or worthless it gets taken into account. 15 (ii): 16 "Carried forward ... those findings or conclusions 17 (on a binary approach or otherwise) to the assessment of 18 whether the claimant has established the existence of 19 reasonable doubt on reliable evidence that the 20 conditions set by article 41(1) are satisfied. 21 "Rather: 22 "(i) the factors, ingredients or stepping stones to 23 found the possibilities relied on, and so the existence 24 of those possibilities, have to be determined by 25 reference to the standard of raising a reasonable doubt</p> <p style="text-align: center;">Page 83</p>
<p>1 certainties. 2 So that's where that part of the history comes from. 3 MR JUSTICE BLAKE: Yes. 4 MR TER HAAR: Then if I can go down a page, paragraph 91: 5 "In my view correctly, it was accepted before me 6 that, as in cases governed by the normal civil standard 7 of proof, an equivalent principled approach based on the 8 evidence is required in the application of the article 9 41(5) test and so the FTT have to (a) identify the 10 ingredients or stepping stones taken into account in 11 their reasoning process as matters about which they have 12 no reasonable doubt and so regard as effective 13 certainties..." 14 That could be on either side of the balance. 15 "... (b) identify the ingredients or stepping stones 16 which they regard as possibilities and the reasons why 17 they have been so identified, and (c) by reference to 18 (a) and (b) their reasons for the conclusion they have 19 reached on the application of the article 41(5) test." 20 Then he comes to explain it a bit further. 21 But this is, as I have said, the origin of the 22 requirement to plead possibilities and certainties. 23 Mr Heppinstall may say I'm wrong but I say that he has 24 never satisfied that requirement. 25 So going to page 35, paragraph 98, the bottom of the</p> <p style="text-align: center;">Page 82</p>	<p>1 set by the article 41(5) test and thus on evidence that 2 cannot be left out of account because it is fanciful or 3 worthless; and. 4 "(ii) those conclusions or findings on the existence 5 of possibilities then have to be carried forward to the 6 determination of when in the light of all the evidence 7 the article 41(5) test has been satisfied." 8 Could I just stop for a moment. One of the most 9 crucial pieces of evidence where that reasoning matters 10 enormously is the Wahab and Rowland survey or paper. 11 I'll come back to the citation, but just before we 12 break for the short adjournment perhaps I can just say 13 why. 14 I don't have to establish that Wahab and Rowland are 15 right, were right. I don't have to establish anything 16 in their regard, but I can point to that evidence and 17 say it is at least a piece of evidence which is regarded 18 by some people in the scientific community as raising 19 questions. Now, what are the questions or what is the 20 question that arises? In the context of this case if 21 you accept that it may well be or it is possibly the 22 case that the New Zealand sailors were exposed to 23 radiation at such a level as to give rise to chromosomal 24 abnormality -- or "aberrations" I think is the 25 expression used -- if you think that may be the case you</p> <p style="text-align: center;">Page 84</p>

<p>1 then have to ask well why might that be the case? Might 2 it be the case that the radiation that caused those 3 aberrations came from their time in the South Pacific? 4 If so, may they be right in indicating that the mean 5 exposure of such people is of the order of 170 6 millisieverts. And if that may be right it casts doubt 7 on a number of things. If those sailors were exposed to 8 that radiation many miles off the coast of 9 Christmas Island it raises enormous questions to all the 10 assumptions factually which had been made as to the 11 protections that people were enjoying. Interesting 12 Mr Heppinstall put into bundle 22 some of the original 13 documents relating to the New Zealand participants and 14 what the vessels were doing, doubtless because he wants 15 to say, "Look at that, there were protections, all the 16 monitors on board showed no sign of radiation. 17 Therefore the Wahab and Rowland study can't be right." 18 Actually what he does is to destroy the whole basis 19 of the Secretary of State's case, is that, because you 20 can't show an effect on whatever monitors there were at 21 the time, therefore there cannot have been radiation. 22 Actually the world turns upside down as a result of 23 this. 24 Moreover, the evidence was that many of the sailors 25 went ashore at Christmas Island and were exposed to</p> <p style="text-align: center;">Page 85</p>	<p>1 completed we'll just have to adjust the timetable. I 2 appreciate that we have had quite an interesting 3 exchange. 4 MR TER HAAR: It's certainly useful from my point of view. 5 MR JUSTICE BLAKE: Well, if it's going from you point of 6 view then it's going to be useful to me. 7 I have 15 minutes to do some advance reading. Do 8 you want me to read any of this or do you prefer to just 9 give me tutored guide to it? 10 MR TER HAAR: I also want your colleagues to have the 11 benefit of the debate, if I can put it that way. 12 MR JUSTICE BLAKE: We'll do it all together. 13 MR TER HAAR: Yes. 14 (1.05 pm) 15 (The short adjournment) 16 (2.00 pm) 17 MR TER HAAR: If we could go back to the decision of the 18 Upper Tribunal. Just to remind you, it's tab 1.10. 19 MR JUSTICE BLAKE: I have it open still, yes. 20 MR TER HAAR: I'd got to page 36. 21 MR JUSTICE BLAKE: Yes. 22 MR TER HAAR: And paragraph 100. 23 MR JUSTICE BLAKE: Yes. 24 MR TER HAAR: Mr Justice Charles continues as follows: 25 "In my judgment, unless a factor, ingredient or</p> <p style="text-align: center;">Page 87</p>
<p>1 whatever there was on Christmas Island. So even if they 2 were not exposed on the vessels there is at least 3 a possibility that there was more radiation on 4 Christmas Island than the evidence upon which the 5 Secretary of State relies as to showing a much lower 6 level. 7 So the Wahab and Rowland evidence is a prime example 8 of the process which Mr Justice Charles is describing 9 here. Because if it's possibly right it throws 10 a spotlight on the whole case which knocks all the way 11 through right to the very end of the case. 12 MR JUSTICE BLAKE: Yes. 13 MR TER HAAR: Would that be a convenient moment? 14 MR JUSTICE BLAKE: Yes, that's fine. 15 It must be right, Mr Heppinstall, that if there is 16 a non-fanciful possibility that these sailors were 17 exposed to 170 millisieverts above background radiation 18 level in the course of their duties in 1957/58, that's 19 a reasonable doubt? 20 Anyway -- 21 MR HEPPINSTALL: I will seek to address you on that question 22 in due course. 23 MR JUSTICE BLAKE: I look forward to hearing from you. 24 Yes, we will come back at two o'clock. I'm afraid 25 we do have to rise at 4.15. But if you haven't</p> <p style="text-align: center;">Page 86</p>	<p>1 stepping stone can be established or ruled out on the 2 basis that the decision maker on the evidence has no 3 reasonable doubt about whether (and so is sure) that it 4 is right or wrong (or did or did not happen or exist) 5 the doubt relating to it, and so the possibility that 6 doubt creates, has to be carried forward in the decision 7 making process. So, evidence that is found to be 8 fanciful or worthless can be ruled out. Also, some 9 evidence relating to credibility (for example whether a 10 claimant was in a particular place or did a particular 11 thing) could found a conclusion that it does not raise 12 a possibility that needs to be carried forward. 13 Equally, and subject to the FTT, wearing its 14 inquisitorial hat, being satisfied that it does not need 15 further investigation, evidence that is accepted or 16 undisputed can be carried forward as an effective 17 certainty and thus as something about which the decision 18 maker is sure." 19 MR JUSTICE BLAKE: "Decision maker" in this context meaning 20 the judicial decision maker rather than the 21 Secretary of State as decision maker. 22 MR TER HAAR: At this stage being the FTT, yes. 23 101: 24 "The decision making process on whether a reasonable 25 doubt has been established on reliable evidence will</p> <p style="text-align: center;">Page 88</p>

<p>1 also have to take account of the relative importance of 2 the relevant factors, ingredients and stepping stones, 3 and, on an evidence-based approach, the nature and 4 extent of the doubts and possibilities relating to 5 them." 6 So in answer to a question which my Lord asked 7 earlier, one does carry out an evaluation. You do weigh 8 up the weight of one piece of evidence against another. 9 So it's not a computer-based, entirely binary process. 10 "For example, as accepted by counsel for the HL 11 Appellants, an overview or cumulative consideration of 12 all the evidence, of the combined effect of doubts, and 13 so the possibilities they give rise to, may or may not 14 establish a reasonable doubt on reliable evidence that 15 the conditions met by Article 41(1) are met. Such an 16 overview of the relevant ingredients and their combined 17 effect is commonly carried out by reference to the 18 normal civil standard (see, for example, Lord Nicholls 19 in Re H) and it involves a judgmental and balancing 20 exercise and thus a reasoning process. 21 "It is in that exercise or process that the decision 22 maker has to revisit the impacts of the possibilities 23 (and effective certainties) carried forward and weigh 24 them against each other to determine what possibilities 25 remain and whether they establish a reasonable doubt.</p> <p style="text-align: center;">Page 89</p>	<p>1 Then (v): 2 "In light of all of the evidence and argument and 3 so, on an overview or an assessment in the round, 4 evaluate the claimant's case to determine whether he has 5 or has not satisfied the article 41(5) test. 6 "It is at stage (v) that the decision maker will 7 form views that can be expressed by reference to the 8 circumstances of the given case and whether the 9 possibilities (and effective certainties) relied on by 10 the claimant found a reasonable doubt. I repeat that, 11 as was accepted by the HL Appellants, at that stage it 12 may be that the decision will be that the combined 13 effects of the possibilities carried forward do not 14 found a reasonable doubt because for example the 15 combination of those possibilities is too far-fetched." 16 So there's what one might call a common sense test 17 at the end of the matter. 18 Then page 38. At paragraphs 107 to 109, is where 19 the Upper Tribunal considered an argument put forward by 20 Mr Heppinstall on behalf of the Secretary of State that 21 there was a two-stage test and that submission was 22 rejected. 23 Then at page 39 at paragraph 112 is a reference to 24 the hypothesis point: 25 "In my view, the passage cited and relied on by the</p> <p style="text-align: center;">Page 91</p>
<p>1 This exercise is very dependent on the circumstances of 2 each case and difficult to explain in the abstract. It 3 is however of critical importance and one that decision 4 makers applying statutory tests and all of us in our 5 daily lives take when considering whether we regard 6 something as a possibility and whether we have a 7 reasonable doubt about something. Tribunals and courts 8 have to explain how they have done it. 9 "In carrying out this process it is highly likely, 10 if not inevitable, that the decision maker: 11 "(i) will have to identify the claimant's case and 12 so the evidence and arguments relied on to support it." 13 That we of course have done with our possibilities 14 and certainties document. 15 "(ii) do the same with the respondent's case." 16 Well, as you noted, my submissions are that the 17 respondent does not engage in that process in the 18 pleadings or in the experts' evidence. 19 "(iii) identify any additional matters he considers 20 need to be addressed." 21 Then (iv): 22 "In light of that identification of the issues 23 evaluate the competing parts of the evidence to 24 determine what possibilities should be carried forward 25 in the decision making process."</p> <p style="text-align: center;">Page 90</p>	<p>1 FTT from Edwards, and so references to 'was a mere 2 hypothesis on a limited study' and 'there are ... three 3 stages: no reasonable doubt, reasonable doubt and 4 consensus' do not indicate where in a particular case 5 the divisions lie. In the phrase 'a mere hypothesis on 6 a limited study' both the words 'mere' and 'limited' are 7 words of degree and their impact is important not least 8 because when something is not known (for example 9 exposure to radiation and/or radiogenicity) the 10 possibilities (including the consensus if there is one) 11 are likely to be based on theory or hypothesis founded 12 on facts, research and reasoning, all of which will have 13 a part to play in determining whether that theory or 14 hypothesis is fanciful or worthless and so (or for other 15 reasons) should be left out of account, or whether it 16 should be carried forward to the final judgmental 17 exercise." 18 So in answer to questions the Tribunal posed to me 19 earlier, a test in relation to a hypothesis is not ruled 20 out simply because it's a mere hypothesis or it's based 21 on a limited study; the question is: is it fanciful or 22 worthless? If not, then it's carried forward and weighs 23 in all the other factors being weighed in the account at 24 the end of the decision making process. 25 Then going on to page 41, I said earlier that this</p> <p style="text-align: center;">Page 92</p>

<p>1 was an appeal, a decision based in part on what we call 2 sometimes a reasons challenge, and at paragraph 41 we 3 can see that -- 4 MR JUSTICE BLAKE: Page 41. 5 MR TER HAAR: I do apologise, at page 41, paragraph 123(iii) 6 you'll see that the decision is a reasons decision. So 7 also 125 -- 8 MR JUSTICE BLAKE: That's reasons as to the legal test to be 9 applied? 10 MR TER HAAR: Yes. 11 MR JUSTICE BLAKE: Yes. 12 MR TER HAAR: Yes. 13 MR JUSTICE BLAKE: Hopefully we might just get that right. 14 MR TER HAAR: Yes. Then if I can move on to page 48, and 15 it's quite a lengthy section here dealing with, at 48, 16 evidence as to exposure. What Mr Justice Charles is 17 doing here, starting at paragraph 160, was reviewing the 18 different evidence which that First Tier Tribunal had 19 heard as to exposure. 20 MR JUSTICE BLAKE: Yes. 21 MR TER HAAR: Then -- 22 MR JUSTICE BLAKE: What is he doing this for? Just to see 23 whether they've applied the test which he spelt out? 24 MR TER HAAR: Yes. So he carries out that review. At 25 page 49, paragraph 164, he sets out the findings of the</p> <p style="text-align: center;">Page 93</p>	<p>1 and gamma radiation. The debate between Professor Regan 2 and Mr Johnston on this (and other matters) extended 3 over a number of reports which were written before and 4 after they signed an agreed gist of classified material 5 on respectively 21 July and 2 August 2011." 6 There is then further review of each of those 7 witnesses' evidence going through to page 55, and he 8 concludes at the top of page 56, paragraph 192: 9 "So the position was that there was competing 10 evidence from those experts on hotspots and the amount 11 of deposition of Pu239 and thus of exposure to alpha 12 radiation." 13 Then a cross heading: 14 "How did the FTT (i) approach and resolve the 15 disputes, (ii) approach the general agreement expressed 16 between the meteorological experts and as a result (iii) 17 reach their conclusions on the level of exposure in 18 inhabited areas?" 19 And we see at page 56, paragraph 197, that's the 20 bottom of the same page: 21 "The approach of the FTT of making findings in 22 respect of disputed expert evidence and so, as they 23 indicate, to resolve those disputes by accepting or 24 effectively accepting part of Mr Johnston's evidence and 25 rejecting the other expert evidence (including</p> <p style="text-align: center;">Page 95</p>
<p>1 Tribunal. 2 Then at the next page he sets out other parts of the 3 conclusion, and at the bottom of page 50, paragraph 168, 4 says that part of what they'd set out was: 5 "... a clear and important indication that they 6 regarded their findings on exposure as findings of 7 fact." 8 He then analyses that further, and goes through at 9 page 53, for example, evidence as to hotspots. 10 Then at page 54, at paragraph 185, dealing with the 11 hotspot argument, he says: 12 "Also, it cannot be said that there was no evidence 13 that there were no hotter spots because there was expert 14 evidence to that effect and, as the FTT correctly 15 record, the possibility that there were such hotspots 16 was obvious. I add that this finding on hotspots and 17 the reasoning behind it are similar to those on exposure 18 of the Tribunal in Busmer and which Newman J found 19 amounted to an error of law." 20 Then a little bit further down that same page, 21 paragraph 187: 22 "As recorded, on hotspots Professor Regan's evidence 23 was that it was completely possible that there were 24 significantly hotter spots of alpha radiation than 25 indicated by the by the recorded measurements of beta</p> <p style="text-align: center;">Page 94</p>	<p>1 meteorological evidence on rainout that was largely 2 agreed and parts of Mr Johnston's evidence in respect of 3 forward areas) is not consistent with an approach that 4 asks and answers the questions whether the expert 5 evidence advanced by the appellants (a) is or is not 6 reliable, and (b) raises possibilities that do or could 7 found a reasonable doubt. Accordingly, it does not 8 accord with a correct application of the Article 41(5) 9 test. 10 "Such possibilities were and are based on, amongst 11 other things, the LNT (no exposure is safe) 12 fallout/rainout, the existence of a source of alpha 13 radiation Pu239, the long-term effects of ingestion of 14 any alpha radiation, the obvious possibility of hotspots 15 higher than those recorded for beta and gamma radiation, 16 and the existence of fallout radiation with them. 17 "I acknowledge that it is possible that a correct 18 approach in law to the application of the Article 41(5) 19 test could found a conclusion that the appeals of the 20 six claimants ... who were not in forward areas should 21 be dismissed on exposure grounds and that the exposure 22 issues in those appeals was argued by the 23 Secretary of State on different grounds to those 24 expressly relied on by the FTT. But if, contrary to my 25 reading and analysis of the decision, the FTT did</p> <p style="text-align: center;">Page 96</p>

<p>1 correctly apply the test I am satisfied on a generous 2 reading of the decision the FTT have failed to 3 adequately explain how they reached their decisions on 4 a correct application of the Article 41(5) test and so 5 have erred in law." 6 So he then goes on to review that. The important 7 point for today's submissions is that what he was 8 holding was that the normal process of testing one piece 9 of evidence against another and preferring one rather 10 than the other is not the right approach. 11 Now again, put that into the context of this case. 12 If you go to Dr Haylock's evidence nobody could doubt 13 that Dr Haylock is an extremely experienced 14 epidemiologist, a man of enormous experience, and 15 I don't in any way suggest anything other than of 16 enormous integrity. What he was doing repeatedly was 17 what he had been instructed to do, which was to express 18 his view as to what was the best approach, what he found 19 the most satisfactory approach, what he regarded as 20 being the consensus of opinion. 21 What he was not asked to do was to set out in 22 a report what might be competing views, nor to comment 23 on the competing views that had already been put in 24 evidence in the previous civil proceedings and in the 25 previous First Tier Tribunal proceedings.</p> <p style="text-align: center;">Page 97</p>	<p>1 I jibed a little at saying it was a Bolam test but 2 it is a sort of Bolam test. Is there a body of opinion 3 out there which represents a contrary view, and in 4 particular the body of opinion expressed in reports 5 which are on the file, are they views which a competent 6 person could hold even if I, as an expert, disagree with 7 them? 8 So you were not, with the greatest respect to the 9 Secretary of State, assisted in answering the 10 appropriate test by the evidence which they gave. 11 The final reference I want to make in this 12 decision -- you'll be glad I'm getting away from it -- 13 is at page 59. 14 At paragraph 210, the Secretary of State before the 15 Upper Tribunal relied upon a case called Sienkiewicz. 16 That was a case in the Supreme Court in which the 17 argument was whether or not you could rely upon 18 epidemiology in order to say that in a negligence case 19 on a balance of probabilities a particular individual 20 claimant could be shown to have suffered a particular 21 condition. 22 Not surprisingly, the use of epidemiology in that 23 broad sense was rejected by the Supreme Court. It was 24 suggested by the Secretary of State in front of the 25 Upper Tribunal that they could rely upon Sienkiewicz in</p> <p style="text-align: center;">Page 99</p>
<p>1 So, for example, the First Tier Tribunal last time 2 had before it evidence of Professor Parker, who the 3 Secretary of State accepts is a distinguished 4 epidemiologist, who comes to conclusions different from 5 Dr Haylock. Dr Haylock was not asked the question in 6 his report: are her views within a range that 7 a reasonable epidemiologist could hold? 8 So the Secretary of State was asking you to approach 9 the matter really on this basis: reject 10 Professor Parker, without giving any reasons in a 11 possibilities and certainties document why you should, 12 prefer Dr Haylock and then reach a conclusion on what 13 the minimum levels of exposure would need to be. 14 That's not the right test. And so the Tribunal, 15 with the greatest of respect to the respondents' case, 16 has to go through and read the Haylock evidence through 17 the prism of the correct test, and you will see when you 18 do that he was answering a question that he had been 19 asked to answer but he was asked the wrong question. 20 That same problem permeates all the evidence, the expert 21 evidence that was given on behalf of the 22 Secretary of State. Because the Secretary of State 23 simply did not take on board the guidance which was 24 given at some length by the Upper Tribunal as to what 25 one should be doing.</p> <p style="text-align: center;">Page 98</p>	<p>1 order to reject any epidemiological basis for my 2 clients' case. In paragraph 210 that submission was 3 roundly rejected by the Upper Tribunal. Astonishingly, 4 exactly the same argument now re-emerges in the 5 Secretary of State's written submissions. 6 MR JUSTICE BLAKE: I must say I haven't quite got to this. 7 Bear that in mind as you develop it. I may be slow in 8 catching up. 9 MR TER HAAR: Perhaps the easiest way -- 10 MR JUSTICE BLAKE: The Secretary of State now says the 11 epidemiological evidence is not admissible or that you 12 can't prove individual causation on the basis of it? 13 MR TER HAAR: The latter, the latter. 14 MR JUSTICE BLAKE: Well, I think isn't that -- is that 15 controversial? Whether epidemiology can prove 16 individual causation, or -- 17 MR TER HAAR: It is absolutely not controversial because you 18 can't prove individual causation but you can raise 19 a doubt as to individual causation on the basis of 20 epidemiology. So let me take a very simple example. 21 Assume that epidemiology shows that 500 out of 22 a thousand people will suffer a particular condition as 23 a result of radiation. Let's say 499 out of a thousand 24 because the example is better. 25 MR JUSTICE BLAKE: Take 250.</p> <p style="text-align: center;">Page 100</p>

<p>1 MR TER HAAR: 250. So a significant number. 2 MR JUSTICE BLAKE: Yes. 3 MR TER HAAR: If you are dealing with the matter on the 4 balance of probabilities that's not enough because if 5 you have 499, there's 501 who get the same condition for 6 other reasons. So epidemiology cannot prove that 7 an individual suffers a particular condition because of 8 whatever circumstances it is you are relying upon. 9 It does not prove the opposite, that you cannot rely 10 upon epidemiology to show that it's a possible cause. 11 So that's why I take it right at 499 -- if you have 12 a figure of 499 out of a thousand cancers caused by 13 radiation, just to take a hypothesis, it would be 14 impossible to say, because that's what epidemiology 15 says, that in an individual case where there's no other 16 evidence that you could rule out the possibility that it 17 was caused -- 18 MR JUSTICE BLAKE: My present understanding, and if it's 19 defective you'll no doubt correct me, is that whatever 20 the epidemiological figures say -- if it says there's 21 never been any case ever in any similar cohort of anyone 22 ever being caused it then that might be strongly 23 determinative, but if you are dealing with a certain 24 statistical level of probability or likelihood, that's 25 simply evidence which goes into the mix, but you can</p> <p style="text-align: center;">Page 101</p>	<p>1 why I gave the example taking the probabilities at their 2 extreme. 3 MR JUSTICE BLAKE: Yes. 4 MR TER HAAR: If the evidence were that a particular 5 condition -- out of a cohort of a thousand people, 499 6 if they have cancer are likely to be people who were 7 exposed to radiation, 501 are likely to be people who 8 had some other cause of cancer, it would not satisfy in 9 relation to the individual person, it would not raise -- 10 it would not establish on a balance of probability that 11 that person suffered the cancer as a result of 12 radiation; it would raise a reasonable doubt as to 13 whether that person suffered cancer as a result of 14 radiation. 15 MR JUSTICE BLAKE: Yes. Then in order to take the example 16 to see where you travel with this, if we have 17 an epidemiological study of a thousand people and the 18 evidence suggested that in normal life, without exposure 19 to radiation in the course of service you would expect 20 10 per cent of the population, or 100 people to 21 unfortunately suffer from a particular form of hard 22 cancer, and then an epidemiological survey of veterans 23 or something suggested that either you were still 24 getting no more than 100 out of a thousand or if it was 25 101 out of a thousand or another, if it was 99 out of</p> <p style="text-align: center;">Page 103</p>
<p>1 never be sure whether any individual client or any 2 individual claimant is within one group or the other 3 group. 4 MR TER HAAR: That's exactly -- you can never be sure. So 5 you already have a doubt as to whether he is or not. 6 MR JUSTICE BLAKE: Well, you may or may not but epidemiology 7 is not going to decide the issue. 8 MR TER HAAR: What my learned friend does is to take a case 9 out of a completely different context -- it's in his 10 submissions if you have those. 11 MR JUSTICE BLAKE: I certainly haven't -- I mean, you are 12 helpfully giving me advance notice, or us advance notice 13 of what we are about to hear but in a sense -- 14 MR TER HAAR: What I am pointing out is the argument which 15 he now puts forward, and the reference for the 16 transcript is page 36 of his submissions, paragraphs 110 17 to 113, is exactly the argument that he tried to use in 18 front of the Upper Tribunal and was rejected at 19 paragraphs 210 and 211 at page 59. 20 MR JUSTICE BLAKE: You tell us what is the role of 21 epidemiology, assuming the epidemiology is reliable 22 evidence within the sense you've used it. So it -- 23 MR TER HAAR: The role is this: it is capable, if reliable, 24 of raising a doubt as to whether or not a particular 25 condition was attributable to war service. So that's</p> <p style="text-align: center;">Page 102</p>	<p>1 a thousand that might be saying it's jolly good for you 2 to do military service and exposed to radiation because 3 you are reducing your risk by contrast to the 4 population. If it shows 101 or 110 or 120, how do we 5 translate the broad brush pictures of epidemiology into 6 our problem? 7 MR TER HAAR: Let's test it in this way. 8 Assume that you have a cohort study which shows that 9 a thousand out of every million people will get 10 a particular form of cancer. 11 MR JUSTICE BLAKE: Yes. 12 MR TER HAAR: These being people that you have sufficient 13 confidence in your cohort that you know that they have 14 not been exposed to radiation. So you have a thousand 15 in a million chance of getting cancer. 16 MR JUSTICE BLAKE: Yes, from radiation other than the 17 background radiation -- 18 MR TER HAAR: At this point no radiation at all other than 19 being on Planet Earth. 20 Then assume that in a particular cohort, who 21 obviously are exposed to Planet Earth but also have been 22 exposed to radiation, you get 1,001 so that you actually 23 have one more person in each -- 1,100 -- who are 24 exposed -- who contract cancer. I am not sure that's 25 the right expression.</p> <p style="text-align: center;">Page 104</p>

<p>1 MR JUSTICE BLAKE: I think I've got it, yes.</p> <p>2 MR TER HAAR: Therefore, you know that there is in that</p> <p>3 group at least one person -- epidemiology tells you that</p> <p>4 one person, you don't know who it is, but one person has</p> <p>5 got cancer even though the other thousand would have got</p> <p>6 it anyway. That raises the issue as to whether or not</p> <p>7 that -- there's a doubt.</p> <p>8 MR JUSTICE BLAKE: It's evidence which certainly goes into</p> <p>9 the mix.</p> <p>10 MR TER HAAR: I say it goes further than that.</p> <p>11 MR JUSTICE BLAKE: Well, the first stage so you're into the</p> <p>12 pool, yes? You're into the evaluation of the pool.</p> <p>13 MR TER HAAR: The question then if you ask yourself "Might</p> <p>14 the cancer have been caused by radiation?" the answer is</p> <p>15 "i know one in a thousand people -- out of a thousand</p> <p>16 people, one will be caused by radiation." The way the</p> <p>17 War Pension legislation works is, as I say, we give the</p> <p>18 benefit of the doubt to the pensioner. I cannot be sure</p> <p>19 that this human being who is now in front of me was not</p> <p>20 that one person.</p> <p>21 MR JUSTICE BLAKE: Right. So if we're using a thousand and</p> <p>22 a million, your mental maths is no doubt better than me</p> <p>23 but does it come down to 99.9 per cent out of a</p> <p>24 1 per cent possibility of a chance?</p> <p>25 MR TER HAAR: The mathematics is not quite right but</p> <p style="text-align: center;">Page 105</p>	<p>1 it's not me?" The answer is: "I can't say it's not</p> <p>2 you."</p> <p>3 MR JUSTICE BLAKE: Well, it may depending on what else you</p> <p>4 have apart --</p> <p>5 MR TER HAAR: This is simply on this.</p> <p>6 MR JUSTICE BLAKE: Right.</p> <p>7 MR TER HAAR: If we're simply dealing with this question of</p> <p>8 where epidemiology comes in, it's that question. Can</p> <p>9 you look at somebody and say "I'm absolutely sure it's</p> <p>10 not you"?</p> <p>11 MR JUSTICE BLAKE: But in the learning or attempted learning</p> <p>12 or the learning on this topic, and given that this</p> <p>13 chamber has been running I think for a great many years</p> <p>14 in different guises in its predecessor chambers, no one</p> <p>15 has attempted to put a statistical significance on</p> <p>16 "reasonable doubt", have they?</p> <p>17 MR TER HAAR: No one has run the Secretary of State's</p> <p>18 argument before, no.</p> <p>19 MR JUSTICE BLAKE: Or the contrary argument that if the</p> <p>20 doubt is -- if it's 99.9 one way but 0.1 another you can</p> <p>21 take the 0.1 and that --</p> <p>22 MR TER HAAR: But the applicant would never be running it</p> <p>23 that way. All the applicant would always be saying is:</p> <p>24 "I know some of us got cancer as a result of our</p> <p>25 exposure, it could have been me."</p> <p style="text-align: center;">Page 107</p>
<p>1 effectively it's the same point, yes.</p> <p>2 MR JUSTICE BLAKE: Right. Although we all know judges are</p> <p>3 cautioned not to turn reasonable doubt into statistical</p> <p>4 chance, for good reason, although the case law is</p> <p>5 littered both on asylum claims, Cara Nak(?) and others,</p> <p>6 with estimates of one in 10 or something other than</p> <p>7 that, is it your submission that a 0.1 per cent chance</p> <p>8 is of itself reasonable doubt?</p> <p>9 MR TER HAAR: It's -- yes.</p> <p>10 MR JUSTICE BLAKE: In which case you would be running with</p> <p>11 Dr Haylock and you would say "Can I have the prize,</p> <p>12 please?"</p> <p>13 MR TER HAAR: The way I put it is this. Look at</p> <p>14 a particular veteran on (inaudible), and if he says to</p> <p>15 you, "Well, my Lord, can you say whether I am that one?</p> <p>16 Can you say whether I'm that one? Because you tell me</p> <p>17 that one in a thousand is going to be that one", your</p> <p>18 answer would have to be, "No, I can't. You might be</p> <p>19 that one. I can't be sure whether it's you or somebody</p> <p>20 else." That's the reasonable doubt. It's very simple.</p> <p>21 It's because --</p> <p>22 MR JUSTICE BLAKE: That might be very simple.</p> <p>23 MR TER HAAR: It really is. I would suggest it's quite</p> <p>24 a good way of thinking about it. Imagine somebody is in</p> <p>25 front of you and asks you the question: "How can you say</p> <p style="text-align: center;">Page 106</p>	<p>1 MR JUSTICE BLAKE: Supposing the applicant, having explored</p> <p>2 all these issues with the thoroughness and integrity you</p> <p>3 would expect of a genuine forensic exploration, in terms</p> <p>4 makes a submission at the end of the hearing -- I'm not</p> <p>5 suggesting it's your submission but I just want to test</p> <p>6 where you go on statistics -- "I absolutely accept every</p> <p>7 epidemiologist who has looked at the question comes up</p> <p>8 with the same number", right?</p> <p>9 MR TER HAAR: Yes.</p> <p>10 MR JUSTICE BLAKE: "And it's therefore 0.1."</p> <p>11 MR TER HAAR: Yes.</p> <p>12 MR JUSTICE BLAKE: "But 0.1 is good enough for me because</p> <p>13 I might just be that 0.1 that therefore gives me</p> <p>14 cancer."</p> <p>15 MR TER HAAR: Exactly my submission.</p> <p>16 MR JUSTICE BLAKE: So it is your submission, because</p> <p>17 I thought it was. There is nothing wrong with it but</p> <p>18 I just wanted to make sure I understood where we're</p> <p>19 going in a debate where I have only heard half the</p> <p>20 story. But that proposition, which certainly we'll have</p> <p>21 to now take into account, isn't something which you've</p> <p>22 got judicial support for other than saying: well, how</p> <p>23 could you say the doubt is not reasonable? Which is</p> <p>24 a rhetorical throwback to statistical possibilities and</p> <p>25 reasonable doubt.</p> <p style="text-align: center;">Page 108</p>

1 MR TER HAAR: I haven't got judicial authority for it
 2 because nobody on either side has run the case as
 3 I understand it on a War Pension on that basis. But go
 4 back to what we do have in the test which I took you to
 5 this morning, which is it may be that the preponderance
 6 of evidence is against causation, it may be the strong
 7 preponderance of the evidence is against causation, and
 8 I took you to those authorities.
 9 MR JUSTICE BLAKE: Yes, yes, I'm there.
 10 MR TER HAAR: That's still not enough to deny somebody their
 11 pension.
 12 MR JUSTICE BLAKE: Well, look, I appreciate I have asked you
 13 a great many questions. I really don't want to
 14 interrupt your flow and I suspect we may not finish you
 15 this evening in which case it's my fault and don't feel
 16 under pressure.
 17 MR TER HAAR: As I said earlier, and I meant it, I'd rather
 18 if you like grapple with the Tribunal's concerns --
 19 MR JUSTICE BLAKE: By the way, I think we might as well
 20 start at ten o'clock tomorrow and Thursday, just to
 21 recover some time and we may go a bit later but
 22 I certainly don't want anyone to feel under pressure,
 23 particularly as a product of me exploring the
 24 submissions on behalf of us all.
 25 But you aimed at some low-lying fruit earlier with

Page 109

1 you saying your 450 out of 1,000. Well, we don't need
 2 to go there. Yes. Obviously if you have on statistics
 3 or epidemiological assessments, if we get there, and
 4 it's pure and reliable, et cetera, et cetera, you are
 5 obviously not concerned about 50 per cent or the
 6 50 per cent margin. That's really neither here nor
 7 there.
 8 MR TER HAAR: Of course not. We're not in that territory.
 9 MR JUSTICE BLAKE: You can go right down beyond, perhaps
 10 down to 20 per cent for the sake of argument. This is
 11 just arbitrary figures. It's nothing to do with any
 12 thought process, I just wanted your help, but somewhere
 13 between a 20 per cent chance and, well, no chance at
 14 all, there may be the very, very, very micropercentages,
 15 0.1 and 0.01, et cetera.
 16 Now, we are not asking the test "Is there no doubt
 17 at all?" but we're asking for reasonable doubt, fanciful
 18 doubt and therefore --
 19 MR TER HAAR: What feeds into this is the policy behind the
 20 legislation.
 21 MR JUSTICE BLAKE: Yes.
 22 MR TER HAAR: I mentioned that earlier.
 23 MR JUSTICE BLAKE: I have that, and I have absorbed in the
 24 reading some of that but the policy we have in the
 25 legislation, as you can sense, I'm troubled by 0.1.

Page 110

1 MR TER HAAR: I understand that.
 2 MR JUSTICE BLAKE: But that's not to say that the trouble
 3 won't be resolved in your favour when I think about it.
 4 MR TER HAAR: Again, we can go back, as I said, to
 5 Dr Haylock's evidence when I said "The consequence is it
 6 might have been caused?" And the answer was: "Yes, it
 7 might have been caused", and that is sufficient because
 8 you have to --
 9 MR JUSTICE BLAKE: You submitted "sufficient".
 10 MR TER HAAR: Of course, that's my submission. Everything
 11 I say is my submission, it may or may not be accepted.
 12 But in a way that's one way of testing it. When you go
 13 to bed at night, having put your decision to bed, apart
 14 from sleeping well, you might say to yourself "I wonder
 15 whether he was the man? I wonder whether he was that
 16 one in 1,000. I know there is a one in 1,000. I'm told
 17 that by the statisticians, or there's likely to be one
 18 or there may be one. I wonder whether he was." If
 19 you've got to that point, as your head hits the pillow,
 20 then actually the doubt is there, and it's quite wrong
 21 for the Secretary of State to try to erect some
 22 artificial figure that 0.1 isn't enough but 2 per cent
 23 might be, or whatever. That's not the test.
 24 The question is -- it's described sometimes as
 25 a jury question; it's a very informed jury question as

Page 111

1 a tribunal -- but, members of the jury, can you be sure
 2 he's not the one? That's the question. It's not the
 3 process of a balance of probabilities. That's what's so
 4 dangerous. We all get ourselves into a mindset where we
 5 think: if I decided --
 6 MR JUSTICE BLAKE: Well, I hope by trying to put it outside
 7 your opening gambit of 450 and bringing it down to
 8 0.1 per cent, I am trying to enter the territory which
 9 can only be about doubt which is reasonable.
 10 MR TER HAAR: Of course you are.
 11 MR JUSTICE BLAKE: Yes?
 12 MR TER HAAR: Yes.
 13 MR JUSTICE BLAKE: Because if you are into a below
 14 20 per cent chance, a below 10 per cent chance, wherever
 15 one wants to put the area of debate -- yes? --
 16 MR TER HAAR: Yes.
 17 MR JUSTICE BLAKE: -- and somewhere there is, you are way,
 18 way, way beyond anything which is balance of
 19 probabilities. You are way below that. You are into
 20 doubt and the reasonableness of doubt and reliable
 21 evidence.
 22 MR TER HAAR: Yes, you are.
 23 MR JUSTICE BLAKE: The reading I am getting at the moment in
 24 this exchange, and if that's where you want your
 25 submission to rest that's where it will rest, but I want

Page 112

<p>1 to make clear that's where you want it to rest, is that 2 anything which is short of complete certainty is 3 a doubt. 4 MR TER HAAR: I certainly say that, so long as it's based on 5 evidence which is not fanciful. You've got to get to 6 that. 7 MR JUSTICE BLAKE: Yes. If you are content for that to be 8 your submission, I will note it. 9 MR TER HAAR: I am content. Let me put it in this way. For 10 the purpose of getting to the 99.9 per cent figure, you 11 only get to that figure by accepting the 12 Secretary of State's reasoning which feeds through to 13 a conclusion based on Mr Hallard's evidence of a 14 particular exposure leading to a particular level of 15 radiation exposure which he then calculates 16 epidemiologically into a percentage chance. 17 The Secretary of State doesn't give you any 18 alternative figures higher up although, as we showed in 19 one of our documents, you can take Dr Haylock's figures, 20 feed in different assumptions and come to higher 21 probabilities. 22 You may remember the document which we handed in. 23 It's in bundle 22 at tab 17. 24 MR JUSTICE BLAKE: Yes, I do remember it. 25 MR TER HAAR: Where we did a calculation first of all in</p> <p style="text-align: center;">Page 113</p>	<p>1 So unless there's anything else on the Upper 2 Tribunal decision, can I move away from that? I am 3 sorry to have taken so long but I think I share with the 4 Tribunal the view that this is a rather important area 5 to understand. 6 I want to now come back to one specific question on 7 the expert evidence, the general approach to the expert 8 evidence, which is this. 9 The Tribunal ruled, and particularly in relation to 10 what I might call the Busby-related evidence, but as 11 a general approach, that CPR 35 should be taken as the 12 touchstone for expert evidence in this case. You will 13 see when you get to the Secretary of State's submissions 14 that the Secretary of State has enthusiastically picked 15 up that particular ball and run with it as being a way 16 of excluding a number of witnesses' evidence. I'm not 17 here to fight a corner for Dr Busby's two clients, or 18 two people he's assisting, but I do suggest that the 19 Secretary of State's approach to CPR 35 is not one which 20 the Secretary of State himself has applied in getting 21 his evidence, for this reason. 22 First of all, if you are to apply CPR 35 you should 23 not have witnesses going outside their particular 24 expertise and Mr Hallard has found himself in some 25 difficulties because the nature of the instructions he</p> <p style="text-align: center;">Page 115</p>
<p>1 relation to Mr Abdale, first of all with a dose of 4 msv 2 but then we took his figures from the Wahab and Rowland 3 report, we took the mean figure which is to be found 4 there of 170 millisieverts, and that, applying what 5 Dr Haylock accepted was the correct DDREF, gave you 6 a probability of causation of a bit over 6 per cent. 7 MR JUSTICE BLAKE: Yes. 8 MR TER HAAR: So this is where one starts to feed other 9 things into the equation. If you were to accept that 10 the Wahab and Rowland report raises a doubt as to 11 whether people who have up to now been assumed to have 12 been exposed to no radiation or minimal amounts of 13 radiation, you accept it gives rise to a reasonable 14 doubt that people such as the New Zealand sailors were 15 actually exposed to 170 on an average, a mean, then your 16 percentage probability of causation is up to 6 per cent 17 and I would say you cannot possibly say -- 18 MR JUSTICE BLAKE: I understand. You may recall the 19 question I left -- 20 MR TER HAAR: Yes. So at the moment the 99.9 per cent is on 21 the basis that all the other cards fall the way that the 22 Secretary of State wants them to fall, and that's -- 23 MR JUSTICE BLAKE: You are still fighting at the last 24 bastion on that hypothesis. 25 MR TER HAAR: We are last bastion there.</p> <p style="text-align: center;">Page 114</p>	<p>1 has been given has led him going a long way outside of 2 any expertise he may have. Mr Hallard, his experience, 3 and in this he is a man of enormous experience, is as 4 a health physicist with enormous experience in carrying 5 out health protection, particularly in regard to the 6 employees of various nuclear establishments with which 7 his employers were concerned. When it comes, for 8 example, to calculations of the dose of radiation you 9 might get from inhaling air which has radiation in it, 10 he is absolutely within his area of expertise. No 11 question about it. I made it clear in cross-examining 12 him that where he does his very complicated calculations 13 which end up telling you how much radioactive material 14 is in the lungs, for example, he is absolutely in his 15 territory. 16 But I don't remember his having a degree in history, 17 he's not got a degree in nuclear physics, he hasn't got 18 experience of research into historical matters. He was 19 being put forward by the Secretary of State as a vehicle 20 through which to create various what are effectively 21 historical theories. He was forced to do it in a sense 22 because what he was asked to do was not to take somebody 23 else's statement of facts and then process that to 24 measure doses received by particular soldiers, which 25 would be within his territory; he was asked effectively</p> <p style="text-align: center;">Page 116</p>

1 to go and review a huge amount of primary material to
 2 draw his own conclusions and then to apply his
 3 expertise.
 4 And as I say, I make it clear that Mr Hallard
 5 appeared to us to be a man of immense integrity who did
 6 find himself from time to time accepting he was having
 7 to make assumptions which were outside his expertise and
 8 his report does so as well, but he was placed in that
 9 position because of the instructions he was given by the
 10 respondent. So one has to take --
 11 MR JUSTICE BLAKE: But if the assumptions that he was given
 12 were meant to be the assumptions of pathways of
 13 causation and dosimetry and all the other matters which
 14 had been so explicitly debated between Professor Regan
 15 and Mr Johnston and others in the transcripts and which
 16 hadn't been properly considered by the FTT last time
 17 round, if those were the assumptions then why is that
 18 wrong? That's not going outside expertise. You are
 19 saying: if I am given X fact, Y fact and Z fact, or Z
 20 hypothesis which I can't dismiss as fanciful or
 21 otherwise, or it's not my job to because that's my
 22 evaluation, but I am asked to then turn all that into
 23 a mathematical calculation, this is what I've come up
 24 with, round 1 or round 2. I appreciate you add more
 25 hypotheses and you add a bit more and then you get out

Page 117

1 your calculator and you vary it. But is that going
 2 outside his expertise?
 3 MR TER HAAR: Yes, it is, because he wasn't given the facts
 4 or the assumptions in that way.
 5 MR JUSTICE BLAKE: I thought he was. I thought he was given
 6 precisely Mr Justice Charles' view of all that material
 7 but you think it wasn't made clear to him what he was
 8 including and what he should be excluding.
 9 MR TER HAAR: No, I think it was slightly different. What
 10 he was asked to do was to assess what dose each person
 11 received and then in order to do so he was given a whole
 12 mass of evidence and told to go and read it for himself
 13 and draw his own conclusions.
 14 Let me give you an example: the Shackleton. The
 15 Shackleton evidence -- back to possibilities and
 16 certainties, Mr Heppinstall will tell me if I'm wrong --
 17 I don't recollect that being a piece of evidence that
 18 featured largely or at all in the previous proceedings.
 19 I may be wrong but certainly he's not put forward in any
 20 document other than Mr Hallard's report a theory that
 21 you can draw conclusions from the Shackleton. Now the
 22 Shackleton --
 23 MR JUSTICE BLAKE: The Shackleton 8 plus 7 trip to the --
 24 I now have my large scale map which I've been studying.
 25 MR TER HAAR: The zigzagging.

Page 118

1 MR JUSTICE BLAKE: The zigzagging trajectory, yes?
 2 MR TER HAAR: Sometimes one does -- some of the evidence in
 3 this case. The idea of being asked to zigzag through
 4 a nuclear cloud -- anyway, there we go.
 5 MR JUSTICE BLAKE: I don't imagine the pilots are one of
 6 your clients, are they? No.
 7 MR TER HAAR: No, because by and large the pilots have
 8 been -- certainly Mr Pascini, who had the most dramatic
 9 evidence of all, he actually flew through the nuclear
 10 cloud, he has been compensated as I understand it.
 11 MR JUSTICE BLAKE: Quite. I didn't interrupt earlier on,
 12 but I mean there's a different group of claimants who
 13 are before Mr Justice Foskett seeking compensation
 14 (inaudible words), but a selected group that went
 15 through FTT. I think some were reassigned from sheep to
 16 goats or goats to sheep, weren't they?
 17 MR TER HAAR: Yes. There are certainly some applicants who
 18 received but without the need to go to the FTT,
 19 received --
 20 MR JUSTICE BLAKE: Quite. The impression I got is that
 21 those flying through the cloud or those intimately
 22 connected with decontamination of aircraft that had gone
 23 through the cloud were in a slightly different position.
 24 MR TER HAAR: They were certainly in a different position.
 25 As I understand it, again each case has its own facts,

Page 119

1 but those involved with flying through the cloud, yes,
 2 I think, if I understand it right. Dr Busby probably
 3 has better information on this than me. Of those
 4 decontaminating, I think Mr Battersby is one of those so
 5 has and has not --
 6 MR JUSTICE BLAKE: Yes, I mean all this is absolutely just
 7 an exploration of -- but I thought the issue was
 8 precisely whether X was a person who was involved in
 9 decontamination or whether there is a reasonable
 10 possibility that he was.
 11 MR TER HAAR: That's one of the issues.
 12 MR JUSTICE BLAKE: As opposed to: if you were, is there now
 13 a reasonable doubt as to how you got it? Because
 14 I thought that some of those who succeeded -- but having
 15 not read the FTT decision in order to not pollute my
 16 mind --
 17 MR TER HAAR: Certainly within my clients' group there are
 18 those where exposure is accepted, but where the
 19 causation of the particular condition is not accepted.
 20 So there are some where exposure is accepted, some where
 21 it's not.
 22 Can I come back to the point I am making about
 23 Mr Hallard?
 24 MR JUSTICE BLAKE: Yes.
 25 MR TER HAAR: He did not take a piece of evidence which had

Page 120

1 been if you like where the Secretary of State said: if
 2 the Tribunal accepts this piece of evidence or thinks
 3 this may be correct, what would be the consequence in
 4 terms of dose? It was the other way round. He was
 5 given the papers, as I understand it, he discovered the
 6 Shackleton evidence, and he then said "I'm now going to
 7 carry out an analysis of wind direction", which is not
 8 for him, that's a meterological exercise, "distance,
 9 historical investigation, how did he travel? Did he
 10 zigzag? Did he go north to south, east to west,
 11 et cetera?" So he moved from being a person purely
 12 measuring dose on the basis of assumptions given to him
 13 to becoming a detective, and particularly in that
 14 example becoming a detective in relation to something
 15 which had never featured -- I will be corrected if I'm
 16 wrong but I'm pretty sure I'm right -- never featured
 17 before as an important piece of evidence.
 18 Similarly, although again I'll be corrected, I don't
 19 think it was in his report, when I cross-examined him
 20 about ground surveys he said "Ah, but there's now
 21 another piece of evidence I've seen relating to whether
 22 or not some people on one of the British ships just
 23 offshore were subjects of being examined with Geiger
 24 counters. That tells me something else." So he was
 25 going beyond taking a set of assumptions and then

Page 121

1 applying them, to making his own assumptions and then
 2 reaching conclusions.
 3 Now that is not the proper role of an expert. It
 4 leaves the Tribunal with this position: you seem to have
 5 in front of you a witness who has examined all the
 6 evidence and reached conclusions but he's not CPR 35
 7 qualified to do so.
 8 There is also a danger which I suspect my Lord, with
 9 the greatest of respect to your colleagues, may be more
 10 aware of than your colleagues. I may be wrong and
 11 I apologise if I am. That is, if you are experienced in
 12 litigation, one of the parts of the training of a judge
 13 or an arbitrator, people deciding things in a court
 14 dispute context is that it is very easy to fix your mind
 15 on what you hear and see through human intervention,
 16 i.e. through witnesses, rather than written material.
 17 In the process of analysis you have to in our submission
 18 always bear in mind that what you hear from another
 19 human being is likely to have disproportionate weight
 20 compared to what you read in the paper. Different human
 21 beings work differently, but it's always a risk.
 22 But what has been done in this case is somebody who
 23 is tremendously expert in health protection and
 24 dosimetry in that context has been brought forward to
 25 set out historical propositions because he is forced to

Page 122

1 do so because he has to make assumptions for the
 2 purposes of a report, but that is easily then
 3 transmogrified, if that is a proper word, into saying
 4 "I accept Mr Hallard's evidence as to this must have
 5 been the dose at this point, this must have been the
 6 exposure at that point,"v which is not his role.
 7 A second point on CPR 35 is this. The expectation
 8 of a court or tribunal under CPR 35 is that an expert
 9 will come forward independently and give impartial
 10 evidence. Now that doesn't just mean the expert is
 11 going to come forward and not take a bribe for going for
 12 one side or the other or appear as an advocate. It
 13 means something broader than that. It means that if
 14 there are legitimate alternative views, those legitimate
 15 alternative views will be brought forward by the expert
 16 to the decision-making tribunal.
 17 So the proper way of presenting things is: "I, an
 18 expert [whatever your expertise is] hold this view. If
 19 I know that there is an alternative body of opinion it's
 20 my duty to draw that to the Tribunal's attention." So
 21 you can say "I held this view, others have expressed
 22 this view, I understand it, I see that some might accept
 23 it but I personally do not accept it." Then you have
 24 a rounded view. That has not been done in this case.
 25 MR JUSTICE BLAKE: Well, I accept what you say. If in part

Page 123

1 that alternative body of opinion is participating in the
 2 debate because the holders of it are there and the
 3 expert knows that and says "I disagree with them because
 4 of this", then the Tribunal is not being misled, the
 5 debate is there. It's simply there's one expert, and
 6 particularly in the shaken baby syndrome cases, for
 7 example, whether the triage is still gospel, as you
 8 know, the courts have had to deal with experts --
 9 MR TER HAAR: I'm not entirely sure I go all the way with
 10 my Lord but I go quite a long way down that route.
 11 If you take again an ordinary civil case where you
 12 have both parties represented, both putting forward
 13 experts in matching disciplines, then the adversarial
 14 process may mean the expert doesn't have to point out
 15 expressly an alternative body of opinion which may be
 16 needed to be weighed against.
 17 If for example in an ordinary piece of litigation
 18 you have a litigant in person with no expert on one side
 19 and a professionally represented party on the other side
 20 with the benefit of expert evidence, and that expert
 21 comes forward, then the Tribunal would be relying upon
 22 that expert for a balanced view. There wouldn't be that
 23 balance. If you take --
 24 MR JUSTICE BLAKE: But the Tribunal might well say in direct
 25 terms, if the expert was giving evidence before one of

Page 124

<p>1 us, "You are the only person who is giving evidence upon 2 this case. You've read CPR 35. Are you able to be sure 3 that there is no body of reasonable opinion which takes 4 a different approach?" 5 MR TER HAAR: Now in this case certainly the Tribunal could 6 do that. 7 MR JUSTICE BLAKE: It should do that. 8 MR TER HAAR: The first question is whether or not the 9 respondent's team putting forward these experts' reports 10 asked their experts the right question in pointing out 11 to them their duty in a case where we were not at this 12 hearing putting forward an equivalent to Mr Hallard, for 13 example, or an equivalent of Professor Thomas, whether 14 they asked their experts to make sure they actually 15 disclosed any alternative views. 16 Now, a good comparison, given that we are dealing 17 with the reasonable doubt test, is criminal proceedings 18 where a jury dealing in a criminal context would be 19 entitled to believe that the prosecution expert will 20 draw to their attention any contrary view in order to be 21 able to say "You, members of the jury, can be sure." 22 The test is the other way round now. 23 Here in this case the respondent's witnesses are 24 effectively in that position where there's no competing 25 evidence because the timing of this, if you remember,</p> <p style="text-align: center;">Page 125</p>	<p>1 advice to the Tribunal about that issue, which clearly, 2 having now seen the Upper Tribunal, was the central 3 issue on many of the areas. I take epidemiology as 4 an example -- 5 MR JUSTICE BLAKE: I can't remember. Did you elicit from 6 Dr Haylock that he'd never read Professor Parker's -- 7 MR TER HAAR: I took him through it and he hadn't read it. 8 I think he may have glanced at it. 9 MR HEPPINSTALL: He said he had read it. 10 MR TER HAAR: He had read it, but he hadn't -- 11 MR HEPPINSTALL: For the avoidance of all doubt, they were 12 all given it and instructed to read it. 13 MR TER HAAR: Then all the more remarkable that they were 14 instructed to read it, they weren't also asked to 15 comment upon it for the benefit of this Tribunal. 16 MR JUSTICE BLAKE: In order to let you develop your 17 submissions smoothly I don't want to encourage a Dutch 18 auction but presumably if that's right, and I will be 19 corrected if I'm wrong, the evidence would have been not 20 merely the reports put in in round 1 but also what 21 testing of those reports took place in the transcript. 22 MR TER HAAR: Actually my memory is jogged. He did say he'd 23 read not only the reports but also the 24 cross-examination. 25 MR JUSTICE BLAKE: Right.</p> <p style="text-align: center;">Page 127</p>
<p>1 the Secretary of State sought a very long period 2 initially for the reports and then extensions and it was 3 never contemplated that we would be fielding experts who 4 could in the timescale of this hearing, or given the 5 financial constraints which everybody knew we're 6 certainly suffering under, would be coming forward to 7 counterbalance that. So they are in that territory. 8 MR JUSTICE BLAKE: I think you were invited to agree a joint 9 expert. 10 MR TER HAAR: We were. 11 MR JUSTICE BLAKE: We won't go over the history. 12 MR TER HAAR: That's certainly correct and we declined. 13 MR JUSTICE BLAKE: I appreciate that. 14 MR TER HAAR: It also feeds into the point which I've 15 already made and I'm not going to repeat, other than 16 just for the note for completeness, that the question 17 which was asked of these experts should have included, 18 particularly for I would say Dr Haylock, as 19 an epidemiologist, "Look at the previous epidemiological 20 evidence and if there is anything in it with which you 21 disagree as being outside the range that a reasonable 22 competent epidemiologist could hold, say so. Because 23 otherwise you are entitled as a Tribunal to move forward 24 on the basis that Dr Haylock was either deliberately not 25 asked to do that exercise or did it and he hasn't given</p> <p style="text-align: center;">Page 126</p>	<p>1 MR TER HAAR: So we are in this position: that the 2 Secretary of State invited the experts to look at this 3 material but either didn't notice that they hadn't 4 commented upon that material, which seems unlikely, or 5 elected to put the evidence in without that material 6 having been commented upon by Dr Haylock, in other 7 words, thinking "Oh, it will be all right. If 8 Dr Haylock is asked any questions the appellants won't 9 have had prior notice of what his view is, but he will 10 be able to answer it then." 11 MR JUSTICE BLAKE: Did you put this question to Dr Haylock? 12 MR TER HAAR: I put to him -- 13 MR JUSTICE BLAKE: No, no, in the pre-oral hearings part, 14 but I mean were you saving this one up for a rainy day? 15 MR TER HAAR: No, my belief was when I read his report that 16 he did not regard it as being part of his instructions 17 to consider the broader issues and therefore I took the 18 view that what we had was no contest that the 19 epidemiological views expressed by Professor Parker were 20 those which could be held by a reasonable epidemiologist 21 and to be fair, I think it is still the 22 Secretary of State's position that Professor Parker's 23 views on epidemiology are those which could be held by 24 a reasonable expert as I understand his 25 cross-examination.</p> <p style="text-align: center;">Page 128</p>

<p>1 MR JUSTICE BLAKE: You are ahead of us because you've read 2 it. 3 MR TER HAAR: Yes, Dr Haylock's answer on this is Day 8, 4 page 17, line 16. I said in relation to 5 Professor Parker: 6 "Have you been given the opportunity to read her 7 report and look at her comment on those epidemiological 8 studies?" 9 That was a reference to the NRPB studies. 10 "I've looked at it but not in great deal." 11 Was the answer he gave. 12 Putting it shortly, the point I making on the expert 13 evidence is that you will see when you get to the 14 Secretary of State's submissions that CPR 35 is used 15 bluntly as a weapon -- bluntly as a blunt weapon. That 16 is sauce for the goose and the gander because the nature 17 of the instructions given and as understood by the 18 experts for the Secretary of State is that they were 19 required to answer very limited questions. The 20 Secretary of State has chosen a battleground which, for 21 the reasons I already submitted, do not reflect the 22 Upper Tribunal's decision and have gone down that route. 23 MR JUSTICE BLAKE: This is not a case where the instructions 24 have gone in, is it? 25 MR TER HAAR: Only to the extent that they are -- not in</p> <p style="text-align: center;">Page 129</p>	<p>1 missing appendix A and I seem to remember I asked him to 2 try and reconstruct that so we did have clarity. 3 MR TER HAAR: And he did. 4 MR JUSTICE BLAKE: And he did that, did he? 5 MR TER HAAR: Yes. 6 MR JUSTICE BLAKE: Did it then turn out that he has dug up 7 a whole lot of files which you've never seen or anything 8 of that sort? 9 MR TER HAAR: No. 10 MR JUSTICE BLAKE: There's not a missing cache found in 11 Bletchley Park or somewhere else. 12 MR TER HAAR: There was no George Carmen moment, no. What 13 there was was -- 14 (Sotto voce joke) 15 He was clearly given a lot of material and 16 effectively told to go and rummage away in it and see 17 what he came up with. 18 MR JUSTICE BLAKE: The only question I wanted to raise was 19 just to make sure -- and I rely upon you to tell me -- 20 that the material he had was material that had been 21 directly or indirectly disclosed in this lot, was it? 22 Did he go off on a frolic of his own and look at a cache 23 of original documents which you and your team have never 24 seen in reality or constructively? There's a million 25 and one documents and the idea that you'll all keep it</p> <p style="text-align: center;">Page 131</p>
<p>1 that sense but each of the experts recites what they 2 believe they are instructed to do and they also 3 amplified that in cross-examination. 4 MR JUSTICE BLAKE: But it hasn't been a case where that's 5 lifted the LPP -- 6 MR TER HAAR: No separate, but I am content to accept what 7 is said by the experts to be their instructions, or are 8 their instructions. 9 Again, somebody reviewing their reports simply 10 didn't have in mind the normal processes because no one 11 of the three actually clearly set out the material that 12 they had been asked to consider and do consider. 13 So the review process by the respondent's legal team 14 clearly had a slightly muddled view about what CPR 35 15 is. I'm not complaining about it, except in this sense. 16 When you see the submissions and see the attack which is 17 coming this way against particularly Professor Busby's 18 witnesses -- 19 MR JUSTICE BLAKE: I think let Professor Busby -- 20 MR TER HAAR: Well -- 21 MR JUSTICE BLAKE: You look after your team, your 22 appellants. 23 MR TER HAAR: Can I move on then to -- 24 MR JUSTICE BLAKE: But in that context on that particular 25 point, I remember you scored a hit with Mr Hallard about</p> <p style="text-align: center;">Page 130</p>	<p>1 in your head, I know you are all remarkable men and 2 women, but it seems unlikely. 3 MR TER HAAR: I will be corrected if I'm wrong. My belief 4 is everything he listed was if you like in play. 5 MR JUSTICE BLAKE: In play. That's all I was -- for obvious 6 reasons. 7 MR TER HAAR: Yes. 8 Can I, maybe the last thing before we adjourn for 9 the mid-afternoon break, just deal with one other matter 10 on experts. 11 Generally my feeling is that courts or tribunals 12 don't like attacks on experts who are doing their best. 13 I'm not going to make that sort of attack, but I am 14 going to make one qualification in relation to 15 Professor Thomas. 16 When I asked Professor Thomas questions, there were 17 tinges that she had of if you like definitely 18 a viewpoint where she verged slightly on the 19 argumentative side but nothing unacceptable and the sort 20 of thing that tribunals are used to. 21 But -- and this is important as part of my case in 22 relation to Wahab and Rowland -- when she was 23 cross-examined by Dr Busby her whole demeanour changed 24 and obviously there's a history there I don't know. 25 MR JUSTICE BLAKE: Obviously I have had disclosed</p> <p style="text-align: center;">Page 132</p>

1 subsequently what I didn't know at the time that she's
 2 been under some degree of personal attack, not
 3 necessarily for the evidence in this case but for other
 4 things she has said.
 5 MR TER HAAR: There may be some explanation there, and I get
 6 the impression it's going both ways. I don't know. But
 7 whatever the justification for it, the effect was, in my
 8 submission, that she lost objectivity in her passion in
 9 answering questions and she got to that point which
 10 human beings sometimes get to under pressure of throwing
 11 in points which suddenly occurred to her. When you
 12 re-read the transcript, there's a bit of that.
 13 Now, as I say, people who are provoked, if that's
 14 the right word, can find themselves in that position.
 15 The Tribunal is placed in a position where you have to
 16 sift through that and say: "This is not somebody who was
 17 at that moment giving evidence dispassionately". They
 18 may still be giving true views, that's also
 19 a possibility.
 20 MR JUSTICE BLAKE: If you give me the references when we
 21 come back where you think that may apply I'll record it
 22 and I will review that passage.
 23 MR TER HAAR: It's really the whole of the last morning of
 24 her evidence, which is the morning where she received
 25 the telegrams.

Page 133

1 MR JUSTICE BLAKE: I have all the telegrams somewhere.
 2 MR TER HAAR: As I say, the fact that she was feeling
 3 passionate, I'm not entering into that debate as to why
 4 or whether it's right or understandable. I'm just
 5 recording on behalf of my clients the fact that she
 6 clearly did and the reason why it's important to my
 7 clients is that at one point under cross-examination she
 8 cast considerable doubt in a couple of throwaway lines,
 9 which we've recorded in our submissions, on the mFISH
 10 method of chromosomal aberration studies.
 11 MR JUSTICE BLAKE: Well, yes.
 12 MR TER HAAR: Would you rather I came back to that subject?
 13 MR JUSTICE BLAKE: I think that would be a good idea. If we
 14 come back at 25 past and then we'll continue to -- I can
 15 go to 4.20 but I have to get upstairs.
 16 MR TER HAAR: I will make sure I will finish as close to
 17 4.15 as is the end of a sentence.
 18 MR JUSTICE BLAKE: Thank you.
 19 (3.13 pm)
 20 (A short break)
 21 (3.25 pm)
 22 MR TER HAAR: My Lord, I was on the question of some
 23 submissions about Professor Thomas and, as I say, my
 24 submission is I don't know, and I'm not going to go
 25 into, why she had such a fierce response to

Page 134

1 Professor Busby but that she did is the case. Where
 2 I am concerned about it is where it affects what seems
 3 to be almost a side swipe at the case on the
 4 Wahab/Rowland study.
 5 MR JUSTICE BLAKE: Yes.
 6 MR TER HAAR: Could I ask you to take up the transcript file
 7 if you have the transcript for Day 5.
 8 MR JUSTICE BLAKE: Yes, I have it. I don't know if my
 9 colleagues have it.
 10 MR TER HAAR: We can lend a copy.
 11 MR JUSTICE BLAKE: We can share.
 12 MR TER HAAR: One moment. (Handed).
 13 MR JUSTICE BLAKE: Day 5.
 14 MR TER HAAR: Day 5, page 85.
 15 MR JUSTICE BLAKE: 85.
 16 MR TER HAAR: Using this, the small numbering. Now at line
 17 13, Dr Busby took Professor Thomas to the Wahab and
 18 Rowland study because that is SB7/123.
 19 MR JUSTICE BLAKE: Yes.
 20 MR TER HAAR: "Okay. Now, can we go to SB7/123. You are
 21 familiar with this paper?"
 22 "Answer: Yes.
 23 "Question: I am sure you are because it's quite
 24 a cause celebre amongst these cases. Would you agree
 25 that what it shows is that there is an excess chromosome

Page 135

1 damage, chromosome translocation frequencies, and also
 2 they studied chromosome aberrations in some cases.
 3 "Answer: Again, I have questions over the
 4 methodology used. Again, it was a small sample size.
 5 When we look for chromosome abnormalities, when we study
 6 patient samples, we don't just do one part of the cells,
 7 we will do multiple sampling to look for regional
 8 variance and things like that and I can't see any
 9 statistics on that in this.
 10 "So although they looked at a large number of cells,
 11 they looked at a relatively small number of individuals.
 12 Again, my queries are the same as they were for previous
 13 studies, it's a very small sample size, you don't know
 14 it's representative of the larger group.
 15 "So it says what it says, but whether you can draw
 16 conclusions as to the larger group and to other groups
 17 of veterans, I'm afraid I would not be happy with
 18 drawing that conclusion from this. It's statistically
 19 unsound."
 20 Now stopping there, what one has to try and remember
 21 is Professor Thomas' demeanour as she gave that answer.
 22 It was tumbling out. It came out word after word after
 23 word after word.
 24 Now, so first of all one needs to ask the
 25 question: was she being dispassionate in giving these

Page 136

<p>1 answers?</p> <p>2 But also, even if she was, you will notice there</p> <p>3 that she is not asking herself the question which the</p> <p>4 Upper Tribunal would have said should have been asked.</p> <p>5 She is asking -- she says at line 8 on page 86:</p> <p>6 "So it says what it says but whether you can draw</p> <p>7 conclusions as to a larger group and to other groups of</p> <p>8 veterans, I'm afraid I would not be happy with drawing</p> <p>9 that conclusion from this."</p> <p>10 Now I can understand as a scientist she's got</p> <p>11 a view, but the question is, for this Tribunal, does it</p> <p>12 raise questions which either cause one to doubt previous</p> <p>13 work or which require further investigation? Now I'll</p> <p>14 come to the further investigation in a moment, material</p> <p>15 which you haven't seen.</p> <p>16 Just for completeness, when she'd finished being</p> <p>17 cross-examined by Professor Busby, Dr Rayner asked some</p> <p>18 questions. If you go to page 93 in the same transcript</p> <p>19 Dr Rayner at page 93, line 13, politely took</p> <p>20 Professor Thomas back to SB7, tab 123, and at line 18</p> <p>21 Dr Rayner said:</p> <p>22 "Yes. I am not going to ask you about the studies</p> <p>23 first of all, I just want to ask your general opinion on</p> <p>24 the validity of the mFISH technique and its application.</p> <p>25 "Answer: Yes, not good, I think. I mean, there's</p> <p style="text-align: center;">Page 137</p>	<p>1 as she gave her evidence.</p> <p>2 MR JUSTICE BLAKE: Yes.</p> <p>3 MR TER HAAR: But can I take you to the Government evidence,</p> <p>4 Dr Braidwood in a previous proceedings. This is at</p> <p>5 SB14, so that file can go away.</p> <p>6 MR JUSTICE BLAKE: I think my colleagues are not connected</p> <p>7 to the Internet whilst we are here so I have been making</p> <p>8 sure we have a download of the day's events but we are</p> <p>9 happy to share them.</p> <p>10 MR TER HAAR: If the other members of the Tribunal aren't</p> <p>11 getting hard copies and would like hard copies of the</p> <p>12 transcripts they can easily be provided.</p> <p>13 MR JUSTICE BLAKE: I think the answer is yes for both.</p> <p>14 MR TER HAAR: I make these offers because I'm not the person</p> <p>15 who has to do the hard work!</p> <p>16 MR JUSTICE BLAKE: You know what memos our clerks are given</p> <p>17 about printing out things ...</p> <p>18 MR TER HAAR: At any rate, we will make sure that two more</p> <p>19 hard copy sets of transcripts are provided.</p> <p>20 MR JUSTICE BLAKE: Well, thank you.</p> <p>21 MR TER HAAR: I might even offer it, just to show how much</p> <p>22 I like to give apples to teachers, in a mini version.</p> <p>23 Very readable.</p> <p>24 MR JUSTICE BLAKE: But too mini and then you are bringing</p> <p>25 out the monocle in order to read it.</p> <p style="text-align: center;">Page 139</p>
<p>1 been a lot of discussion about looking at chromosomal</p> <p>2 aberrations using these type of techniques. I don't</p> <p>3 think we would use these any morning going into the</p> <p>4 future, we turn to genome sequencing and things like</p> <p>5 that, because we can do it.</p> <p>6 "These tests are -- I mean, usually you have to have</p> <p>7 quite a high impact on your cells. I think some of</p> <p>8 these were done a very long while after the actual</p> <p>9 exposure. I am interested -- I mean, that suggests to</p> <p>10 me that, if these are genuine, then those must be in</p> <p>11 stem cells because you will have lost your circulating</p> <p>12 lymphocytes during the 50-year period several times</p> <p>13 over. I find it very strange that these results are</p> <p>14 valid given the -- and due to radiation exposure, they</p> <p>15 could be due to many other things -- and due to</p> <p>16 radiation exposure after a 50-year gap."</p> <p>17 MR JUSTICE BLAKE: And I clarified two sources.</p> <p>18 MR TER HAAR: Yes. Now that is where for the first time in</p> <p>19 this hearing doubt was expressed as to the mFISH method</p> <p>20 of looking at cells. I'm not sure that's the right</p> <p>21 scientific way of describing it but I think the Tribunal</p> <p>22 know what I mean.</p> <p>23 MR JUSTICE BLAKE: Yes.</p> <p>24 MR TER HAAR: Can I move from that and the Tribunal will</p> <p>25 make whatever it does of my submissions as to her manner</p> <p style="text-align: center;">Page 138</p>	<p>1 MR TER HAAR: I think probably you'd find it -- I'm going to</p> <p>2 make a gamble. I will offer it to you in A5 and if you</p> <p>3 say it's unreadable we'll do it again in A4.</p> <p>4 MR JUSTICE BLAKE: I think some of us are having to make</p> <p>5 long journeys with these documents.</p> <p>6 MR TER HAAR: I hope to have them done by tomorrow but at</p> <p>7 any rate as soon as possible.</p> <p>8 MR JUSTICE BLAKE: Yes, thank you.</p> <p>9 MR TER HAAR: I was going to take you to bundle SB14, and</p> <p>10 this is something which you haven't been asked to look</p> <p>11 at before and so it's new territory. Could you go,</p> <p>12 please, in bundle SB14 to tab 5.7.</p> <p>13 MR JUSTICE BLAKE: Yes. This is cross-examination below.</p> <p>14 MR TER HAAR: This is, yes, the previous hearing,</p> <p>15 cross-examination.</p> <p>16 MR JUSTICE BLAKE: Yes.</p> <p>17 MR TER HAAR: And the witness I am about to take you to is</p> <p>18 a Dr Braidwood who is the Government medical officer.</p> <p>19 MR JUSTICE BLAKE: Yes, she's the medical officer who</p> <p>20 made --</p> <p>21 MR TER HAAR: Makes the decisions.</p> <p>22 MR JUSTICE BLAKE: Yes.</p> <p>23 MR TER HAAR: And she was being asked questions, or I think</p> <p>24 perhaps more accurately came to defend the decisions</p> <p>25 rather than to make them. Mr Heppinstall will be able</p> <p style="text-align: center;">Page 140</p>

<p>1 to correct me about that. But she was being asked 2 questions about the Wahab/Rowland study, and at page 74 3 if we could start from there, at page 74, line 13, 4 Mr Heppinstall is asking questions. 5 MR JUSTICE BLAKE: So is this re-examination? 6 MR TER HAAR: I think it's an interruption of 7 cross-examination. 8 MR JUSTICE BLAKE: Interjection. Right. 9 MR TER HAAR: We see that from line 8: 10 "Mr Heppinstall: It's not for me to give you legal 11 advice mid cross-examination." 12 Perhaps I should go back. The question is this -- 13 I started at the wrong place. Go back to page 73, 14 higher up the page. 15 MR JUSTICE BLAKE: Yes, is that 22? 16 MR TER HAAR: 22: 17 "Question: We now have the present Prime Minister 18 as Leader of the Opposition [possibly that may be where 19 he is still], a letter written on behalf of David 20 Cameron, his office, Thursday, 1 December 2009, in the 21 middle: 22 'The Government recently promised [and of course 23 then it was a Labour Government] to undertake a health 24 analysis ...(Reading to the words)... servicemen and 25 their families.'</p> <p style="text-align: center;">Page 141</p>	<p>1 between his teeth. 2 MR JUSTICE BLAKE: Yes, I -- well anyway. I've read quite 3 a lot of Mr Metzger over the last two or three working 4 days. 5 MR TER HAAR: At any rate, if we go over the page. 6 MR JUSTICE BLAKE: I know him well, of course. 7 MR TER HAAR: If you go over the page, at the bottom of 8 page 78 he has been pressing: why wasn't a further study 9 done? 10 MR JUSTICE BLAKE: 78? 11 MR TER HAAR: Line 20. 12 MR JUSTICE BLAKE: Line 20. 13 MR TER HAAR: The bottom of the page: 14 "The Secretary of State's position, in spite of what 15 I suggest is powerful evidence from the Rowland report, 16 is not to implement the recommendations contained within 17 that, but to maintain an overall position that no 18 exposure to harmful ionising radiation exists in 19 relation to these appellants." 20 Then it's the next answer which is the one I rely 21 upon in particular. 22 "I think you are putting words into my mouth, 23 forgive me. I think that the Rowland report showed 24 a significant difference between the two groups, and as 25 a scientist or someone who is interested in</p> <p style="text-align: center;">Page 143</p>
<p>1 "Why has the Secretary of State not carried out 2 a Rowland-type study in this country? 3 "Answer: Am I allowed to answer that? 4 "Mr Heppinstall: It's not for me to give you legal 5 advice mid-cross-examination. 6 "Judge Stubbs: [The President of the Tribunal] It 7 doesn't relate to the points that you were making just 8 now, a meeting between minister and the individual -- 9 "Mr Heppinstall: Insofar as it's within your 10 knowledge, Dr Braidwood, yes. Insofar as it touches and 11 concerns a private meeting between an MP acting on 12 behalf of his constituents and a Minister, no. 13 "Answer: All right. May I just say that I think 14 there are a couple of thing which are quite important." 15 Then she gives some evidence about qualifications as 16 to the report carried out. 17 There's then a small speech by Mr Heppinstall at the 18 top of page 75, but in fact I think to be fair it was 19 actually not Mr Heppinstall but Mr Metzger 20 cross-examining. He has wrongly been recorded. 21 MR JUSTICE BLAKE: The authorship has been -- is that right? 22 Shall we delete Mr Heppinstall? 23 MR HEPPINSTALL: Yes. 24 MR JUSTICE BLAKE: Right. 25 MR TER HAAR: It is Mr Metzger. Anyway, he gets the bit</p> <p style="text-align: center;">Page 142</p>	<p>1 evidence-based work I would have been interested to 2 replicate this study in a variety of populations and 3 certainly including United Kingdom atomic veterans. 4 That that was not done was not my decision." 5 She's pressed as to why it wasn't done. 6 Importantly, she as a Government scientist, 7 a Government medical expert, says that she would have 8 been interested to replicate this study and she accepts 9 that it shows a significant difference between the two 10 groups. 11 Now, if that's the position of the Government 12 medical officer it's quite remarkable that without prior 13 warning, as I understand it in these proceedings 14 Mr Heppinstall is going to invite you to reject 15 completely any message to be derived from the 16 Wahab/Rowland report. 17 Because this is so central to our case I am going to 18 take you to our written closing submissions on this to 19 tie together what we say there. I'm not going to repeat 20 everything that is in our written closing submissions 21 but this part I submit is of such fundamental importance 22 I want to take you through what we've said. 23 So if you have a black file of closing submissions 24 I handed up this morning. 25 MR JUSTICE BLAKE: Yes.</p> <p style="text-align: center;">Page 144</p>

<p>1 MR TER HAAR: This is to be found at page 39, tab 1. 2 MR JUSTICE BLAKE: Right. Do we need this? 3 MR TER HAAR: No. 4 MR JUSTICE BLAKE: We've done that. 5 MR TER HAAR: Been there, done that. 6 MR JUSTICE BLAKE: Yes. I'm going to put away file SB1 as 7 well. 8 MR TER HAAR: Yes, absolutely. 9 MR JUSTICE BLAKE: Yes. 10 MR TER HAAR: All you need, certainly for the next 11 20 minutes, is my submissions. I am asking you to go to 12 page 39, please. 13 At the bottom of that page with the cross heading 14 "Calculating dose retrospective dosimetry", this is 15 where we have the start of a lengthy section which deals 16 with our submissions in relation to the Wahab/Rowland 17 survey. We say this at paragraph 91: 18 "The second way of calculating a dose for the 19 appellants is to conduct retrospective dosimetry. An 20 example of such an exercise involves looking for 21 statistically significant chromosomal abnormalities and 22 estimating the dose required to cause such 23 an abnormality. In these appeals the focus is on the 24 outcome of the study by Rowland et al." 25 You know that that's in bundle SB7/tab 123.</p> <p style="text-align: center;">Page 145</p>	<p>1 MR JUSTICE BLAKE: Yes. 2 MR TER HAAR: We summarise, I hope it would be accepted 3 accurately, the effects of the report going over to 4 page 42. 5 MR JUSTICE BLAKE: Page 42. 6 MR TER HAAR: The top of page 42, paragraph 101. That's 7 still just recording what the report concluded. 8 MR JUSTICE BLAKE: Right. 9 MR TER HAAR: Then 102, we refer to the question asked by 10 Dr Rayner of Professor Thomas and we recorded the 11 answer, and then we say this: 12 "It is not clear why Professor Thomas told Dr Rayner 13 there was no elevated rate of dicentric. This appears 14 not to be the case since there are 12 dicentric in the 15 veterans and one in the controls. The authors of the 16 Rowland study report were therefore correct to draw 17 attention to the increased levels of dicentric as 18 pointing to radiation exposure as explanation of the 19 chromosomal abnormalities. The perceived wisdom is that 20 these are linked to radiation. The authors of the 21 Rowland report also considered that the time period 22 since the tests invalidated their results but concluded 23 that this was not the case. They say that their 24 conclusion was in line with the findings of other 25 investigations and reported that past radiation can</p> <p style="text-align: center;">Page 147</p>
<p>1 "There are in fact two documents to which the 2 Tribunal's attention is referred. These are the Nuclear 3 Test Veterans Study and the Elevated Chromosomal 4 Translocations Frequency, the Rowland report." 5 You may remember that at tab 123 two documents are 6 to be found there. 7 MR JUSTICE BLAKE: Yes. 8 MR TER HAAR: "Both of these documents are written by the 9 same authors and are found in the bundles." 10 The reference I have already given, SB7/123. 11 "The HL Appellants submit that the conclusion of the 12 Rowland report and the study, namely that the 13 New Zealand veterans were exposed to ionising radiation 14 resulting in chromosome aberrations and had a mean dose 15 of 170 millisieverts is highly supportive of their case 16 that the appellants were exposed to ionising radiation 17 on Christmas Island at much greater levels than the SOSD 18 admits." 19 I point out you are now familiar with the contents 20 of the report. 21 "The key facts and conclusions are set out below for 22 ease of reference." 23 We then set out some details. I'm not going to read 24 them out. You probably already know this and you know 25 where to find them.</p> <p style="text-align: center;">Page 146</p>	<p>1 leave a permanent signature in the genomes several years 2 after the event. 3 "Therefore, our results are not extraordinary, 4 despite a gap of 50 years after the initial event. The 5 yet further indicator that ionising radiation was the 6 cause of the aberrations to the high number of cells 7 with extraordinary complex chromosomal rearrangements, 8 known as rogue cells. The authors state [and we add the 9 emphasis in what follows]: the presence of CCRs in 10 veterans may be viewed as an additional indicator of 11 past radiation exposure. Lazutka (1996) reported that 12 rouge cells are seen in patients after nuclear accidents 13 concomitant with the stimulation of JC virus 14 antibodies. This not surprising considering the immune 15 system is known to be compromised by exposure even to 16 low levels of ionising radiation. The high rogue cell 17 count we observed in veterans could be interpreted as 18 signature of immuno deficiency arising initially as a 19 consequence of radiation exposure." 20 Then we set out the overall conclusion of the 21 Rowland report, which you've already seen. 22 We then carry out a survey of the expert evidence in 23 these and previous proceedings, in particular the 24 previous proceedings, relating to this report. First of 25 all, Professor Brenner, and of course I took you to this</p> <p style="text-align: center;">Page 148</p>

<p>1 earlier. SB11, tab 1. 2 "We point out that Professor Brenner is the" -- 3 MR JUSTICE BLAKE: I have read all those references. 4 MR TER HAAR: Yes. 5 You can see, important, at 109: 6 "His field of expertise, according to his report, is 7 the biological effect of radiation at the cytogenetic 8 and human level. So therefore he is well placed to give 9 evidence on the topic wholly within his field of 10 expertise, namely mFISH analysis." 11 We set out what he says. 12 Paragraph 110: 13 "Quite properly as an expert he recognises the 14 possibility that veterans' abnormalities might be 15 attributable to some other factor, although he knew of 16 no direct evidence that they were in fact from some 17 other factor. This being the case the most likely 18 source of increased chromosome aberrations is radiation 19 exposure, and if this is the case the radiation dose 20 estimates produced in the Rowland study may be regarded 21 as state-of-the-art best estimates." 22 Then I have taken you already to Professor Brenner, 23 noting the evidence of Professor Kaldor. 24 Professor Brenner disagreed, and we cite what 25 Professor Brenner said about Professor Kaldor.</p> <p style="text-align: center;">Page 149</p>	<p>1 accepted eminent -- 2 MR JUSTICE BLAKE: You are going to get double tick under 3 "Professor Brenner, eminent"; right? So far so good. 4 If he points out that the IAEA has validated the same 5 dose reconstruction method used by Rowland and Wahab, 6 there's a potential win-win for you there. 7 MR TER HAAR: Absolutely. Now, I may be corrected -- I am 8 being corrected -- totally wrong, it's not in the SB 9 bundles, the IAEA paper is at bundle SB20, tab 11. 10 (Pause) 11 I can fall into error at the drop of hat, but -- 12 MR JUSTICE BLAKE: SB20/150, was that? 13 MR TER HAAR: SB20/11. 14 MR JUSTICE BLAKE: Tab 11. 15 MR TER HAAR: Yes. 16 MR JUSTICE BLAKE: All right. 17 MR TER HAAR: I was going to go on to page 46, 18 Professor Parker. 19 MR JUSTICE BLAKE: Yes, I just pulled you back, I'm sorry. 20 MR TER HAAR: No, no, and I wish I had it at my fingertips. 21 MR JUSTICE BLAKE: No, no, well -- 22 MR TER HAAR: Professor Parker, called on behalf of my 23 clients. 24 MR JUSTICE BLAKE: Yes. 25 MR TER HAAR: I do not believe that the Secretary of State</p> <p style="text-align: center;">Page 151</p>
<p>1 So first of the experts in the files. 2 Professor Brenner, fully supportive that the Rowland 3 Wahab study shows something related to radiation. 4 Professor Parker, we have referred to her evidence, 5 she -- and I don't think it's disagree that she is 6 a respected Canadian epidemiologist. 7 MR JUSTICE BLAKE: Sorry, 111, the words in bold in the 8 quote from Brenner's comment on Kaldor, does the 9 interested observer have the IAEA 2001 comment on dose 10 reconstruction based on FISH? 11 MR TER HAAR: I am tolerably certain you do not, but I may 12 be corrected. 13 MR JUSTICE BLAKE: Do you have it? Was it attached to 14 a Brenner report at some stage? 15 MR TER HAAR: That's what I mean, it certainly isn't in the 16 SB bundles and I am tolerably certain it's not in the 17 archives, but I might be proved wrong. 18 MR JUSTICE BLAKE: Yes. I'm a little cautious about DIY, us 19 doing it ourselves, without the opportunity of you 20 reviewing it. 21 MR TER HAAR: Yes, well whether it's feasible for us as 22 a team to get hold of it, I don't know, but we'll see 23 what we can do. 24 Certainly we rely upon -- in my simple world I rely 25 upon this as being the conclusions of an eminent --</p> <p style="text-align: center;">Page 150</p>	<p>1 would argue with the description that she is a respected 2 Canadian epidemiologist. 3 MR JUSTICE BLAKE: Okay, well -- 4 MR TER HAAR: I certainly put in terms to Professor Thomas 5 whether she was somebody who could be respected, or 6 words to that effect, and she accepted that she was. 7 She said there were other epidemiologists she preferred, 8 but she accepted that she was somebody whose evidence 9 was credible and carried weight. 10 She also looked at the Rowland report, and we have 11 set out her evidence in relation to it. 12 Now so far it might be said well what you are doing 13 is referring to evidence which is put in on behalf of 14 the claimants and we should take that under advisement 15 in that respect. 16 So now I turn to one of the Secretary of State's 17 experts, page 47, bottom of the page, Dr Lindahl. 18 MR JUSTICE BLAKE: Yes. 19 MR TER HAAR: She was originally instructed in the 20 negligence litigations you see at paragraph 115. 21 MR JUSTICE BLAKE: Yes. 22 MR TER HAAR: His view about mFISH, in his 2006 report, says 23 "it appears an excellent technique to detect stable 24 translocations". 25 MR JUSTICE BLAKE: Yes.</p> <p style="text-align: center;">Page 152</p>

<p>1 MR TER HAAR: As to the Rowland report, he said, at the top: 2 "The work appears technically well-founded. 3 Demonstration of a threefold increase in DNA 4 translocations in a small group of 50 nuclear test 5 veterans compared to age map (?) control group is 6 reported and appears credible." 7 This is the Secretary of State's expert witness. 8 MR JUSTICE BLAKE: Yes. 9 MR TER HAAR: He then goes on in 116 -- and this is where 10 transformation from negligence litigation to War Pension 11 Appeal is important -- he says this: 12 "On balance, I believe that most of the increased 13 DNA translocation frequency detected by the mFISH method 14 in many of the New Zealand nuclear war veterans might 15 have been caused by the exposure to some form of 16 ionising radiation or, alternatively, by exposure on 17 ships to organic solvents or related chemicals that are 18 able to cause chromosome damage. It is not possible to 19 conclude on the balance of probabilities that 20 a 51 per cent or a higher chance of increase of 21 translocations were due to direct exposure to ionising 22 radiation rather than something else, although this 23 remains a possibility." 24 MR JUSTICE BLAKE: Yes. 25 MR TER HAAR: Professor Kaldor, you've already seen his view</p> <p style="text-align: center;">Page 153</p>	<p>1 Professor Thomas's criticisms of the mFISH technology 2 are misplaced. In light of the evidence she gave the HL 3 appellants put in evidence a recent report from Tawn and 4 others published in the Journal of Radiation Research 5 2015 entitled 'Chromosome aberrations determined by FISH 6 in radiation workers in the Sellafield nuclear 7 facility'. 8 We cite the introduction to that report, and that is 9 a 2015 report which uses the FISH or mFISH technique in 10 the context of the radiation workers at Sellafield. 11 So, as we conclude at 125: 12 "Although this report does not consider the nuclear 13 veterans of Christmas Island or the Rowland Wahab study 14 it does not obviously corroborate Professor Thomas's 15 evidence that mFISH has fallen out of use and is 16 an unsafe way of reconstructing historical dose 17 estimates. A peer review study suggested the opposite." 18 Then finally Dr Darroudi: 19 "It's fair to say that in his report for the 20 original litigation he was critical of the Rowland 21 study. However, we emphasise, it's important that the 22 Tribunal bears in mind his report is prepared with the 23 balance of probabilities test in mind. He was not 24 instructed to say whether or not the Rowland study gave 25 rise to a reasonable doubt that exposures were higher</p> <p style="text-align: center;">Page 155</p>
<p>1 as re-recorded, so to, speak in Dr Brenner's report, but 2 we've set it out again at page 118. You'll see it in 3 italics, and the sentence we've already been to today in 4 bold type in 118. 5 We then comment on Professor Thomas, and I cite the 6 passage that I have already taken you to about her 7 criticism of mFISH. 8 We make these points at page 50, paragraph 122. We 9 first of all said none of it was foreshadowed, but then 10 we say: 11 "More fundamentally, although Professor Thomas was 12 in some respects critical of the mFISH study, at no 13 point did she suggest that the evidence was effectively 14 worthless and unreliable." 15 In other words, if we apply the statutory test, she 16 didn't elevate it to that standard. 17 "Indeed, having set out her reservations about 18 mFISH, Professor Thomas said that a lot of people are 19 not using it. The obvious implication that some people 20 are still using it. In giving her evidence at this 21 stage of the proceedings it appears that 22 Professor Thomas was not focusing on the legal test and 23 was simply expressing her opinion on the technology." 24 The next paragraph: 25 "The HL appellants suggested in any event that</p> <p style="text-align: center;">Page 154</p>	<p>1 than had been recorded. Had he been asked these 2 questions he may well have agreed that a reasonable 3 doubt was raised in a similar way to Professor Kaldor." 4 We've quoted that. 5 MR JUSTICE BLAKE: Darroudi stays as a report in the civil 6 litigation. He never gave a report for the War Pensions 7 Chamber and never was called as a witness. 8 MR TER HAAR: Absolutely correct. 9 MR JUSTICE BLAKE: Right, okay. 10 MR TER HAAR: So he is actually the high point in the 11 original evidence of criticism of the Rowland Wahab 12 report. The Secretary of State did not, for the purpose 13 of the last FTT or for the purpose of this FTT, ask 14 Dr Darroudi to address his attention to the relevant 15 legal test. 16 MR JUSTICE BLAKE: Yes. Just can we just go back to 125, 17 the critical importance of the Rowland Wahab study. 18 I have a lot more reading to do personally on this, and 19 I say "I" because others may well be further ahead of 20 me. But my present understanding is that mFISH was used 21 by a bioscience technique to identify chromosomal 22 aberrations. Having got that data using the mFISH 23 technique and its intricacies that the team then sought 24 to ask the question: what level of exposure to ionising 25 radiation would you need to get a similar magnitude of</p> <p style="text-align: center;">Page 156</p>

1 chromosome changes? So they then expose mice or
 2 someone, acute doses of tissue, to levels of ionising
 3 radiation and that's where you get the stats that we
 4 get.
 5 That part of the operation, is that an integral part
 6 of mFISH or is that a different operation which seeks to
 7 turn mFISH into a dosimetry? Do you follow what I mean?
 8 MR TER HAAR: I follow what you mean. I am pretty sure I
 9 know the answer. Let me just check I have the answer
 10 right.
 11 MR JUSTICE BLAKE: Yes. (Pause)
 12 I am corrected, it was the blood of donors, not
 13 mice. We haven't got an animal/human translocation
 14 issue there.
 15 MR TER HAAR: No. The answer is that my -- I believe you
 16 are right, it is in fact a two-stage exercise. Step 1
 17 is using mFISH, which is what Professor Thomas
 18 criticises, to establish that there is chromosomal
 19 aberrations.
 20 MR JUSTICE BLAKE: Yes.
 21 MR TER HAAR: Then you ask, next question, what does that
 22 mean? What level of radiation would you have to apply
 23 in order to get that result?
 24 MR JUSTICE BLAKE: Yes. Right. It's just that -- this is
 25 expressed in 125 -- the Tribunal member absorbing all

Page 157

1 this and cut and pasting it in a decision might be
 2 erring because there may be two questions.
 3 MR TER HAAR: Yes. I think if one takes 125, the Thomas
 4 criticism was at the first stage saying: what are you
 5 doing using mFISH? It's old technology.
 6 MR JUSTICE BLAKE: Yes. Now whole genome sequencing, which
 7 we now know --
 8 MR TER HAAR: And then she wasn't, as such, criticising the
 9 second stage of trying to work out what it might mean.
 10 There may be separate criticisms of that, but that was
 11 not what the point was.
 12 MR JUSTICE BLAKE: That's why I wanted to say, you know, two
 13 points of exploration, as we read it. Thank you.
 14 MR TER HAAR: Can I then, while on that, though, just look
 15 at, again, how this Tribunal should deal with that
 16 suggestion. Let me assume for the moment that the
 17 Tribunal were to say, applying the right test, we do not
 18 think that today it will be a safe -- using today's
 19 standards it would be a safe approach to use the mFISH,
 20 you would use genomes today. That doesn't invalidate
 21 the old study. Professor Thomas was missing the point,
 22 in a sense. As I say, she was getting a bit carried
 23 away. The question is --
 24 MR JUSTICE BLAKE: I think we see the logic of that
 25 proposition.

Page 158

1 MR TER HAAR: Thank you.
 2 MR HEPPINSTALL: That point is not being taken.
 3 MR TER HAAR: So the rest of --
 4 MR JUSTICE BLAKE: Just before you go on to the rest, can
 5 I ask yet another question? You've just taken us to
 6 Dr Braidwood's answers in 2013 about how she, as
 7 a scientist, would have been interested in a UK mFISH
 8 replicating study, but for reasons beyond her control it
 9 wasn't done.
 10 Is that the only form of investigation that could
 11 have been done that might have been relevant to the
 12 issues for the appellants in these appeals? In
 13 particular, would an individual piece of either
 14 pathology or examination of blood sample of a living
 15 human being have potentially revealed the answer to
 16 a curious observer, does X have evidence of genetic
 17 modifications?
 18 MR TER HAAR: The answer first of all is as I understand it,
 19 I don't believe this has been fully explored in the
 20 evidence but I may be corrected if I'm wrong. Nobody
 21 I think has suggested that everybody who has a cancer
 22 which is related back or other condition which is
 23 related back to the Christmas Island ionising is bound
 24 to have chromosomal aberrations. I'm not sure whether
 25 that has been explored.

Page 159

1 My understanding is certainly what the study says is
 2 if you find chromosomal aberrations and can exclude all
 3 other causes, paint or whatever else people are
 4 suggesting, then you are left with -- let's, on this
 5 point, I'll take it on the balance of probability --
 6 you're left with the probability that those aberrations
 7 were caused by exposure to ionising radiation. And if
 8 you can exclude the possibility that there had been any
 9 other source of ionising radiation in the meantime you
 10 then, on a balance of probability, would be able to
 11 establish that those New Zealand sailors were exposed to
 12 ionising radiation and the only possibility would have
 13 been -- that's if you are dealing with it on the balance
 14 of probabilities. Of course, we're dealing with
 15 a different --
 16 MR JUSTICE BLAKE: True, true.
 17 MR TER HAAR: -- but as to whether it would have been
 18 possible, for example, to carry out a survey of all the
 19 surviving atomic explosion veterans from the
 20 United Kingdom, I assume theoretically it would and you
 21 could have come through controls. That's not been done.
 22 MR JUSTICE BLAKE: No, but I mean I appreciate it hasn't
 23 been done, I mean, you have Dr Braidwood's evidence
 24 which points it out. I suppose the question -- and
 25 forgive me if it's scientifically ignorant in some

Page 160

1 way -- is could, for any particular claimant or
 2 appellant, the person who says, "I'm in a similar
 3 position to the New Zealand sailors, do a blood test on
 4 me to see whether my chromosomes have been modified"?"
 5 MR TER HAAR: I don't believe that question has been
 6 explored in the evidence.
 7 MR JUSTICE BLAKE: That's biologically possible, or you
 8 don't know?
 9 MR TER HAAR: I assume it's certainly biologically possible
 10 to do the test.
 11 MR JUSTICE BLAKE: Yes. You don't need a whole cohort
 12 sample just to ask that piece of medical --
 13 MR TER HAAR: But I am not sure you would get -- the answer
 14 from the Secretary of State would be, well that might be
 15 -- but that might just tell you that they had exposure
 16 through CT scans or the other. What is important is to
 17 establish a big enough cohort that you can say it's
 18 improbable that this number of people would all have
 19 been exposed to ionising radiation.
 20 MR JUSTICE BLAKE: But if none of them had had any
 21 chromosomal damage then -- I mean, I know these are
 22 speculations --
 23 MR TER HAAR: Because I don't -- I will be corrected if I'm
 24 wrong, we'll soon get to the end of the day and we can
 25 think about it overnight -- I'm not aware --

Page 161

1 MR JUSTICE BLAKE: Then park it, park it.
 2 MR TER HAAR: Yes. As I say, I'm not aware of that question
 3 having been raised in the way the Tribunal does. So
 4 it's one of those things, evidence which maybe might be
 5 possible, I don't know. But if I've got a better answer
 6 I'll give it to you in the morning.
 7 MR JUSTICE BLAKE: Yes.
 8 MR TER HAAR: You will by now be aware -- and we spell it
 9 out in the following part of our submissions -- how
 10 fundamental this question is capable of being. Because
 11 always bearing in mind the test, if there was this group
 12 of sailors who it's credible to suggest might well have
 13 been exposed to ionising radiation as a result of being
 14 involved in the test bomb process, test bomb testing
 15 process, and if, credibly, an alternative has been
 16 considered, then you have to ask yourself how safe are
 17 all of the foundations upon which the
 18 Secretary of State's case have been built?
 19 At the heart of that, if we come back to applied
 20 common sense -- which is always important in this sort
 21 of -- one has to remember that what was being done at
 22 the time was of course experimental, it was the nature
 23 of what was going on. Not only that, we know from, for
 24 example, Mr Hallard's evidence -- as he carried out
 25 research about surveys and who had dosimeters -- we know

Page 162

1 from the contemporaneous records which are in front of
 2 you that the people in charge of the safety processes
 3 thought they knew what they were doing. They thought,
 4 for example, that only the people nearest to the forward
 5 areas and in other very specialist areas would need
 6 dosimeters. As I put it at one point, "the boffins, not
 7 the conscripts", which is perhaps an unfortunate
 8 expression. But certainly they were selective because
 9 it was not the approach to say, "We simply don't know
 10 what the dangers are on a long-term basis, we must
 11 gather as much information about the health implications
 12 of this", what of course this was about, ground
 13 strategy, it was about gathering as much information as
 14 about the use of atomic bombs as weapons. And that's
 15 understandable, that is what everybody was there to do.
 16 But you cannot suggest that there were not built into
 17 this, or the Secretary of State cannot suggest that
 18 there weren't built into this enormous numbers of
 19 assumptions: how many dosimeters do you issue? Who gets
 20 radiation suits? Who gets put here? Who gets put
 21 there?
 22 MR JUSTICE BLAKE: When we get to Christmas Island at least,
 23 my present understanding of the documentation is that
 24 that was a judgment made on experience on previous tests
 25 where they concluded that giving a film badge to all was

Page 163

1 a waste of time.
 2 MR TER HAAR: There is certainly -- there are documentation
 3 which supports exactly that view. One of the documents
 4 suggests they had to throw thousands of these away
 5 because they just they showed no results.
 6 MR JUSTICE BLAKE: Yes.
 7 MR TER HAAR: But what was being done was making a series of
 8 assumptions, and nobody asking themselves at that
 9 point -- and you can understand why -- what are the
 10 long-term implications? What is going to happen to one
 11 of these young men when they want a pension in 40-years'
 12 time? Of course they weren't thinking about that.
 13 But --
 14 MR JUSTICE BLAKE: Well, no.
 15 MR TER HAAR: -- when working out levels of exposure, it's
 16 very important to keep in mind what people were really
 17 doing at the time, what their focus was. And I'm not --
 18 it's not any part of my case to suggest that my clients
 19 were deliberately placed in the way of danger, that's
 20 not my case. Those sort of suggestions have been made
 21 in other places, that's not what I'm here to put forward
 22 and promote. But that -- the level of protections,
 23 certainly in terms of measurements, wouldn't match up to
 24 examination today, was accepted by Mr Hallard. That is
 25 within his expertise, what you would carry out as

Page 164

<p>1 elementary safety procedures today was simply not done. 2 With the benefit of hindsight it's extraordinary that 3 urine samples were not being taken even of those in the 4 most exposed areas. 5 MR JUSTICE BLAKE: Yes. Since hearing Mr Hallard -- and 6 I see Mr Johnston conducting a fairly robust set of 7 opinions on the benefits of urine samples in 2013 -- 8 I don't know where the balance of opinion has ended up 9 on that, but do we get any help in this? 10 MR TER HAAR: No. All I do is point out that, certainly by 11 today's standards, what was being done wouldn't stand up 12 to muster for a moment. That was certainly accepted by 13 Mr Hallard who actually, on questions of health physics 14 and health and safety, was, I suggest, much more expert 15 than Mr Johnston, who was a physicist whose speciality 16 was creating the biggest bomb possible, the biggest bang 17 possible. 18 So it wouldn't be fundamentally surprising to 19 discover that against that background all the 20 assumptions that were made at the time, made in good 21 faith, yes, but may have been false. That's the 22 importance of Wahab Rowland, because something needs to 23 be explained away. My clients, for many of whom in fact 24 it's too late to get the pension, but the ones who are 25 left behind can't wait for another five years or ten</p> <p style="text-align: center;">Page 165</p>	<p>1 MR JUSTICE BLAKE: Well -- 2 MR TER HAAR: But sometimes one has to keep an eye on what 3 is going on. 4 I am going to go on to a different topic. I know 5 the Tribunal hasn't had an opportunity to read my 6 submissions. Would it be convenient to stop at this 7 moment? 8 MR JUSTICE BLAKE: Yes. 9 Right. Dr Rayner, who has been particularly keeping 10 her eye on the papers which are cited in discussion of 11 Wahab Rowland, has come across the Brown Phelps study. 12 Do we have a reference for that in the library? 13 MR TER HAAR: I will ask those who know. 14 MR JUSTICE BLAKE: Yes. If we do, we'd like to track it 15 down; if we don't, I think our collective appetite is 16 whetted enough to try and find it. 17 MR TER HAAR: If we don't, does the doctor by any chance 18 have the citation of it? Oh, we do have it. So no 19 need. Can we give the Tribunal the reference as well? 20 (Pause) If you just give me a moment, we'll get it. 21 MR JUSTICE BLAKE: Yes. (Pause) 22 MR TER HAAR: I think we may have to come back to this. 23 MR JUSTICE BLAKE: Fine. We can do that tomorrow. Right, 24 we will adjourn now. Can we resume, please, at 25 ten o'clock. Provisionally, if we give our</p> <p style="text-align: center;">Page 167</p>
<p>1 years of research to find out what might develop if the 2 Government decides in due course to fund research, they 3 need pensions now, they needed them five years ago. 4 That is part again of the context of the War Pension 5 process, that you don't wait to get the best evidence, 6 you do what you can on the present evidence so long as 7 it's reliable, et cetera. 8 I am going to go on -- 9 MR JUSTICE BLAKE: Do the estates of those who have died 10 during the appellate process get a lump sum in lieu or 11 something? 12 MR TER HAAR: They will certainly get any back payment of 13 pensions. 14 MR JUSTICE BLAKE: Is this appeal simply a matter of honour 15 for them or -- 16 MR TER HAAR: No, there is some money involved. But the 17 truth is -- and of course it's a test case for many 18 other people who are waiting -- the reality is that this 19 whole exercise has been quite an extraordinary exercise 20 because the amount of money that will be paid by their 21 pensions, which will matter to my clients and to others 22 in a similar position, is dwarfed by what the 23 Secretary of State has spent trying to stop them getting 24 their pensions. That's a political comment rather than 25 a legal comment.</p> <p style="text-align: center;">Page 166</p>	<p>1 stenographers a morning and afternoon break and no one 2 else is feeling too exhausted to carry on, could we at 3 least contemplate going on until about 4.30/4.45? Just 4 to redress some of the balance of my interruptions. 5 MR TER HAAR: Just so that it assists going forward, we did 6 lose a bit of time today and I did lose time and was 7 slower than I expected to be. What I will do is run up 8 to the mid-morning break, so that would be roughly 9 taking the time originally thought, allowing for the 10 fact we started a little later than the 10 o'clock 11 projection, and I will be concentrating principally on 12 making points on the Secretary of State's submissions, 13 just so we can cross-reference -- 14 MR JUSTICE BLAKE: Anticipatory, get your retaliation in. 15 MR TER HAAR: Absolutely. That sort of thing. 16 MR JUSTICE BLAKE: Right. Thank you very much. 17 Ten o'clock. 18 (4.15 pm) 19 (The court adjourned until 20 Wednesday, 29 June 2016 at 10.00 am) 21 22 23 24 25</p> <p style="text-align: center;">Page 168</p>

1	I N D E X	
2		
3	Closing submissions by MR TER HAAR5	
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
	Page 169	

A				
A4 140:3	130:6	additional 6:20 8:8	Ah 14:5 22:1	98:19 105:14
A5 140:2	acceptance 73:24	90:19 148:10	121:20	106:18 107:1
AAC 17:10	74:25	address 35:22 63:1	ahead 49:23 51:22	111:6 128:10
AB 11:17	accepted 40:8 42:1	63:20 86:21	129:1 156:19	129:3,11,19
abandoned 7:1	59:6 65:17 74:2,5	156:14	aimed 109:25	135:22 136:3,21
Abdale 114:1	81:11 82:5 83:2	addressed 90:20	air 116:9	137:25 139:13
aberration 134:10	88:15 89:10 91:11	addressing 43:24	aircraft 119:22	142:3,3,13 143:20
aberrations 84:24	111:11 114:5	adduced 12:2 44:19	al 145:24	147:11 157:9,9,15
85:3 136:2 138:2	120:18,19,20	adequate 30:8	algorithms 25:1	159:15,18 161:13
146:14 148:6	147:2 151:1 152:6	adequately 97:3	allowed 17:17	162:5
149:18 155:5	152:8 164:24	adjourn 132:8	70:15 142:3	answered 48:24
156:22 157:19	165:12	167:24	allowing 70:18	answering 79:2
159:24 160:2,6	accepting 95:23,24	adjourned 168:19	77:10 168:9	98:18 99:9 133:9
ability 7:3	113:11 117:6	adjournment 84:12	alongside 42:6	answers 96:4 137:1
able 4:10 13:18	accepts 98:3 121:2	87:15	alpha 94:24 95:11	159:6
19:18 33:5 34:8	144:8	adjust 87:1	96:12,14	antibodies 148:14
69:1 125:2,21	accident 18:10,11	administered 35:4	alternative 63:5	Anticipatory
128:10 140:25	18:13	administrative	113:18 123:14,15	168:14
153:18 160:10	accidents 148:12	30:15,18	123:19 124:1,15	antithetical 59:2
abnormalities	accord 96:8	admissible 100:11	125:15 162:15	anybody 25:19
136:5 145:21	account 26:21	admits 146:18	alternatively	40:16
147:19 149:14	34:11,15 35:25	adopted 69:20	153:16	anybody's 5:4
abnormality 84:24	44:2 47:21 48:17	77:11	altogether 22:12	anyway 4:6 31:22
145:23	51:24 82:10 83:14	advance 2:18 87:7	amen 8:24	31:24 86:20 105:6
absence 70:6	84:2 89:1 92:15	102:12,12	amount 69:10	119:4 142:25
absolutely 11:19	92:23 108:21	advanced 96:5	95:10 117:1	143:2
24:22 43:13 47:19	accredited 49:12	adversarial 124:13	166:20	apart 10:25 107:4
51:12 52:12 62:20	accurate 65:18	advice 127:1	amounted 69:20	111:13
100:17 107:9	accurately 55:9	141:11 142:5	94:19	apologies 1:19
108:6 116:10,14	140:24 147:3	advised 76:13	amounts 69:13	15:20
120:6 145:8 151:7	accusations 52:7	advisement 152:14	114:12	apologise 1:24 93:5
156:8 168:15	acknowledge 96:17	advocate 123:12	amplified 130:3	122:11
absorb 4:11	Act 10:20 78:17	advocates 2:17	analogy 78:12,15	apparent 47:3
absorbed 110:23	acting 50:13 142:11	afraid 2:22 64:21	analogy 78:12,15	appeal 12:12,21
absorbing 157:25	action 11:8,14	86:24 136:17	analyse 35:18	14:21 15:7 17:17
abstract 90:2	12:14,15 13:13	137:8	analyses 94:8	17:18 69:6 70:15
abstractly 67:4	14:5,7 28:6	afternoon 168:1	analysis 25:5 38:25	71:1,7 77:10,11
academic 56:8	activities 69:23	age 153:5	47:8 55:2 56:12	93:1 153:11
accept 21:3 26:24	actual 138:8	aggressive 54:5	61:3 83:2 96:25	166:14
34:16 36:18 40:8	acute 35:5 157:2	ago 24:8 68:10	121:7 122:17	appeals 16:22
54:8 56:25 57:2	ad 53:3,11,12	166:3	141:24 149:10	70:13,18 73:4
59:9,13 60:17	add 21:19 37:13	agree 7:2 79:13	and/or 92:9	96:19,22 145:23
67:13 74:25 84:21	94:16 117:24,25	80:6 126:8 135:24	animal/human	159:12
108:6 114:9,13	148:8	agreed 3:7 95:4	157:13	appear 69:7 123:12
123:4,22,23,25	added 7:17,21	96:2 156:2	answer 18:8 50:19	appeared 117:5
	addiction 67:19	agreement 95:15	73:18 77:7,7	appears 21:18
			81:23 89:6 92:18	

69:14 147:13 152:23 153:2,6 154:21 appellant 69:11,17 72:9 161:2 appellant' 70:7 appellant's 67:14 68:2 69:19,20 72:3,8 appellants 2:17 89:11 91:11 96:5 128:8 130:22 143:19 145:19 146:11,16 154:25 155:3 159:12 appellate 166:10 appendix 131:1 appetite 68:22 167:15 apples 139:22 applicant 107:22 107:23 108:1 applicants 119:17 application 78:10 78:11,15 82:8,19 96:8,18 97:4 137:24 applied 73:19 93:9 93:23 115:20 162:19 apply 59:3 97:1 115:22 117:2 133:21 154:15 157:22 applying 67:8 83:4 90:4 114:4 122:1 158:17 appreciate 50:25 51:8 79:8 87:2 109:12 117:24 126:13 160:22 apprehend 46:10 63:15 approach 2:19 3:17 17:4,14 30:12 39:12 47:2 51:9	51:11,12 52:11 58:2,12 60:23 64:3,17 69:19 72:19 73:19 77:11 77:16,19 78:5,9 78:16,16 79:24 82:7 83:5,11,17 89:3 95:14,15,21 96:3,18 97:10,18 97:19 98:8 115:7 115:11,19 125:4 158:19 163:9 approached 38:5 69:7 approaches 48:20 approaching 16:1 appropriate 31:16 99:10 arbitrary 110:11 arbitrator 122:13 archaeology 14:24 65:12 archival 8:16 archive 65:15 68:16,20,25 archives 9:22 150:17 area 16:15 23:17 27:13,20 28:4 45:8 46:14 50:25 57:10,13 60:7 112:15 115:4 116:10 areas 22:17 27:15 51:18 69:11 95:18 96:3,20 127:3 163:5,5 165:4 argue 152:1 argued 20:9 40:22 96:22 argument 22:7 31:24 38:24 66:19 83:2 91:2,19 94:11 99:17 100:4 102:14,17 107:18 107:19 110:10	argumentative 132:19 arguments 20:13 29:9,12 35:25 66:12 90:12 arises 84:20 arising 148:18 article 65:6 66:9,22 66:24 73:20 78:12 78:17 81:15 82:8 82:19 83:5,20 84:1,7 89:15 91:5 96:8,18 97:4 artificial 111:22 ashore 85:25 aside 12:25 asked 48:24 54:3 54:10 63:5,7,9,11 65:8 89:6 97:21 98:5,19,19 109:12 116:22,25 117:22 118:10 119:3 125:10,14 126:17 126:25 127:14 128:8 130:12 131:1 132:16 137:4,17 140:10 140:23 141:1 147:9 156:1 asking 1:12 55:25 69:8 70:9 98:8 110:16,17 137:3,5 141:4 145:11 164:8 asks 96:4 106:25 aspects 54:22 assess 118:10 assessment 14:15 19:5,7 20:2,3 26:12 34:22 83:17 91:3 assessments 110:3 assist 10:1 13:18 assistance 2:7 3:20 42:22 52:10 assisted 99:9	assisting 5:20 115:18 assists 168:5 assume 18:9 25:23 33:25 36:1,4 46:12 100:21 104:8,20 158:16 160:20 161:9 assumed 14:1 114:11 assuming 19:25 42:22 65:17 102:21 assumptions 27:7 85:10 113:20 117:7,11,12,17 118:4 121:12,25 122:1 123:1 163:19 164:8 165:20 Astonishingly 100:3 astronomers 24:9 asylum 106:5 atomic 32:20 144:3 160:19 163:14 attached 73:8 150:13 attack 46:19 47:25 48:5,22 49:2,10 51:16,19,24 52:20 53:6,12,20,23 54:17 57:8,15 60:1,3 130:16 132:13 133:2 attacking 49:11 attacks 52:13 53:11 54:8 132:12 attempt 2:3 attempted 6:22 52:25 107:11,15 attention 11:23 14:3 40:25 123:20 125:20 146:2 147:17 156:14 attributability	31:15 attributable 26:1 62:23 68:11 102:25 149:15 attributed 18:16 attribution 18:15 18:17 auction 127:18 August 95:5 authorities 6:9,13 6:17,20 65:6,9,10 68:24 69:1 109:8 authority 109:1 authors 146:9 147:15,20 148:8 authorship 45:5 142:21 available 5:9 6:14 average 114:15 avoidance 127:11 aware 2:23 122:10 161:25 162:2,8
B				
b 82:15,18 96:6 baby 59:22 124:6 back 1:12 2:23 3:13 5:17 10:12,13 13:1 16:16,20 17:7,21 21:17,21 22:5,14,17 27:21 29:12,14 34:6 39:22 41:7,13,16 44:5 49:19 50:25 59:4 62:13 63:22 76:4 77:3 80:12 80:16 81:6 84:11 86:24 87:17 109:4 111:4 115:6 118:15 120:22 133:21 134:12,14 137:20 141:12,13 151:19 156:16 159:22,23 162:19 166:12 167:22 background 29:20				

86:17 104:17 165:19 bad 9:21 badge 163:25 badly 35:20 balance 16:1,6 17:1 18:1,3 28:1,7,9 33:7 36:10 41:4 50:22 51:2 63:25 72:7 78:22 80:21 82:14 99:19 101:4 103:10 112:3,18 124:23 153:12,19 155:23 160:5,10 160:13 165:8 168:4 balanced 124:22 balancing 73:6 78:6 89:19 ball 115:15 bang 165:16 bank 16:14 Bar 13:6 base 23:11 based 32:19 51:6 51:24 59:10 78:6 78:19,22 79:5 81:14 82:7 92:11 92:20 93:1 96:10 113:4,13 150:10 basically 4:15 basis 1:23 11:22 17:17,18 24:20 27:2 31:7,18 35:4 48:14 52:15 53:21 55:17 56:4 57:25 59:9 69:12 72:3 72:16 85:18 88:2 98:9 100:1,12,19 109:3 114:21 121:12 126:24 163:10 basket 20:3 21:18 39:5 79:15 bastion 114:24,25 bath 59:22,23	Battersby 120:4 battleground 129:20 bear 100:7 122:18 bearing 162:11 bears 155:22 becoming 121:13 121:14 bed 111:13,13 began 42:24 beginnings 26:17 behalf 43:15 44:18 44:23 50:14 91:20 98:21 109:24 134:5 141:19 142:12 151:22 152:13 beings 122:21 133:10 belief 128:15 132:3 believe 11:9 57:8 125:19 130:2 151:25 153:12 157:15 159:19 161:5 benefit 6:16 11:20 48:16 87:11 105:18 124:20 127:15 165:2 benefits 165:7 best 58:15 59:1 97:18 132:12 149:21 166:5 beta 94:25 96:15 better 13:18 16:11 36:9 49:7 53:9 100:24 105:22 120:3 162:5 beyond 67:17 110:9 112:18 121:25 159:8 big 6:24 161:17 bigger 5:16 6:24 7:9 biggest 165:16,16 binary 78:15 83:17	89:9 biological 149:7 biologically 161:7,9 bioscience 156:21 bit 9:7,8,8 77:4 82:20 94:20 109:21 114:6 117:25 133:12 142:25 158:22 168:6 bits 21:10,11 38:9 38:19 black 65:24 144:23 BLAKE 1:5 2:13 3:2,5,9,11,19 4:2 4:7,10,14,18,21 5:1,6,11,18,23 6:2 6:5,12,15,21 7:1,3 7:6,16,24 8:7,10 8:16 9:1,3,16,23 10:3,11,18,22,25 11:10,13,16 12:9 13:14,16,21,25 14:11,18,23 15:9 15:12,14,18 16:4 17:10,23 18:6,25 19:4,16 20:15,21 21:4,7,11 23:8,15 23:19 24:1,3,18 24:21 27:25 28:3 28:15,18,20,25 29:15,25 30:4,9 30:13,18 31:10,19 31:22,25 32:7,10 34:16 35:16 37:5 37:8,12,17,19 38:13 39:8,11,16 39:21 40:15,19 41:24 42:10,12,18 43:2 45:17,25 46:7,21 47:2,15 47:23 48:1,8,11 49:1,23 50:9,24 51:20 52:3,8,17 53:4,7,14,17 54:20,23 55:7,12	55:19,22 56:1,5 56:11,24 57:11,22 58:12,14,19,23 59:14,19 61:7,9 61:14,19,21 62:5 64:18,20,23 65:1 65:4,7,12,19 67:4 67:8,23 68:7,13 68:17,22,25 69:3 70:20 71:4,6,10 74:7,12 75:4,14 75:18,20,23 76:4 76:10,17,21 77:2 79:8,14,25 80:3,8 80:14 81:2 82:3 86:12,14,23 87:5 87:12,19,21,23 88:19 93:4,8,11 93:13,20,22 100:6 100:10,14,25 101:2,18 102:6,11 102:20 103:3,15 104:11,16 105:1,8 105:11,21 106:2 106:10,22 107:3,6 107:11,19 108:1 108:10,12,16 109:9,12,19 110:9 110:21,23 111:2,9 112:6,11,13,17,23 113:7,24 114:7,18 114:23 117:11 118:5,23 119:1,5 119:11,20 120:6 120:12,24 123:25 124:24 125:7 126:8,11,13 127:5 127:16,25 128:11 128:13 129:1,23 130:4,19,21,24 131:4,6,10,18 132:5,25 133:20 134:1,11,13,18 135:5,8,11,13,15 135:19 138:17,23 139:2,6,13,16,20	139:24 140:4,8,13 140:16,19,22 141:5,8,15 142:21 142:24 143:2,6,10 143:12 144:25 145:2,4,6,9 146:7 147:1,5,8 149:3 150:7,13,18 151:2 151:12,14,16,19 151:21,24 152:3 152:18,21,25 153:8,24 156:5,9 156:16 157:11,20 157:24 158:6,12 158:24 159:4 160:16,22 161:7 161:11,20 162:1,7 163:22 164:6,14 165:5 166:9,14 167:1,8,14,21,23 168:14,16 blaming 63:3 blanks 50:4 Bletchley 131:11 block 79:23 81:5 blocks 80:2 blood 157:12 159:14 161:3 blunt 129:15 bluntly 2:5 37:1 129:15,15 board 85:16 98:23 body 33:21 44:1,3 49:18 54:4 58:7 99:2,4 123:19 124:1,15 125:3 boffins 163:6 Bolam 58:12,16 99:1,2 bold 150:7 154:4 bomb 32:20 162:14 162:14 165:16 bombs 25:17,18 163:14 bono 1:22 bottom 66:1,3
---	--	--	---	---

71:16 72:20 82:25 94:3 95:20 143:7 143:13 145:13 152:17 bound 70:5 159:23 box 9:23 55:4 Braidwood 139:4 140:18 142:10 Braidwood's 159:6 160:23 branch 34:14 50:16 51:16 breach 49:5 breached 40:9 break 84:12 132:9 134:20 168:1,8 Brenner 32:13 34:2 34:8,13,14 36:24 148:25 149:2,22 149:24,25 150:2 150:14 151:3 Brenner's 32:6 150:8 154:1 bribe 123:11 bring 79:11,12,15 bringing 79:18 112:7 139:24 British 121:22 broad 15:25 99:23 104:5 broader 123:13 128:17 broadly 12:20 broken 18:10,15 brought 10:16 122:24 123:15 Brown 167:11 Brownie 2:13 brush 104:5 building 79:23 80:1 81:5 built 55:10 162:18 163:16,18 bulk 27:21 bullying 54:7 bundle 6:9 8:3,6,7	32:3 64:22 65:9 68:24 85:12 113:23 140:9,12 145:25 151:9 bundles 6:14 8:8 9:21 12:2 68:21 146:9 150:16 151:9 burden 33:6 Busby 3:12 4:15 5:21 15:11 18:21 61:17 120:2 130:19 132:23 135:1,17 137:17 Busby's 2:10 5:8 60:2 115:17 130:17 Busby-related 115:10 business 64:4 Busmer 68:8 77:17 94:18	calls 59:12 Cameron 141:20 Canadian 150:6 152:2 cancer 103:6,8,11 103:13,22 104:10 104:15,24 105:5 105:14 107:24 108:14 159:21 cancers 101:12 capable 23:7 25:2 102:23 162:10 car 18:11 Cara 106:5 cards 46:17 49:18 114:21 care 32:11 38:6 43:6,7 45:4,6 67:15 careful 16:25 20:7 51:13 Carmen 131:12 carried 78:20 83:16 84:5 88:6,12,16 89:17,23 90:24 91:13 92:16,22 142:1,16 152:9 158:22 162:24 carries 57:9 93:24 carry 21:16 89:7 121:7 148:22 160:18 164:25 168:2 carrying 31:18 36:6 78:24 90:9 116:4 case 8:17 9:17 12:3 13:1 14:13 15:5 23:3 24:4 27:15 29:18 30:16 40:24 41:16 42:25 43:16 43:16 44:17,21 47:3 50:3 53:20 64:3 65:25 67:12 67:14,21 68:10,22 69:3,8,19,21,22	70:12,16,21,23 71:2,7,7,21 72:6 72:10,11,24 73:2 77:15 81:4 84:20 84:22,25 85:1,2 85:19 86:10,11 90:2,11,15 91:4,8 92:4 97:11 98:15 99:15,16,18 100:2 101:15,21 102:8 106:4,10 109:2,15 115:12 119:3,25 122:22 123:24 124:11 125:2,5,11 125:23 129:23 130:4 132:21 133:3 135:1,3 144:17 146:15 147:14,23 149:17 149:19 162:18 164:18,20 166:17 cases 65:14 69:14 71:13 78:13,17 82:6 124:6 135:24 136:2 cast 134:8 casts 85:6 catching 100:8 catergorised 77:23 78:3 causation 19:23 20:6 100:12,16,18 100:19 109:6,7 114:6,16 117:13 120:19 causative 67:18 cause 73:14,23,25 77:5 101:10 103:8 135:24 137:12 145:22 148:6 153:18 caused 6:24 18:13 26:9,10 74:4,6,10 85:2 101:12,17,22 105:14,16 111:6,7 153:15 160:7	causes 160:3 caution 38:6 60:12 cautioned 106:3 cautious 150:18 caveats 56:17 CCRs 148:9 celebre 135:24 cell 27:8 57:14 148:16 cells 136:6,10 138:7 138:11,20 148:6,8 148:12 cent 74:3 76:8 103:20 105:23,24 106:7 110:5,6,10 110:13 111:22 112:8,14,14 113:10 114:6,16 114:20 153:20 central 38:1 127:2 144:17 centre 14:9 century 10:13 certain 18:4,7,14 18:17 19:10,24 27:11 30:23 39:11 79:7 81:10 101:23 150:11,16 certainly 2:16 4:13 8:25 11:12 13:4 16:2 21:15,15 38:20 46:25 47:12 48:22 50:7,19 54:9 58:10 61:18 64:16 68:16 79:23 87:4 102:11 105:8 108:20 109:22 113:4 118:19 119:8,17,24 120:17 125:5 126:6,12 144:3 145:10 150:15,24 152:4 160:1 161:9 163:8 164:2,23 165:10,12 166:12 certainties 7:13
	C			
	c 82:17 cache 131:10,22 calculated 24:8,10 calculates 113:15 calculating 145:14 145:18 calculation 113:25 117:23 calculations 116:8 116:12 calculator 118:1 calibration 8:23 38:13 call 1:11 2:21 29:3 30:14 36:12 41:20 43:20 44:12 48:8 48:25 51:1 79:22 91:16 93:1 115:10 called 4:22 8:1 18:21 20:4 32:15 41:11 99:15 151:22 156:7			

17:20,23 40:1,7 45:7 81:13,19,22 81:25 82:1,13,22 89:23 90:14 91:9 98:11 118:16 certainty 18:2 88:17 113:2 cetera 54:25 110:4 110:4,15 121:11 166:7 challenge 30:15 50:16,17,20,21 67:9 93:2 chamber 107:13 156:7 chambers 107:14 chance 74:3,5 104:15 105:24 106:4,7 110:13,13 112:14,14 113:16 153:20 167:17 changed 132:23 changes 157:1 characterise 64:13 charge 163:2 Charles 12:23 15:7 17:5,25 20:8,13 21:1 22:9 26:22 29:12 30:2 40:5 40:22 43:25 46:9 49:6 63:14 65:23 66:2,16 70:11 71:11 76:24 77:15 78:14 86:8 87:24 93:16 Charles' 15:20 29:8 39:24 42:7 81:20 118:6 check 21:17 68:18 157:9 chemicals 153:17 Children 78:17 choice 61:11 chosen 43:21,22,23 61:1 62:18 63:22 129:20	Christmas 18:11 25:16 68:11 85:9 85:25 86:1,4 146:17 155:13 159:23 163:22 chromosomal 84:23 134:10 138:1 145:21 146:3 147:19 148:7 156:21 157:18 159:24 160:2 161:21 chromosome 135:25 136:1,2,5 146:14 149:18 153:18 155:5 157:1 chromosomes 161:4 chronology 48:13 circulating 138:11 circumstances 35:6 72:10 90:1 91:8 101:8 citation 65:2 74:18 77:3 84:11 167:18 cite 149:24 154:5 155:8 cited 32:13 66:17 91:25 167:10 civil 11:6 13:4 16:3 16:6 18:6 22:4,20 23:2 58:9 68:4 78:22 81:4 82:6 83:9 89:18 97:24 124:11 156:5 claim 10:15,24 11:14 22:4,20 23:2 45:5 51:3 71:23 72:3,8 claimant 71:24 72:4 83:18 88:10 91:10 99:20 102:2 161:1 claimant's 90:11 91:4	claimants 2:17 10:12 13:17,23 14:3,10,16 18:9 96:20 119:12 152:14 claims 12:13,17,19 12:21 13:4 106:5 clarified 138:17 clarity 131:2 classified 95:4 clear 43:14 58:15 66:19 94:5 113:1 116:11 117:4 118:7 147:12 clearly 42:16 127:1 130:11,14 131:15 134:6 clerk 1:7 clerks 139:16 client 102:1 clients 2:7 43:15 44:23 81:21 115:17 119:6 134:5,7 151:23 164:18 165:23 166:21 clients' 100:2 120:17 clock 168:10 close 34:17 64:4 70:12 134:16 closed 35:8 48:12 closer 68:12 closing 3:15 5:2,23 6:2 7:11,18,20 144:18,20,23 169:2 cloud 119:4,10,21 119:23 120:1 coast 85:8 cogency 24:24 25:6 26:14 34:21 cogent 26:11 cohort 101:21 103:5 104:8,13,20 161:11,17	coin 76:25 colleagues 4:10 10:20 49:24 87:10 122:9,10 135:9 139:6 collective 167:15 column 7:21 columns 7:17 combination 91:15 combined 89:12,16 91:12 come 1:12 5:16 12:4 14:3 15:3 17:21 19:12 22:17 23:17 28:4,13 29:12,14 34:6 38:9 39:14 43:10 44:20 49:19 52:23 56:3,6 58:3 60:6 66:13 68:4 76:23 84:11 86:24 105:23 113:20 115:6 117:23 120:22 123:9,11 133:21 134:14 137:14 160:21 162:19 167:11,22 comes 3:14 57:17 60:6 82:2,20 98:4 107:8 108:7 116:7 124:21 coming 1:20 3:13 6:15 22:21 39:22 62:2 126:6 130:17 commendable 2:11 comment 2:22 97:22 127:15 129:7 150:8,9 154:5 166:24,25 commented 70:11 128:4,6 comments 27:17 66:16 Commissioners 70:25 common 21:17,22	91:16 162:20 commonly 89:17 community 84:18 compared 41:25 122:20 153:5 comparing 22:2 comparison 125:16 compelling 73:10 compensated 119:10 compensation 119:13 competent 36:5 99:5 126:22 competing 90:23 95:9 97:22,23 125:24 complaining 130:15 complaint 53:7 complete 8:20 13:11 113:2 completed 87:1 completely 18:23 26:18 34:11 45:1 52:15 53:3 58:19 94:23 102:9 144:15 completeness 126:16 137:16 complex 13:5 148:7 compliance 46:8 complicated 1:22 19:18 116:12 complications 60:22 compromised 148:15 computer-based 89:9 concentrating 168:11 concept 22:8 24:23 74:16 concepts 29:14 conceptually 22:18
--	---	---	--	---

<p>concerned 45:8 50:4 57:4 110:5 116:7 135:2</p> <p>concerning 70:13</p> <p>concerns 109:18 142:11</p> <p>conclude 70:4 153:19 155:11</p> <p>concluded 32:17 69:14 147:7,22 163:25</p> <p>concludes 95:8</p> <p>conclusion 19:12 20:4 27:10 32:18 36:5 37:3 56:3,6 57:19,25 58:4 60:6 66:13,22 82:18 88:11 94:3 96:19 98:12 113:13 136:18 137:9 146:11 147:24 148:20</p> <p>conclusions 57:18 59:10 73:22 79:6 83:16 84:4 95:17 98:4 117:2 118:13 118:21 122:2,6 136:16 137:7 146:21 150:25</p> <p>concomitant 148:13</p> <p>condition 25:25 29:21 68:10 99:21 100:22 101:5,7 102:25 103:5 120:19 159:22</p> <p>conditions 35:5,5 66:22 67:2 74:4 83:20 89:15</p> <p>conduct 145:19</p> <p>conducted 64:10</p> <p>conducting 165:6</p> <p>confidence 8:22 104:13</p> <p>conflict 34:12</p> <p>conflicting 21:11</p>	<p>connected 26:1 62:25 119:22 139:6</p> <p>connection 67:18 75:2,8</p> <p>connects 37:23</p> <p>conscripts 163:7</p> <p>consensus 4:23 16:15,21 23:21 57:2,5 58:6,11 92:10 97:20</p> <p>consensus' 92:4</p> <p>consequence 29:22 75:1 111:5 121:3 148:19</p> <p>consequences 34:6 34:7</p> <p>consider 70:16 71:13 72:9 128:17 130:12,12 155:12</p> <p>considerable 4:8 45:4 47:5 134:8</p> <p>consideration 79:1 79:16 80:4 89:11</p> <p>considered 12:19 32:21 48:23 51:9 67:15 91:19 117:16 147:21 162:16</p> <p>considering 15:4 90:5 148:14</p> <p>considers 90:19</p> <p>consistent 96:3</p> <p>constantly 22:5</p> <p>constituents 142:12</p> <p>constituted 70:16</p> <p>constraints 126:5</p> <p>constructively 131:24</p> <p>contact 69:11 70:7</p> <p>contained 8:24 72:21 143:16</p> <p>contamination 69:24</p> <p>contemplate 168:3</p> <p>contemplated</p>	<p>126:3</p> <p>contemporaneous 163:1</p> <p>content 113:7,9 130:6</p> <p>contention 69:25</p> <p>contents 146:19</p> <p>contest 128:18</p> <p>context 25:9 30:21 50:21 84:20 88:19 97:11 102:9 122:14,24 125:18 130:24 155:10 166:4</p> <p>continue 134:14</p> <p>continues 87:24</p> <p>contract 104:24</p> <p>contrary 25:4 96:24 99:3 107:19 125:20</p> <p>contrast 104:3</p> <p>control 35:3 36:4,9 153:5 159:8</p> <p>controls 147:15 160:21</p> <p>controversial 100:15,17</p> <p>convenient 86:13 167:6</p> <p>converse 74:3</p> <p>convert 78:25</p> <p>convinced' 70:8</p> <p>copied 5:7 8:14</p> <p>copies 1:16 5:4 65:16 139:11,11</p> <p>copy 1:14 5:12 135:10 139:19</p> <p>copying 5:21</p> <p>corner 115:17</p> <p>correct 39:12 52:24 57:5 59:13 62:21 62:22 96:8,17 97:4 98:17 101:19 114:5 121:3 126:12 141:1 147:16 156:8</p>	<p>corrected 57:7 121:15,18 127:19 132:3 150:12 151:7,8 157:12 159:20 161:23</p> <p>correctly 57:3 82:5 94:14 97:1</p> <p>corridor 11:1</p> <p>corroborate 155:14</p> <p>counsel 89:10</p> <p>count 148:17</p> <p>counter-intuitive 16:4</p> <p>counterbalance 126:7</p> <p>counters 121:24</p> <p>country 10:21 142:2</p> <p>couple 32:13 134:8 142:14</p> <p>course 2:10 3:24 6:8 9:9 19:19 20:25 23:1 30:18 39:17 47:4,19 50:2 51:15,20 58:21 61:22,24 67:8 70:21 86:18 86:22 90:13 103:19 110:8 111:10 112:10 141:22 143:6 148:25 160:14 162:22 163:12 164:12 166:2,17</p> <p>court 11:18 12:12 12:12,13 14:8,11 14:21,22 22:21 30:18 41:9 48:7 60:20 66:15 99:16 99:23 122:13 123:8 168:19</p> <p>courts 30:15 90:7 124:8 132:11</p> <p>covered 2:6</p> <p>CPR 115:11,19,22 122:6 123:7,8</p>	<p>125:2 129:14 130:14</p> <p>create 74:17 116:20</p> <p>created 31:10</p> <p>creates 35:10 88:6</p> <p>creating 165:16</p> <p>credibility 34:9 46:20 47:25 48:22 49:12 51:25 53:21 54:2,8,12,18,19 54:20,21 55:12,13 55:16,18 56:2,7,8 56:10,13 57:15 63:6 80:17 88:9</p> <p>credible 33:21 37:10 38:21 44:1 44:3 46:14 47:9 52:16,22 53:24 58:7,18 59:9 74:15,22,24 76:6 152:9 153:6 162:12</p> <p>credibly 44:14 162:15</p> <p>criminal 125:17,18</p> <p>critical 90:3 154:12 155:20 156:17</p> <p>criticised 36:7</p> <p>criticises 157:18</p> <p>criticising 158:8</p> <p>criticism 45:22 154:7 156:11 158:4</p> <p>criticisms 45:20 155:1 158:10</p> <p>cross 65:5 95:13 145:13</p> <p>cross-examination 40:14 45:24 46:23 50:8,15 54:4 127:24 128:25 130:3 134:7 140:13,15 141:7 141:11</p> <p>cross-examined 43:10 48:19</p>
---	--	---	--	---

121:19 132:23 137:17 cross-examining 40:15 116:11 142:20 cross-reference 168:13 cross-referenced 8:5 cross-referred 8:2 Crown 71:3,4 crucial 46:5 84:9 CT 161:16 cumulative 89:11 curiosity 68:13 curious 159:16 current 1:18 25:4 cut 55:16 158:1 cytogenetic 149:7	dead 53:18 deal 2:11 7:17 18:18 34:18 42:21 43:21 44:17,19,20 45:6 55:14 56:18 74:18 124:8 129:10 132:9 158:15 dealing 9:10 17:8 22:18 23:17 31:16 36:10 65:23 93:15 94:10 101:3,23 107:7 125:16,18 160:13,14 deals 57:6 145:15 dealt 26:22 45:12 death 67:20 debate 87:11 95:1 108:19 112:15 124:2,5 134:3 debated 117:14 December 141:20 decide 17:18 35:11 49:14 102:7 decided 11:21 12:23 14:23 112:5 decides 166:2 deciding 12:3 20:18 72:16 122:13 decision 6:11 11:17 13:1 15:21 17:11 17:21 22:14 26:20 26:23 29:6,8 30:7 31:14 37:2,9 45:19 48:8,10,11 58:5 62:1,3,12,16 63:20 64:11,14,15 64:24 65:24 66:11 66:18 68:9,14 71:20 73:4,16 77:16 78:10 79:6 81:9 83:4 87:17 88:2,6,17,19,20 88:21,24 89:21 90:3,10,25 91:6 91:12 92:24 93:1	93:6,6 96:25 97:2 99:12 111:13 115:2 120:15 129:22 144:4 158:1 decision-making 35:24 123:16 decisions 30:21 65:14,23 72:15 97:3 140:21,24 declared 49:10 declined 126:12 decontaminating 120:4 decontamination 119:22 120:9 deemed 73:14 defective 101:19 Defence 68:8 defend 140:24 defendant 10:14 deferred 42:10,11 deficiency 148:18 definite 66:5 definitely 132:17 definition 21:9 25:18 degree 8:21 41:24 60:11 92:7 116:16 116:17 133:2 delayed 1:3 delete 20:23 142:22 deliberate 63:19 64:10 deliberately 63:12 126:24 164:19 delight 46:24 delivered 46:4 delved 17:15 demeanour 132:23 136:21 Demonstration 153:3 denied 25:23 deny 109:10 depend 30:23 35:2	depended 69:15 dependent 90:1 depending 30:21 107:3 depends 23:13 51:18 deposition 95:11 depth 17:3 60:9 derived 144:15 describe 7:10 described 34:2 79:23 111:24 describing 86:8 138:21 description 56:25 57:2 152:1 deserving 46:16 despite 36:20,22,25 37:10 148:4 destroy 85:18 detail 3:17 15:21 22:17 28:14 details 50:12 146:23 detect 152:23 detected 153:13 detective 121:13,14 determination 84:6 determinative 101:23 determine 77:20 89:24 90:24 91:4 determined 83:6,24 155:5 determining 81:15 92:13 develop 100:7 127:16 166:1 devoted 60:8 dicentrics 147:13 147:14,17 died 166:9 difference 27:19 33:2 35:6 61:16 143:24 144:9 different 16:19,22	22:11 37:4 42:15 48:20,21 49:25 50:21 51:6,18,23 52:22 53:11,25 54:13,19,22 58:8 64:14 81:5 93:18 96:23 98:4 102:9 107:14 113:20 118:9 119:12,23 119:24 122:20 125:4 157:6 160:15 167:4 differently 14:22 70:16 122:21 difficult 17:16,18 30:20 50:25 60:19 75:13 90:2 difficulties 44:7 115:25 direct 69:1 124:24 149:16 153:21 directed 39:25 47:21 80:4 directing 67:16 direction 9:4 17:24 40:5 56:19 121:7 directions 39:25 46:11 48:6 49:4 49:14,15 63:16 directly 131:21 directs 51:5 disagree 63:7 99:6 124:3 126:21 150:5 disagreed 149:24 disappear 8:18 discharge 15:1 discharging 42:5 disciplines 124:13 disclosed 125:15 131:21 132:25 discover 10:23 165:19 discovered 29:1 121:5 discovering 9:17
D				
D 169:1 daily 90:5 damage 136:1 153:18 161:21 damages 10:10 danger 122:8 164:19 dangerous 112:4 dangers 163:10 Darroudi 155:18 156:5,14 data 25:3 29:16 37:23,24,24 52:3 156:22 date 11:11 14:19 76:1 daunting 9:5 David 141:19 dawn 26:18 day 4:5,17 128:14 129:3 135:7,13,14 161:24 day's 139:8 days 1:6 9:10 143:4 DDREF 114:5				

discovery 37:21,22	donors 157:12	112:9,20,20 113:3	due 23:1 86:22	82:14 103:23
discussion 62:11	dosages 73:11	114:10,14 120:13	138:14,15,15	109:2 126:24
138:1 167:10	dose 22:7 32:20,24	125:17 127:11	153:21 166:2	128:3 137:12
dismiss 117:20	33:14 35:4,5	134:8 137:12	dug 131:6	159:13
dismissed 69:9	62:20,20,22 114:1	138:19 155:25	Dutch 127:17	elected 128:5
96:21	116:8 118:10	156:3	duties 15:1 86:18	electronic 1:15
dispassionate	121:4,12 123:5	doubt' 66:20 83:10	duty 71:18 123:20	elegantly 79:21
136:25	145:14,18,22	doubted 57:4	125:11	elementary 165:1
dispassionately	146:14 149:19	doubtless 64:13	dwarfed 166:22	elevate 154:16
133:17	150:9 151:5	85:14		elevated 146:3
dispersion 69:15	155:16	doubts 19:14,25	E	147:13
disproportionate	doses 116:24 157:2	80:5,17,23 89:4	E 169:1	elicit 127:5
122:19	dosimeters 162:25	89:12	e-mail 1:9	eliminate 34:20
dispute 122:14	163:6,19	download 139:8	earlier 15:14 89:7	38:15
disputed 95:22	dosimetry 15:17	Dr 2:10 4:15 5:8,21	92:19,25 109:17	eliminates 38:16
disputes 95:15,23	117:13 122:24	15:11 16:10 18:21	109:25 110:22	else's 116:23
distance 121:8	145:14,19 157:7	32:6,13 34:2,8	119:11 149:1	emerged 40:13,17
distinguish 53:11	double 151:2	36:24 45:16,23	earn 2:13	eminent 34:4 36:20
59:21	doubt 18:4 19:3,14	60:19 61:1 62:24	Earth 104:19,21	36:21 150:25
distinguished 98:3	19:22 20:5 21:16	63:9 74:2,25 76:2	ease 146:22	151:1,3
distributed 1:17	21:21 23:7,21	97:12,13 98:5,5	easiest 100:9	emphasis 15:23
divider 32:5	26:21 28:11,13	98:12 106:11	easily 123:2 139:12	17:19 148:9
division's 72:1	29:23,23 31:7,10	111:5 113:19	east 121:10	emphasise 155:21
divisions 92:5	33:20 35:10 39:2	114:5 115:17	easy 16:2,25 72:17	emphasises 77:17
DIY 150:18	39:4,6 51:6,11	120:2 126:18,24	122:14	employees 116:6
DNA 27:7 153:3,13	56:9 60:17 63:24	127:6 128:6,8,11	eccentric 25:8	employers 116:7
doctor 167:17	66:8,10,14,25	129:3 132:23	echo 74:1	enable 48:24
document 5:13,21	67:5,18 68:2 69:9	135:17 137:17,19	Edwards 92:1	encourage 127:17
5:24,25 7:14 45:4	69:24 70:2,5,10	137:21 139:4	effect 64:6 73:13	ended 80:24 165:8
53:5 90:14 98:11	70:17 71:23 72:4	140:18 142:10	77:22 78:1 79:2	engage 15:2 39:17
113:22 118:20	74:7,17 75:15,18	147:10,12 152:17	85:20 89:12,17	40:6 41:23 56:17
documentation	75:21 76:8,11,13	154:1 155:18	94:14 133:7 149:7	64:11 76:14 90:17
14:25 163:23	76:14,18,19,19	156:14 159:6	152:6	engaged 41:22
164:2	77:9,21 79:3,7	160:23 167:9	effective 81:13	56:14 62:17 64:12
documents 1:9 8:13	80:25 81:9 82:12	Drake 67:11	82:12 88:16 89:23	engaging 73:6
8:14 85:13 113:19	83:8,19,25 85:6	dramatic 119:8	91:9	engine 7:12
131:23,25 140:5	86:19 88:3,5,6,25	draw 16:22 117:2	effectively 7:14	enjoying 85:11
146:1,5,8 164:3	89:14,25 90:7	118:13,21 123:20	35:21 51:25 79:7	enormous 2:6 7:5
doing 27:2 41:18	91:10,14 92:3,3	125:20 136:15	81:10 95:24 106:1	9:4 60:9 85:9
42:19 45:9,10	96:7 97:12 100:19	137:6 147:16	116:20,25 125:24	97:14,16 116:3,4
48:5 52:5 85:14	101:19 102:5,24	drawing 136:18	131:16 154:13	163:18
93:17,22 97:16	103:12 105:7,18	137:8	effects 10:21 25:18	enormously 84:10
98:25 132:12	105:22 106:3,8,20	drawn 41:1	25:20 26:5,6	enquiry 53:8
150:19 152:12	107:16,20 108:23	driven 21:15	73:12 91:13 96:13	enter 112:8
158:5 163:3	108:25 110:16,17	drop 151:11	147:3	entering 134:3
164:17	110:18 111:20	dry 44:16	either 11:13 24:24	enthusiasm 37:20

39:17	72:15 94:19	33:21 36:12,17	129:13 133:3,17	145:20 160:18
enthusiastically	151:11	37:18 41:11,15	133:24 139:1,3	162:24 163:4
115:14	essentially 66:14	42:3 43:8,20,24	142:15 143:15	excellent 152:23
entirely 2:20 24:25	establish 16:18	44:1,3,12,15,19	148:22 149:9,16	excess 135:25
28:22 31:17 89:9	41:11 62:19 66:24	45:12,15,17,18	149:23 150:4	exchange 19:19
124:9	84:14,15 89:14,25	46:2 47:4,22 48:4	152:8,11,13	52:9 61:22 62:6
entitled 1:23 48:17	103:10 157:18	48:15,18,21 49:9	154:13,20 155:2,3	87:3 112:24
58:3 72:9,12	160:11 161:17	50:20 51:7 52:1	155:15 156:11	exclude 19:10,15
77:12 81:1 125:19	established 16:7,8	52:14,15,18,21,24	159:16,20 160:23	21:2 78:25 79:16
126:23 155:5	40:21 57:20 66:20	52:25 53:21 56:4	161:6 162:4,24	160:2,8
entitlement 67:2	83:18 88:1,25	56:21 57:13,20	166:5,6	excluding 115:16
entry 7:20	establishing 16:13	60:11 61:2,4,15	evidence-based	118:8
epidemiological	establishments	63:16,17 66:10,12	89:3 144:1	exclusions 10:21
61:2 100:1,11	116:6	66:25 67:13,17	evidently 37:25	exclusively 72:1
101:20 103:17,22	estates 166:9	68:1 69:8,10,17	exact 64:5	exercise 19:5 36:9
110:3 126:19	estimates 106:6	70:2,5,6,8,10,17	exactly 5:17 16:5	47:16 73:6 78:6
128:19 129:7	149:20,21 155:17	72:6,19,21 73:9,9	20:9,19 22:3	79:19 89:20,21
epidemiologically	estimating 145:22	73:11,13,22 74:2	24:10 25:15 35:15	90:1 92:17 121:8
113:16	et 54:25 110:4,4,15	74:15,20 75:2,8	62:15 63:13 64:8	126:25 145:20
epidemiologist	121:11 145:24	77:19,20,22 78:2	74:8 76:20 100:4	157:16 166:19,19
36:20 44:13 97:14	166:7	78:7,19 79:1,17	102:4,17 108:15	exhausted 68:23
98:4,7 108:7	ether 6:6	81:4 82:8 83:11	164:3	168:2
126:19,22 128:20	evaluate 20:18	83:12,13,19 84:1	examination 9:11	exist 66:7,25 80:5,5
150:6 152:2	90:23 91:4	84:6,9,16,17	28:16 159:14	88:4
epidemiologists	evaluation 19:5,21	85:24 86:4,7 88:2	164:24	existence 12:4 66:5
152:7	20:17 37:12 39:3	88:7,9,15,25 89:8	examine 27:4,13	69:16 83:18,23
epidemiology 35:2	79:19 89:7 105:12	89:12,14 90:12,18	51:17	84:4 96:12,16
74:9 99:18,22	117:22	90:23 91:2 93:16	examined 30:6	existing 13:1
100:15,20,21	evening 109:15	93:18 94:9,12,14	121:23 122:5	exists 66:14 143:18
101:6,10,14 102:6	event 13:4,7 77:10	94:22 95:7,10,22	examining 31:3	expect 44:20
102:21,21 104:5	148:2,4 154:25	95:24,25 96:1,2,5	example 7:22 18:9	103:19 108:3
105:3 107:8 127:3	events 72:25 139:8	97:9,12,24 98:2	18:16,20,22 19:1	expectation 63:15
128:23	eventually 51:9	98:16,20,21 99:10	22:16 24:2,19	81:23 123:7
epilation 60:15,19	80:6	100:11 101:16,25	26:24 27:7 28:5	expected 46:10,11
61:3	everybody 126:5	102:22 103:4,18	28:23 32:1,2,9	168:7
Equally 16:10	159:21 163:15	105:8 109:6,7	41:13 43:9,23	experience 33:19
88:13	everybody's 5:7	111:5 112:21	45:14 50:4 56:21	97:14 116:2,3,4
equation 114:9	evidence 12:1	113:5,13 115:7,8	60:15 63:2,21,23	116:18 163:24
equivalent 53:12	13:14,23,24 14:2	115:10,12,16,21	73:6,10 83:10	experienced 13:5
82:7 125:12,13	14:15 15:9,10	118:12,15,17	86:7 88:9 89:10	36:23 97:13
erect 111:21	18:12,19,23 20:20	119:2,9 120:25	89:18 91:14 92:8	122:11
Ergo 39:1,4	21:3,5,6,12 22:12	121:2,6,17,21	94:9 98:1 100:20	experimental
err 17:24	22:13 23:11,15	122:6 123:4,10	100:24 103:1,15	162:22
erred 71:21 97:5	26:11,13 27:15,17	124:20,25 125:1	116:8,14 118:14	expert 13:24 14:2
erring 158:2	27:22 28:8,10	125:25 126:20	121:14 124:7,17	14:15 21:6 28:8
error 17:6 22:2	31:8 32:3,16	127:19 128:5	125:13 127:4	32:15 33:21 34:3

34:8 37:10,11,11 37:11 41:17 43:8 43:20 44:15 46:13 49:8 51:17 53:14 56:18 61:7 63:16 72:19 94:13 95:22 95:25 96:4 98:20 99:6 115:7,7,12 122:3,23 123:8,10 123:15,18 124:3,5 124:14,18,20,20 124:22,25 125:19 126:9 128:24 129:12 144:7 148:22 149:13 153:7 165:14 expert's 78:7 expertise 115:24 116:2,10 117:3,7 117:18 118:2 123:18 149:6,10 164:25 experts 27:22 42:15 44:3 49:22 95:10 95:16 124:8,13 125:10,14 126:3 126:17 128:2 129:18 130:1,7 132:10,12 150:1 152:17 experts' 90:18 125:9 explain 29:8 44:13 82:20 90:2,8 97:3 explained 29:3 165:23 explanation 133:5 147:18 explicitly 117:14 exploration 14:2 108:3 120:7 158:13 explored 27:24 108:1 159:19,25 161:6 exploring 53:18	109:23 explosion 26:2,10 160:19 expose 157:1 exposed 29:20 45:11 69:25 84:22 85:7,25 86:2,17 103:7 104:2,14,21 104:22,24 114:12 114:15 146:13,16 160:11 161:19 162:13 165:4 exposure 29:22 69:14,23 70:14 85:5 92:9 93:16 93:19 94:6,17 95:11,17 96:11,21 96:21 98:13 103:18 107:25 113:14,15 120:18 120:20 123:6 138:9,14,16 143:18 147:18 148:11,15,19 149:19 153:15,16 153:21 156:24 160:7 161:15 164:15 exposures 155:25 express 97:17 expressed 78:5 91:7 95:15 99:4 123:21 128:19 138:19 157:25 expressing 154:23 expression 41:10 57:1 84:25 104:25 163:8 expressly 26:22 72:23 96:24 124:15 extended 95:2 extensions 126:2 extent 14:25 42:12 89:4 129:25 extract 63:21	extracts 65:10 extraordinary 68:5 148:3,7 165:2 166:19 extreme 103:2 extremely 2:18 13:7 97:13 eye 167:2,10 <hr/> F <hr/> face 9:5 59:3 75:25 faced 13:8,10 facility' 155:7 fact 1:22 10:25 14:8 16:9,9,9 18:2 18:12 25:15 32:2 34:2 36:20,22 38:19,19,19 41:1 43:25 74:10 76:8 77:8,13 78:9,16 78:25 79:4 81:7 81:10 94:7 117:19 117:19,19 134:2,5 142:18 146:1 149:16 157:16 165:23 168:10 factor 79:4 81:7 87:25 149:15,17 factors 83:6,22 89:2 92:23 facts 69:21 92:12 116:23 118:3 119:25 146:21 factual 21:5 45:8 factually 85:10 failed 6:23 14:10 97:2 fails 79:14 fair 128:21 142:18 155:19 fairly 165:6 faith 165:21 fall 16:25 22:10 34:22 114:21,22 151:11 fallacious 61:13	fallen 17:6 155:15 falling 22:2 35:14 72:15 fallout 15:17 69:18 69:22 96:16 fallout/rainout 96:12 false 26:18 165:21 familiar 135:21 146:19 families.' 141:25 family 78:13 fanciful 19:15 34:15 37:18 47:22 75:24 76:3,6,15 76:20,23,25 77:1 77:23 78:2,4,20 83:11,14 84:2 88:8 92:14,21 110:17 113:5 117:20 fancy 17:12,13 fantastically 13:4 far 27:4 35:10 50:4 52:1,14 57:3,12 67:14 151:3 152:12 far-fetched 91:15 fascinating 62:6 faster 4:11 father 24:7 fault 80:10 109:15 faulty 55:2 favour 11:21 66:21 68:2 71:24 72:4 72:13 79:1,17 111:3 feasible 150:21 featured 118:18 121:15,16 feed 113:20 114:8 feeding 26:20 feeds 110:19 113:12 126:14 feel 109:15,22 feeling 132:11	134:2 168:2 fell 71:24 felt 17:13 feminem 53:3,11 field 30:20 34:9 149:6,9 fielding 126:3 fierce 46:19 60:1 134:25 fight 115:17 fighting 114:23 figure 101:12 111:22 113:10,11 114:3 figures 101:20 110:11 113:18,19 114:2 file 5:16,20,22 7:10 99:5 135:6 139:5 144:23 145:6 files 5:8 6:24 131:7 150:1 fill 17:25 film 163:25 final 21:9,16 31:5 33:12 92:16 99:11 finally 29:3 155:18 financial 126:5 find 2:1,11,15 7:22 8:4 25:14 58:1 62:10 67:17 71:21 117:6 133:14 138:13 140:1 146:25 160:2 166:1 167:16 finding 77:8,13 78:10,16 94:16 findings 21:16 78:6 83:16 84:4 93:25 94:6,6 95:21 147:24 finds 31:20 fine 86:14 167:23 fingertips 151:20 finish 2:4 3:25 109:14 134:16
---	--	--	--	--

finished 4:17 137:16	forensic 8:22 15:2 31:7 42:3 108:3	founding 23:7	137:13,14 143:8	123:9 133:20
firm 66:19	foreseeable 32:23	found 83:3	148:5 156:19	139:22 141:10
first 1:19 3:7 7:10 10:7 11:7 12:18 12:18,18,20,24 13:12 14:3 17:6 18:21 20:18,19 22:8 29:5 31:14 32:5 36:6 40:13 40:17 45:15 46:1 46:4 55:14 56:12 56:25 57:24 65:21 67:23 72:21 93:18 97:25 98:1 105:11 113:25 114:1 115:22 125:8 136:24 137:23 138:18 148:24 150:1 154:9 158:4 159:18	33:11 34:18	four 1:6 57:17	future 32:23 33:11 34:18 138:4	142:4 149:8 162:6 167:19,20,25
FISH 150:10 155:5 155:9	foreshadowed 154:9	frame 9:18 20:3		given 5:14 17:24 35:9 44:11 48:6 48:15 54:10,15 58:23 63:16 71:21 73:19 77:7 79:4 81:7 91:8 98:21 98:24 107:12 116:1 117:9,11,19 118:3,5,11 121:5 121:12 125:16 126:4,25 127:12 129:6,17 131:15 138:14 139:16 146:10
five 1:6 165:25 166:3	form 91:7 103:21 104:10 153:15 159:10	framed 12:6	G	gives 60:16 74:21 108:13 114:13 142:15
fix 122:14	formidable 51:22	freeze 38:7	gambit 112:7	giving 26:21 46:10 46:16 52:18 98:10 102:12 124:25 125:1 133:17,18 136:25 154:20 163:25
flaw 31:20 51:8	fortunate 72:9,12	frequencies 136:1 153:13	gamble 140:2	glad 99:12
Fleet 18:13	forward 33:10 34:1 34:2,4,10 43:10 47:24 49:2,3 60:1 74:20 78:20,21,24 79:11,12,15,18 80:15,20,22 83:16 84:5 86:23 88:6 88:12,16 89:23 90:24 91:13,19 92:16,22 96:3,20 102:15 116:19 118:19 122:24 123:9,11,15 124:12,21 125:9 125:12 126:6,23 163:4 164:21 168:5	fresh 42:3	gamma 95:1 96:15	glanced 127:8
flew 119:9	forward 33:10 34:1 34:2,4,10 43:10 47:24 49:2,3 60:1 74:20 78:20,21,24 79:11,12,15,18 80:15,20,22 83:16 84:5 86:23 88:6 88:12,16 89:23 90:24 91:13,19 92:16,22 96:3,20 102:15 116:19 118:19 122:24 123:9,11,15 124:12,21 125:9 125:12 126:6,23 163:4 164:21 168:5	Friday 4:18	gander 129:16	GLP 1:8
floating 17:15	forward 33:10 34:1 34:2,4,10 43:10 47:24 49:2,3 60:1 74:20 78:20,21,24 79:11,12,15,18 80:15,20,22 83:16 84:5 86:23 88:6 88:12,16 89:23 90:24 91:13,19 92:16,22 96:3,20 102:15 116:19 118:19 122:24 123:9,11,15 124:12,21 125:9 125:12 126:6,23 163:4 164:21 168:5	friend 102:8	gap 138:16 148:4	go 3:7,9 9:22 16:12 16:16,17,20 17:3 17:7 19:6,17 27:1 27:4,14,21 29:7 29:14 30:9 32:5 36:16,25 38:10 41:3,6,16 48:14 49:8 55:3 56:19 58:10,11 59:5 60:18 62:2,21,23 63:22 64:19 67:10 72:20 74:24 80:12 81:6 82:4 87:17 97:12 98:16 108:6 109:3,21 110:2,9 111:4,12 117:1
flow 109:14	forward 33:10 34:1 34:2,4,10 43:10 47:24 49:2,3 60:1 74:20 78:20,21,24 79:11,12,15,18 80:15,20,22 83:16 84:5 86:23 88:6 88:12,16 89:23 90:24 91:13,19 92:16,22 96:3,20 102:15 116:19 118:19 122:24 123:9,11,15 124:12,21 125:9 125:12 126:6,23 163:4 164:21 168:5	front 13:13 14:9 20:10 40:22 45:1 49:10 99:24 102:18 105:19 106:25 122:5 163:1	gather 163:11	
flying 75:25 119:21 120:1	Foskett 11:1,21 13:19 14:14 29:4 38:3 51:2 119:13	fruit 109:25	gathering 163:13	
focus 145:23 164:17	Foskett's 11:17 45:19	frustration 9:16	Geiger 121:23	
focusing 154:22	found 24:13 60:19 64:24 65:11,15 83:8,23 88:7,11 91:10,14 94:18 96:7,19 97:18 114:3 115:24 131:10 145:1 146:6,9	FTT 66:18 71:14 82:9 88:13,22 92:1 94:14 95:14 95:21 96:24,25 97:2 117:16 119:15,18 120:15 156:13,13	gender 53:14	
follow 60:20 67:5 157:7,8	found 24:13 60:19 64:24 65:11,15 83:8,23 88:7,11 91:10,14 94:18 96:7,19 97:18 114:3 115:24 131:10 145:1 146:6,9	fully 32:22 34:16 67:13 80:18 150:2 159:19	general 52:10 53:16,17 78:9 95:15 115:7,11 137:23	
following 23:22 62:15 162:9	foundations 162:17	functional 12:16	generalised 72:21	
follows 66:23 87:24 148:9	founded 92:11	fund 166:2	Generally 132:11	
forced 116:21 122:25		fundamental 41:21 77:10 144:21 162:10	generous 97:1	
forces 35:22 67:21		fundamentally 37:4,6 44:23 54:15 154:11 165:18	genetic 159:16	
forehead 74:13		further 33:23 36:16 42:23 46:22 50:12 64:1 65:16 69:6 69:17 73:17 82:20 88:15 94:8,20 95:6 105:10	genome 27:19 44:9 138:4 158:6	
			genomes 148:1 158:20	
			gentle 54:6	
			genuine 108:3 138:10	
			George 131:12	
			getting 5:10 42:3 68:12 99:12 103:24 104:15 112:23 113:10 115:20 139:11 158:22 166:23	
			gist 95:4	
			give 6:21 18:8 20:16 22:15 23:25 24:2,6 28:11 32:1 36:18 45:14 66:10 73:24 83:7 84:23 87:9 89:13 105:17 113:17 118:14	

118:12 119:4,18 121:10 124:9,10 126:11 131:16,22 134:15,24 135:20 137:18 139:5 140:11 141:12,13 143:5,7 145:11 151:17 156:16 159:4 166:8 167:4	good 1:5 2:11 9:23 35:3,3 104:1 106:4,24 108:12 125:16 134:13 137:25 151:3 165:20 goose 129:16 gospel 124:7 governed 82:6 Government 10:13 46:15 49:17 139:3 140:18 141:22,23 144:6,7,11 166:2 grapple 61:11 109:18 grasp 11:5,6 79:21 great 28:25 40:2 42:21 45:4,6 67:15 107:13 109:13 129:10 greater 146:17 greatest 35:14 48:2 98:15 99:8 122:9 Greer 65:25 66:17 ground 24:3,24 121:20 163:12 grounds 23:24 24:1 70:19 96:21,23 group 32:19 35:3 36:9 102:2,3 105:3 119:12,14 120:17 136:14,16 137:7 153:4,5 162:11 groups 136:16 137:7 143:24 144:10 guidance 77:22 78:1 98:23 guide 87:9 guises 107:14	4:13,15,20 5:2,3,7 5:16,19,24 6:4,10 6:13,19 7:5,9,17 8:4,8,11,25 9:2,15 9:19 10:1,5,12,19 10:23 11:8,11,15 11:19 12:10 13:15 13:17 14:18 15:3 15:10,13,16,19 16:5 17:13 18:3,8 19:1,12 20:7,19 20:25 21:5,8,14 23:13,16,20 24:2 24:6,19 25:6 28:1 28:4,17,19,22 29:7,24 30:3,7,11 30:14 31:9,12,21 31:23 32:1,8,12 35:13,17 37:6,9 37:15,18 38:12 39:4,10,13,19,22 40:17,20 42:9,11 42:17 43:1,5 45:18 46:1,8,25 47:12,19,24 48:2 48:10,20 49:2 50:7,19 51:18,23 52:7,12,19 53:6 53:10,16,20 54:22 55:6,11,14,21,24 56:2,6,16,25 57:12,23 58:13,16 58:21 59:4,15,20 61:8,11,18,20,24 62:7,9 64:19,21 64:24 65:2,5,8,14 65:21 67:7,10 68:1,8,16,18,20 68:24 69:2,4 71:11 74:8,18 75:6,17,19,22 76:2,6,16,19,22 77:3 79:13,23 80:1,6,10,15 81:3 82:4 86:13 87:4 87:10,13,17,20,22	87:24 88:22 93:5 93:10,12,14,21,24 100:9,13,17 101:1 101:3 102:4,8,14 102:23 103:4 104:7,12,18 105:2 105:10,13,25 106:9,13,23 107:5 107:7,17,22 108:9 108:11,15 109:1 109:10,17 110:8 110:19,22 111:1,4 111:10 112:10,12 112:16,22 113:4,9 113:25 114:8,20 114:25 118:3,9,25 119:2,7,17,24 120:11,17,25 124:9 125:5,8 126:10,12,14 127:7,10,13,22 128:1,12,15 129:3 129:25 130:6,20 130:23 131:3,5,9 131:12 132:3,7 133:5,23 134:2,12 134:16,22 135:6 135:10,12,14,16 135:20 138:18,24 139:3,10,14,18,21 140:1,6,9,14,17 140:21,23 141:6,9 141:16 142:25 143:5,7,11,13 145:1,3,5,8,10 146:8 147:2,6,9 149:4 150:11,15 150:21 151:7,13 151:15,17,20,22 151:25 152:4,19 152:22 153:1,9,25 156:8,10 157:8,15 157:21 158:3,8,14 159:1,3,18 160:17 161:5,9,13,23 162:2,8 164:2,7	164:15 165:10 166:12,16 167:2 167:13,17,22 168:5,15 169:2 half 10:13 108:19 Hallard 7:23 62:19 115:24 116:2 117:4 120:23 125:12 130:25 164:24 165:5,13 Hallard's 113:13 118:20 123:4 162:24 hand 32:4 handed 5:9,15 7:9 113:22 135:12 144:24 hands 39:1 hanging 13:6 36:14 36:15 hangs 74:16 hapless 17:8 happen 88:4 164:10 happened 42:8 64:2 happens 3:23,24 46:22 happy 136:17 137:8 139:9 hard 1:14 5:12 38:19 103:21 139:11,11,15,19 harmful 143:18 hat 88:14 151:11 Hay 73:13 Hay's 73:8 Haylock 45:16 60:19 61:1 62:24 63:9 74:25 76:2 97:13 98:5,5,12 98:16 106:11 114:5 126:18,24 127:6 128:6,8,11 Haylock's 74:2 97:12 111:5
168:3,5	H H 89:19 Haar 1:19 2:15 3:4 3:8,10,12,23 4:4,8			

113:19 129:3 head 58:15 111:19 132:1 headed 65:5 78:9 heading 95:13 145:13 health 116:4,5 122:23 141:23 163:11 165:13,14 hear 13:14,20 31:25 61:17,18 102:13 122:15,18 heard 13:17 15:6,9 26:13 27:17 48:4 66:11 93:19 108:19 hearing 3:1 7:19,22 7:25 12:1 18:22 39:25 49:19,20 50:1 62:13 64:10 86:23 108:4 125:12 126:4 138:19 140:14 165:5 hearings 128:13 heart 162:19 heavily 72:13 held 12:13 63:10 76:24 123:21 128:20,23 help 19:16,17 20:16 29:17 34:23 35:5 38:15 110:12 165:9 helpful 5:1 34:19 51:1 52:12 61:23 62:10 helpfully 65:10 102:12 Heppinstall 3:1,13 4:16,25 6:18,22 7:2 12:5 13:17,19 13:22 14:5,14,21 14:24 29:9 35:22 50:2,12 57:7 61:18 64:13 68:19	70:25 71:5,9 82:23 85:12 86:15 86:21 91:20 118:16 127:9,11 140:25 141:4,10 142:4,9,17,19,22 142:23 144:14 159:2 Heppinstall's 50:7 high 138:7 148:6 148:16 156:10 higher 38:21 96:15 113:18,20 141:14 153:20 155:25 highly 90:9 146:15 hindsight 165:2 Hiroshima 60:10 historical 57:6,8 59:6 116:18,21 121:9 122:25 155:16 historiography 14:13 history 2:24 11:4 15:4 20:11 39:15 39:22,23 56:23 57:13 60:7 62:14 82:2 116:16 126:11 132:24 hit 130:25 hits 111:19 hitting 18:13 HL 89:10 91:11 146:11 154:25 155:2 Hogan 1:12 2:17 5:19 hold 8:19 23:8 43:18 44:14 59:16 98:7 99:6 123:18 126:22 150:22 holders 124:2 holding 44:13 66:4 97:8 holds 58:18 hominem 53:3,12	honour 166:14 Hooper 18:23 hoot 43:6,7 hope 1:5 2:1,7,7,15 112:6 140:6 147:2 hopefully 4:16 8:14 93:13 hotspot 94:11 hotspots 70:14 94:9 94:15,16,22 95:10 96:14 hotter 94:13,24 huge 117:1 human 75:25 105:19 122:15,19 122:20 133:10 149:8 159:15 Hunt 67:12 Hunt's 67:19 hypotheses 21:12 23:10,11 26:16 117:25 hypothesis 16:12 16:13 22:19,25 23:8 24:6,11,19 24:21,23 25:9 26:14 27:6 33:10 34:12 38:22 43:19 51:16 55:3 91:24 92:2,5,11,14,19 92:20 101:13 114:24 117:20 hypothetical 61:23 75:24	82:17 identify 82:9,15 90:11,19 156:21 idle 40:25 ignorant 160:25 ignored 45:1 ignores 63:13 ii 78:21 83:15 84:4 90:15 95:15 iii 78:24 79:14 90:19 95:16 ill-founded 54:25 illustrate 60:24 illustrated 39:20 imagine 106:24 119:5 immense 117:5 immune 148:14 immuno 148:18 impact 45:12 77:18 92:7 138:7 impacts 89:22 impartial 123:9 implement 143:16 implication 154:19 implications 47:10 163:11 164:10 importance 2:6 34:21 47:5 89:1 90:3 144:21 156:17 165:22 important 2:24 11:24 15:4,21 22:13 27:14 39:19 48:13 55:6,11 56:20 59:20 77:22 77:25 78:1 92:7 94:5 97:6 115:4 121:17 132:21 134:6 142:14 149:5 153:11 155:21 161:16 162:20 164:16 Importantly 144:6 impossible 17:10 101:14	impression 119:20 133:6 improbable 161:18 inaudible 106:14 119:14 incapable 38:18 included 40:3 126:17 includes 60:2 including 33:21 92:10 95:25 118:8 144:3 inconceivable 30:1 inconsistent 66:4 73:1 incorrect 78:7 increase 153:3,20 increased 147:17 149:18 153:12 incredible 80:13 incredibly 16:2 indented 34:17 independent 20:22 80:18 independently 123:9 index 9:7 indicate 73:5 92:4 95:23 indicated 72:6 94:25 indicating 85:4 indication 94:5 indicator 25:3 148:5,10 indirectly 131:21 individual 45:9 99:19 100:12,16 100:18,19 101:7 101:15 102:1,2 103:9 142:8 159:13 individuals 136:11 inevitable 90:10 inference 69:21 influenced 38:22
		I		
		i.e 6:11 56:4 76:6 122:16 IAEA 150:9 151:4 151:9 idea 38:14,14,16 49:8 119:3 131:25 134:13 identification 90:22 identified 24:16		

inform 3:16	Internet 139:7	146:17 155:13	judicial 71:6 88:20	49:1,6,23 50:9,24
information 4:11	interplay 80:16	159:23 163:22	108:22 109:1	51:20 52:3,8,17
38:9 120:3 163:11	interpreted 148:17	issue 15:12,13,15	July 95:5	53:4,7,14,17
163:13	interrupt 109:14	15:16 52:22 102:7	June 1:1 42:21	54:20,23 55:7,12
informed 1:8	119:11	105:6 120:7 127:1	50:13 168:20	55:19,22 56:1,5
111:25	interrupted 79:9	127:3 157:14	jurisdiction 56:19	56:11,24 57:11,22
ingenuity 25:11	interruption 141:6	163:19	59:2 70:22 71:1	58:12,14,19,23
ingestion 96:13	interruptions	issued 11:7	jurisdictions 76:10	59:14,19 61:7,9
ingredient 79:5	168:4	issues 6:2 15:2	jury 76:12 111:25	61:14,19,21 62:5
81:8 87:25	intervened 41:25	35:11 49:11 52:17	111:25 112:1	63:14 64:18,20,23
ingredients 82:10	intervention	62:2 70:13 90:22	125:18,21	65:1,4,7,12,19,19
82:15 83:6,22	122:15	96:22 108:2	justice 1:5 2:13 3:2	65:23,24 66:2,16
89:2,16	intimated 11:7	120:11 128:17	3:5,9,11,19 4:2,7	67:4,8,11,23 68:7
inhabited 95:18	intimately 119:21	159:12	4:10,14,18,21 5:1	68:9,13,17,22,25
inhaling 116:9	intricacies 156:23	italics 32:12 154:3	5:6,11,18,23 6:2,5	69:3 70:11,15,20
initial 148:4	introduction 155:8	iv 79:4,12 90:21	6:12,15,21 7:1,3,6	70:23 71:4,6,10
initially 126:2	invalidate 73:16		7:16,24 8:7,10,16	71:11 74:7,12
148:18	158:20	J	9:1,3,16,23 10:3	75:4,14,18,20,23
inquiry 42:23 54:7	invalidated 147:22	J 70:15 77:17 94:18	10:11,18,22,25	76:4,10,17,21,24
inquisitorial 88:14	investigated 22:23	Japan 25:17	11:1,10,13,16,17	77:2,15 78:14
insofar 7:25 9:9	22:25 23:5	JC 148:13	11:21 12:9,23	79:8,14,25 80:3,8
43:16 65:9 142:9	investigation 22:24	jibed 99:1	13:14,16,19,21,25	80:14 81:2,20
142:10	88:15 121:9	jigsaw 18:1	14:11,14,18,23	82:3 86:8,12,14
instructed 97:17	137:13,14 159:10	job 117:21	15:6,9,12,14,18	86:23 87:5,12,19
127:12,14 130:2	investigations	jogged 127:22	15:20 16:4 17:5	87:21,23,24 88:19
152:19 155:24	147:25	Johnston 95:2	17:10,23,25 18:6	93:4,8,11,13,16
instructions 63:4	invite 144:14	117:15 165:6,15	18:25 19:4,16,18	93:20,22 100:6,10
115:25 117:9	invited 55:20 126:8	Johnston's 95:24	20:7,13,15,21,25	100:14,25 101:2
128:16 129:17,23	128:2	96:2	21:4,7,11 22:9	101:18 102:6,11
130:7,8	involved 120:1,8	joint 126:8	23:8,15,19 24:1,3	102:20 103:3,15
instrument 51:5	162:14 166:16	joke 131:14	24:18,21 25:10	104:11,16 105:1,8
integral 157:5	involves 89:19	jolly 104:1	26:22 27:25 28:3	105:11,21 106:2
integrity 97:16	145:20	Journal 155:4	28:15,18,20,25	106:10,22 107:3,6
108:2 117:5	ionising 143:18	journey 10:6 35:12	29:4,8,11,15,25	107:11,19 108:1
intend 1:15	146:13,16 148:5	55:19	30:2,4,9,13,18	108:10,12,16
intense 37:21	148:16 153:16,21	journeys 140:5	31:10,19,22,25	109:9,12,19 110:9
intent 8:25 9:2,20	156:24 157:2	judge 13:13 15:1	32:7,10 34:16	110:21,23 111:2,9
intention 3:24	159:23 160:7,9,12	40:5 71:3,18	35:16 37:5,8,12	112:6,11,13,17,23
interested 138:9	161:19 162:13	122:12 142:6	37:17,19 38:3,13	113:7,24 114:7,18
143:25 144:1,8	iron 9:3	judges 106:2	39:8,11,16,21,24	114:23 117:11
150:9 159:7	irrelevant 29:6	judgment 11:2 14:9	40:5,15,19,22	118:5,6,23 119:1
interesting 1:6 67:9	58:20 68:15	14:12 19:19 23:2	41:24 42:7,10,12	119:5,11,13,20
85:11 87:2	Island 18:11 25:16	29:14 54:11 65:11	42:18 43:2,25	120:6,12,24
Interjection 141:8	45:10 68:11 69:11	68:1 87:25 163:24	45:17,19,25 46:7	123:25 124:24
internal 23:10	69:23 70:1 85:9	judgmental 89:19	46:9,21 47:2,15	125:7 126:8,11,13
24:24	85:25 86:1,4	92:16	47:23 48:1,8,11	127:5,16,25

128:11,13 129:1 129:23 130:4,19 130:21,24 131:4,6 131:10,18 132:5 132:25 133:20 134:1,11,13,18 135:5,8,11,13,15 135:19 138:17,23 139:2,6,13,16,20 139:24 140:4,8,13 140:16,19,22 141:5,8,15 142:21 142:24 143:2,6,10 143:12 144:25 145:2,4,6,9 146:7 147:1,5,8 149:3 150:7,13,18 151:2 151:12,14,16,19 151:21,24 152:3 152:18,21,25 153:8,24 156:5,9 156:16 157:11,20 157:24 158:6,12 158:24 159:4 160:16,22 161:7 161:11,20 162:1,7 163:22 164:6,14 165:5 166:9,14 167:1,8,14,21,23 168:14,16 justification 133:7 justify 36:8	keeping 167:9 kept 44:16 key 146:21 kind 51:21 Kingdom 144:3 160:20 knew 25:18 26:2 43:15 51:4 59:1 126:5 149:15 163:3 knocks 86:10 know 9:14,18 10:19 10:20 16:10 23:23 24:5 26:4,5 29:4 29:17 30:19 46:12 49:13,25 50:3 51:2,4 59:11 60:14,15 68:25 104:13 105:2,4,15 106:2 107:24 111:16 123:19 124:8 132:1,24 133:1,6 134:24 135:8 136:13 138:22 139:16 143:6 145:25 146:24,24 150:22 157:9 158:7,12 161:8,21 162:5,23 162:25 163:9 165:8 167:4,13 knowing 42:19 knowledge 13:22 13:23 14:20 27:6 41:25 42:14 59:7 68:22 75:25 142:10 known 49:15 50:1 92:8 148:8,15 knows 13:8 25:13 58:25 124:3	Labour 141:23 lacking 34:9 language 40:10 54:4 75:11 large 12:24 15:2 20:12 21:18 118:24 119:7 136:10 largely 96:1 118:18 larger 136:14,16 137:7 late 1:20 10:16,23 44:20 165:24 lateness 1:25 latest 49:9 launch 46:18 48:22 law 6:9,10 12:25 16:3 30:20 51:21 71:8,9,10 72:12 78:13 83:4 94:19 96:18 97:5 106:4 lawyer 16:8 26:25 59:18 lawyers 16:20,21 16:24 41:20 lawyers' 40:10 Lazutka 148:11 lead 31:3 Leader 141:18 leading 23:6 113:14 leads 56:9 learned 102:8 learning 37:21,22 65:20 107:11,11 107:12 leave 48:25 58:14 148:1 leaves 22:1 122:4 led 31:4 67:20 81:20 116:1 left 19:2,13 38:14 38:16,18 45:3 65:20 74:5 84:2 92:15 114:19 160:4,6 165:25 leg 18:10,15	legal 15:1 16:8 65:12 93:8 130:13 141:10 142:4 154:22 156:15 166:25 legislation 12:7 23:3 68:6 105:17 110:20,25 legislative 51:5 legitimate 123:14 123:14 legitimately 56:14 56:17 legs 16:13 lend 72:23 73:17 135:10 length 40:2 45:4 98:24 lengthy 1:10 2:22 61:20 93:15 145:15 let's 18:9 25:23 33:25 36:4,4 46:21 80:12 100:23 104:7 160:4 letter 11:14 141:19 level 12:16,16 45:10 50:22 61:23 84:23 86:6,18 95:17 101:24 113:14 149:8 156:24 157:22 164:22 levels 32:25 33:14 98:13 146:17 147:17 148:16 157:2 164:15 Lewis 77:6 library 8:13,13,15 9:7 167:12 lie 92:5 lies 37:19 51:22 lieu 166:10 life 16:5 67:21 103:18	lifted 130:5 light 77:18,20 84:6 90:22 91:2 155:2 likelihood 101:24 limit 11:22 29:19 42:4 limitation 10:14,20 11:8 limited 19:7 41:24 42:14 92:2,6,6,21 129:19 Lindahl 152:17 line 16:22 59:3 129:4 135:16 137:5,19,20 141:3 141:9 143:11,12 147:24 lines 134:8 linked 147:20 listed 132:4 Listening 47:2 litigant 124:18 litigation 10:8 12:14 28:6 33:3,4 41:18 51:2 58:10 68:4 122:12 124:17 153:10 155:20 156:6 litigations 152:20 littered 106:5 little 1:22 9:5,7,8,8 50:5 78:8 94:20 99:1 150:18 168:10 live 13:14 lives 90:5 living 159:14 LNT 96:11 logic 24:25 158:24 logical 22:25 23:22 24:20 logically 74:8 long 3:22 4:5 17:23 28:1,8 73:12 76:19 80:8 113:4 115:3 116:1
K	L			
K 69:2 Kaldor 32:14,14 33:18 34:1,12 36:21 44:7 63:22 63:23,24 149:23 149:25 150:8 153:25 156:3 Kaldor's 32:18 41:14 keep 46:17 49:18 53:14 131:25 164:16 167:2	label 5:19 labelling 5:14 laboratory 35:4			

124:10 126:1 138:8 140:5 166:6 long-term 69:12 96:13 163:10 164:10 look 2:8 10:14 17:19 27:15 35:1 47:20 53:23 56:21 61:1 65:25 68:4 77:17 85:15 86:23 106:13 107:9 109:12 126:19 128:2 129:7 130:21 131:22 136:5,7 140:10 158:14 looked 1:9 3:22 11:2 32:10 47:5,6 47:7 52:6 108:7 129:10 136:10,11 152:10 looking 10:12,13 14:24 16:12 23:20 32:6 42:15 62:7 69:4 70:8 138:1 138:20 145:20 loose 7:4 Lord 1:19 5:3 7:2 10:19 12:11 13:8 46:9 49:4,13 55:25 64:7 65:24 68:9 80:11 89:6 89:18 106:15 122:8 124:10 134:22 Lord's 43:20 Lordship 4:4 65:8 lorry 18:11,13 lose 7:3 168:6,6 lost 31:24 133:8 138:11 lot 2:5,5 131:7,15 131:21 138:1 143:3 154:18 156:18 love 24:3	Lovells 1:12 2:17 5:19 low 148:16 low-lying 109:25 lower 86:5 LPP 130:5 luck 9:8 lump 166:10 lungs 116:14 lure 58:24 lymphocytes 138:12 <hr/> M magnitude 156:25 mainstream 38:23 maintain 143:17 majority 58:11 maker 79:6 81:9 83:4 88:2,18,19 88:20,21 89:22 90:10 91:6 makers 90:4 making 5:11 27:7 27:16 45:20 58:5 59:22 78:10 88:7 88:24 90:25 92:24 95:21 120:22 122:1 129:12 139:7 142:7 164:7 168:12 man 97:14 111:15 116:3 117:5 manage 6:15 9:24 managing 5:13 mankind 25:12 manner 138:25 map 2:16 118:24 153:5 margin 110:6 mass 21:9,11 118:12 match 164:23 matching 124:13 material 1:20 9:11 23:15 30:4,9	34:21 38:2,17,21 38:23 42:20 71:19 71:22 95:4 116:13 117:1 118:6 122:16 128:3,4,5 130:11 131:15,20 131:20 137:14 materials 1:13 17:11 68:14 mathematical 117:23 mathematically 24:16 mathematics 24:8 24:25 105:25 maths 105:22 matter 2:9,24 7:15 11:4 15:6 16:1 17:14 21:22 26:11 31:17 36:10 49:3 54:6,17 66:14 74:7 81:11 91:17 98:9 101:3 132:9 166:14,21 matters 1:24 11:23 60:9 72:13,16 81:14 82:11 83:7 84:9 90:19 95:2 116:18 117:13 maximum 62:21 mean 6:19 23:13 35:7 37:25 50:24 52:5 55:7 71:10 76:13,24 81:11 85:4 102:11 114:3 114:15 119:12 120:6 123:10 124:14 128:14 137:25 138:6,9,22 146:14 150:15 157:7,8,22 158:9 160:22,23 161:21 meaning 66:8 88:19 means 17:22 25:2 47:18,20 69:24	79:11 123:13,13 meant 109:17 117:12 measure 116:24 measured 32:25 33:15 69:13 measurements 70:14 94:25 164:23 measuring 121:12 medical 29:21 72:1 140:18,19 144:7 144:12 161:12 meet 19:24 meeting 4:2 142:8 142:11 member 157:25 members 11:20 13:9 112:1 125:21 139:10 memory 127:22 memos 139:16 men 132:1 164:11 mental 105:22 mention 29:1 34:24 49:22 mentioned 8:11 110:22 mere 92:1,5,6,20 merely 127:20 merits 14:5,7,20 15:17 message 144:15 met 89:15,15 meterological 95:16 96:1 121:8 method 134:10 138:19 151:5 153:13 methodology 136:4 methods 27:19 32:21 52:13 Metzer 142:19,25 143:3 mFISH 27:18 134:9 137:24	138:19 149:10 152:22 153:13 154:7,12,18 155:1 155:9,15 156:20 156:22 157:6,7,17 158:5,19 159:7 mice 157:1,13 microbiologist 27:3 27:5 microbiology 27:1 27:3 57:14 micropcentages 110:14 mid 141:11 mid-afternoon 132:9 mid-cross-exami... 142:5 mid-morning 168:8 middle 141:21 miles 24:14 85:8 military 104:2 million 104:9,15 105:22 131:24 millisieverts 85:6 86:17 114:4 146:15 mind 4:13 21:20 60:17 64:8 100:7 120:16 122:14,18 130:10 155:22,23 162:11 164:16 mindset 15:25,25 16:25 112:4 mine 49:25 mini 139:22,24 minimal 114:12 minimum 22:6 98:13 minister 65:25 141:17 142:8,12 minority 58:7 minute 6:21 minutes 87:7 145:11 misled 124:4
---	---	--	--	--

misplaced 155:2	55:11,12 57:13	neither 78:21 110:6	116:6,17 119:4,9	52:8 53:7 59:5
missing 71:15	MP 142:11	neutral 53:14	146:2 148:12	77:2 135:20 152:3
131:1,10 158:21	msv 114:1	never 13:5 25:8	153:4,14 155:6,12	156:9
misusing 52:3,4,4	muddled 130:14	27:11 75:4,7	number 10:8 12:24	old 56:22 57:1
mix 21:1,8 22:14	multiple 136:7	82:24 101:21	20:12 21:19 85:7	158:5,21
59:8 101:25 105:9	mustard 72:25	102:1,4 107:22	95:3 101:1 108:8	once 21:14
Mm-hm 27:25	73:14,23	121:15,16 126:3	115:16 136:10,11	ones 165:24
57:11	muster 40:11	127:6 131:7,23	148:6 161:18	ongoing 38:8
mode 67:10	165:12	156:6,7	numbering 135:16	open 35:7,9 36:2,2
models 52:4	muted 60:3	nevertheless 1:23	numbers 163:18	36:3 39:11 44:6
moderate 29:10		2:21 32:23 33:13		70:4 87:19
moderately 2:21	N	55:4 60:12 61:15	O	opened 11:22
modifications	N 169:1	new 56:22 59:12,13	o 168:10	opening 40:13
159:17	Nagasaki 60:10	84:22 85:13	o'clock 3:20 86:24	112:7
modified 161:4	Nak 106:5	114:14 140:11	109:20 167:25	operate 30:19
moment 3:6 5:17	narrative 30:24	146:13 153:14	168:17	operation 157:5,6
7:4 15:4 34:25	narrow 58:24	160:11 161:3	object 36:8 44:23	opinion 38:23
50:5 55:7 65:17	nature 76:18 89:3	Newman 65:19	objectivity 133:8	97:20 99:2,4
68:10 76:2 84:8	115:25 129:16	68:9 70:15,23	obligation 43:14	123:19 124:1,15
86:13 112:23	162:22	77:16 94:18	observed 148:17	125:3 137:23
114:20 131:12	navigate 15:14	nexus 55:1	observer 150:9	154:23 165:8
133:17 135:12	near 23:2	Nicholls 89:18	159:16	opinions 21:11
137:14 158:16	nearest 163:4	night 46:4 64:7	obtained 71:1	165:7
165:12 167:7,20	neatly 33:2	111:13	obvious 74:5 94:16	opportunity 2:8
money 36:8 166:16	necessarily 133:3	nominated 71:18	96:14 132:5	3:16 36:12 43:19
166:20	necessary 65:15	non-fanciful 86:16	154:19	129:6 150:19
monitors 85:16,20	need 6:13 20:16	non-legal 11:20	obviously 1:23 2:6	167:5
monocle 139:25	24:23 27:24 29:8	normal 78:22 82:6	5:13 10:13 16:19	opposed 120:12
moon 24:9,15	35:9 49:13 51:23	83:9 89:18 97:8	30:22 35:18,24	opposite 34:1 67:24
morning 1:5,7 4:18	65:9 77:17 88:14	103:18 130:10	42:19 60:7 65:16	101:9 155:17
6:23 109:5 133:23	90:20 98:13 110:1	normally 22:4	104:21 110:2,5	Opposition 141:18
133:24 138:3	119:18 145:2,10	north 121:10	132:24,25 155:14	option 62:16
144:24 162:6	156:25 161:11	note 53:9 56:11	occasions 73:5	oral 8:20 15:9,10
168:1	163:5 166:3	76:12 113:8	occurred 69:22	42:25
mortality 60:14	167:19	126:16	133:11	orally 2:3
Mothersill 45:16	needed 30:5 41:8	noted 45:17 90:16	offer 139:21 140:2	order 6:15 14:15
45:23 46:23 50:15	62:15 73:19	notes 5:25	offerings 5:12	17:25 33:6 40:9
Mothersill's 47:25	124:16 166:3	notice 2:19 44:11	offers 139:14	42:5,6,7 43:20
mouth 143:22	needs 22:22,24,25	48:5 54:9,15	office 71:3,4 141:20	49:5 50:11 64:16
move 55:5 78:8	34:22 74:14 88:12	60:25 102:12,12	officer 140:18,19	81:20 85:5 99:18
93:14 115:2	136:24 165:22	128:3,9 137:2	144:12	100:1 103:15
126:23 130:23	negligence 10:10	noting 149:23	offshore 121:23	118:11 120:15
138:24	11:8 12:15 13:13	notwithstanding	Oh 56:5 128:7	125:20 127:16
moved 121:11	22:20 28:6 33:3,4	66:5	167:18	139:25 157:23
moves 59:11	99:18 152:20	NRPB 129:9	okay 10:4 14:23	ordered 41:16,23
moving 16:14 55:6	153:10	nuclear 25:17	21:17 42:9 43:2	63:14

ordering 13:3	137:19 141:2,3,13	123:25 128:13,16	PAT 69:6 70:4,8	64:2 98:20
orders 46:8	141:14 142:18	132:21 136:6	71:2	permission 49:21
ordinary 22:20	143:5,7,8,13	144:21 157:5,5	path 27:1 63:13	permit 19:23
124:11,17	145:1,12,13 147:4	162:9 164:18	pathology 159:14	person 37:2 53:13
organic 153:17	147:5,6 151:17	166:4	pathways 117:12	55:3 99:6 103:9
origin 82:21	152:17,17 154:2,8	participants 32:20	patient 136:6	103:11,13 104:23
original 7:14,19,20	paid 166:20	33:1,15 85:13	patients 148:12	105:3,4,4,20
8:5,12 15:24	paint 160:3	participating 124:1	pause 3:5 5:15	118:10 120:8
85:12 131:23	paper 9:12 26:25	particular 16:15	151:10 157:11	121:11 124:18
155:20 156:11	43:13 84:10	34:24 38:5 77:6	167:20,21	125:1 139:14
originally 63:14	122:20 135:21	88:10,10 92:4	pausing 79:8	161:2
152:19 168:9	151:9	99:4,19,20 100:22	payment 166:12	personal 54:19,20
ought 4:3	papers 28:25 57:6	101:7 102:24	peer 155:17	55:13,16 56:8
outcome 42:19	57:10,20,25 58:1	103:4,21 104:10	pension 10:7 12:6	57:15 60:7 74:16
145:24	59:8 121:5 167:10	104:20 106:14	25:22 51:15 72:10	80:17 133:2
outer 24:10	paradigm 56:22,22	113:14,14 115:15	105:17 109:3,11	personalise 52:8
outside 33:18 43:17	57:1 59:12,13	115:23 116:24	153:10 164:11	54:24
112:6 115:23	paragraph 32:18	120:19 130:24	165:24 166:4	personally 8:20
116:1 117:7,18	33:2 44:5 65:3,22	143:21 148:23	pensioner 105:18	34:23 37:22 49:24
118:2 126:21	66:8 67:11 69:5	159:13 161:1	pensioners 46:17	58:15 123:23
overall 19:7 20:2,4	70:24 71:11 72:18	particularly 48:4	pensions 12:17,19	156:18
20:17 22:6 34:22	72:20 73:21 77:8	109:23 115:9	25:10 46:16 51:3	persuade 40:20
80:5 143:17	78:14 79:10 82:4	116:5 121:13	65:25 69:6 73:4	41:4
148:20	82:25 87:22 91:23	124:6 126:18	77:11 156:6 166:3	persuaded 41:2
overcome 33:6	93:2,5,17,25 94:3	130:17 167:9	166:13,21,24	42:14
overlap 77:15	94:10,21 95:8,19	parties 124:12	people 48:9 52:23	persuasion 31:7
overlaps 70:12	99:14 100:2	partisan 53:22	57:10 59:16 62:8	Phelps 167:11
overnight 161:25	145:17 147:6	partly 41:20 47:24	63:7 84:18 85:5	philosophy 16:23
overview 89:11,16	149:12 152:20	48:10	85:11 100:22	phrase 51:7 92:5
91:3	154:8,24	parts 48:21 52:24	103:5,6,7,17,20	physically 5:4
<hr/>	paragraphs 32:13	52:25 90:23 94:2	104:9,12 105:15	physicist 24:7
P	83:3 91:18 102:16	96:2 122:12	105:16 114:11,14	116:4 165:15
Pacific 33:1,16	102:19	party 124:19	115:18 121:22	physics 116:17
85:3	park 131:11 162:1	Pascini 119:8	122:13 133:13	165:13
page 32:12 44:5	162:1	pass 40:11	154:18,19 160:3	PI 51:2
65:2,22 66:1,3	Parker 98:2,10	passage 41:13 66:2	161:18 163:2,4	pick 4:21
67:10,11 69:5	128:19 129:5	67:12 70:22 71:16	164:16 166:18	picked 115:14
71:15,16 72:5,20	150:4 151:18,22	91:25 133:22	perceived 147:19	pictures 104:5
78:9,14 82:4,25	Parker's 127:6	154:6	percentage 113:16	piece 25:3 37:23,23
83:1 87:20 91:18	128:22	passages 66:17	114:16	37:24 38:1 84:17
91:23 92:25 93:4	part 17:17 19:5	69:4	perfectly 57:23	89:8 97:8 118:17
93:5,14,25 94:2,3	20:21,22 30:7	passed 22:6 24:13	60:5	120:25 121:2,17
94:9,10,20 95:7,8	31:17,17 35:23	passing 64:6	period 126:1	121:21 124:17
95:19,20 99:13	38:16 39:13 69:7	passion 133:8	138:12 147:21	159:13 161:12
102:16,19 129:4	81:19 82:2 92:13	passionate 134:3	permanent 148:1	pieces 38:19 84:9
135:14 137:5,18	93:1 94:4 95:24	pasting 158:1	permeates 44:24	pillow 111:19

pilots 119:5,7	pointing 102:14	90:6 94:15 96:14	66:6,7,21 67:1,6	113:21 153:19
place 36:6 88:10	125:10 147:18	101:16 105:24	109:5,7	155:23 160:14
127:21 141:13	pointless 35:12,13	120:10 133:19	presence 148:9	probability 16:7
placed 25:11 117:8	35:16,17	149:14 153:23	present 101:18	66:6,7,21 67:1,6
133:15 149:8	points 2:5 4:22	160:8,12	141:17 156:20	72:16 101:24
164:19	51:23 53:25 55:8	possible 19:20	163:23 166:6	103:10 114:6,16
places 164:21	60:13 72:7 73:15	52:22 60:5 61:12	presenting 123:17	160:5,6,10
placing 70:6	74:9 133:11 142:7	67:16 69:23 75:12	President 71:1	probable 17:2 19:8
planet 24:13	151:4 154:8	75:19,21 94:23	142:6	probably 17:13
104:19,21	158:13 160:24	96:17 101:10	pressed 144:5	42:13 58:15 61:16
planets 24:10	168:12	140:7 153:18	pressing 143:8	61:17 120:2 140:1
play 1:18 92:13	policy 110:19,24	160:18 161:7,9	pressure 1:21 54:5	146:24
132:4,5	politely 137:19	162:5 165:16,17	109:16,22 133:10	probative 73:7
plays 32:2 76:11	political 166:24	possibly 14:20 42:6	presumably 127:18	problem 46:21
plead 39:25 82:22	pollute 120:15	84:21 86:9 114:17	pretty 4:16 121:16	58:23 98:20 104:6
pleaded 40:4 44:17	pool 105:12,12	141:18	157:8	problems 9:6 13:7
pleading 7:14 8:5	population 103:20	pot 19:9	previous 7:25 12:7	13:10 53:25 61:14
8:12 40:12 41:21	104:4	potential 151:6	28:6 32:6 41:2,17	procedural 62:14
42:10 81:18	populations 144:2	potentially 72:24	65:23 97:24,25	procedures 165:1
pleadings 44:18	posed 92:18	159:15	118:18 126:19	proceed 12:13
90:18	position 45:3 48:3	potshots 43:24	136:12 137:12	proceedings 1:3
please 32:3 106:12	54:2 75:9,9,13	powder 44:16	139:4 140:14	10:7,8,14 11:6,12
140:12 145:12	76:9 95:9 117:9	powerful 143:15	148:23,24 163:24	12:8 18:7 33:9
167:24	119:23,24 122:4	practical 12:16	previously 77:7	41:17 97:24,25
plunge 74:14	125:24 128:1,22	32:2 44:6 48:23	primary 30:23	118:18 125:17
plus 118:23	133:14,15 143:14	56:21	117:1	139:4 144:13
pm 87:14,16	143:17 144:11	practicalities 10:2	prime 86:7 141:17	148:23,24 154:21
134:19,21 168:18	161:3 166:22	practitioner 16:3,6	principally 168:11	process 1:11 16:8
point 2:14,16 10:15	possess 90:25	pre-oral 128:13	principle 53:16,17	16:12,17 17:8
16:5 21:14 27:5	possibilities 7:13	pre-reading 9:11	55:22	19:21 20:8,22
31:4 34:19 36:4	17:20 40:1,23	preamble 61:25	principled 82:7	22:3 31:3 32:9
39:5 40:25 41:21	41:7 45:7 77:18	62:11	print 1:10	35:24 38:7,17
43:1,5 60:14,15	78:19 81:13,19,22	precisely 118:6	printing 139:17	39:24 41:23 42:1
71:8 73:21 74:8	81:24,25 82:16,22	120:8	prior 48:5 128:9	42:4,12 45:1
84:16 87:4,5	83:8,23,24 84:5	predecessor 107:14	144:12	50:11 54:16 59:21
91:24 97:7 104:18	89:4,13,22,24	prefer 22:10 51:10	prism 68:5 98:17	59:24 60:18 63:1
106:1 111:19	90:13,24 91:9,13	51:10 58:6 87:8	private 142:11	81:5 82:11 86:8
120:22 123:5,6,7	91:15 92:10 96:6	98:12	prize 106:11	88:7,24 89:9,20
124:14 126:14	96:10 98:11	preferred 152:7	pro 1:22	89:21 90:9,17
129:12 130:25	108:24 118:15	preferred' 73:9	probabilities 16:2	92:24 97:8 110:12
133:9 134:7	possibility 7:6 31:6	preferring 78:6	17:1,20 28:2,7,9	112:3 116:23
146:19 149:2	40:3 73:25 74:9	83:12 97:9	33:8 36:11 40:7	122:17 124:14
154:13 156:10	74:22 75:14,23,24	preliminary 23:10	41:4 50:23 51:3	130:13 162:14,15
158:11,21 159:2	75:24,25 76:7	premature 54:25	62:24 63:25 72:7	166:5,10
160:5 163:6 164:9	78:24 79:2,18	prepared 155:22	78:23 99:19 101:4	processes 130:10
165:10	86:3,16 88:5,12	preponderance	103:1 112:3,19	163:2

<p>produced 45:5 149:20</p> <p>producing 57:10</p> <p>product 48:18 109:23</p> <p>professionally 124:19</p> <p>professor 3:12 15:18 18:23 27:18 32:14,14,18 33:18 34:1 36:21 40:18 41:14 44:7 45:16 46:23 47:25 49:12 50:15 60:2,3,6,24 61:15 62:21 63:3 63:22,23,24 73:8 73:13 94:22 95:1 98:2,10 117:14 125:13 127:6 128:19,22 129:5 130:17,19 132:15 132:16 134:23 135:1,17 136:21 137:17,20 147:10 147:12 148:25 149:2,22,23,24,25 149:25 150:2,4 151:3,18,22 152:4 153:25 154:5,11 154:18,22 155:1 155:14 156:3 157:17 158:21</p> <p>project 7:1</p> <p>projection 168:11</p> <p>promise 1:13</p> <p>promised 141:22</p> <p>promote 164:22</p> <p>promptly 1:24</p> <p>proof 33:7 78:11 82:7</p> <p>proper 54:9 66:13 66:18,23 122:3 123:3,17</p> <p>properly 67:16 71:20 117:16 149:13</p>	<p>proposition 28:16 57:21 67:24 80:9 108:20 158:25</p> <p>propositions 122:25</p> <p>prosecution 125:19</p> <p>prospect 14:16</p> <p>protection 116:5 122:23</p> <p>protections 85:11 85:15 164:22</p> <p>prove 1:16 24:20 36:12 100:12,15 100:18 101:6,9</p> <p>proved 24:7 28:7 33:11 150:17</p> <p>proven 24:22 27:12 38:19</p> <p>provide 43:8 65:16</p> <p>provided 30:24 139:12,19</p> <p>provides 77:21 78:1</p> <p>provision 25:22</p> <p>Provisionally 167:25</p> <p>provoked 133:13</p> <p>Pu239 95:11 96:13</p> <p>public 54:10</p> <p>published 155:4</p> <p>pulled 151:19</p> <p>pure 110:4</p> <p>purely 21:5 121:11</p> <p>purports 57:24</p> <p>purpose 12:3 33:4 42:3,18 61:22 113:10 156:12,13</p> <p>purposes 8:16,22 14:17 28:5 30:22 33:12 53:15 66:24 123:2</p> <p>pursued 12:21</p> <p>put 2:2,4 5:19 6:16 10:24 12:17 16:14 20:13,20 21:1 22:13 29:11 32:16</p>	<p>33:10 34:1,2 39:2 43:5,11,12 47:24 49:2,3 50:3,17,17 51:7 55:24 59:8 61:1 62:19 64:18 70:1 74:20 80:1,1 80:6,23 85:12 87:11 91:19 97:11 97:23 106:13 107:15 111:13 112:6,15 113:9 116:19 118:19 127:20 128:5,11 128:12 145:6 152:4,13 155:3 163:6,20,20 164:21</p> <p>puts 15:5 21:1 34:4 60:1 102:15</p> <p>putting 2:4 15:23 34:10 37:1 55:2 56:16 77:1 124:12 125:9,12 129:12 143:22</p> <p>puzzle 18:1</p> <p>puzzling 29:15</p> <hr/> <p style="text-align: center;">Q</p> <hr/> <p>qualification 132:14</p> <p>qualifications 54:11,12,13 142:15</p> <p>qualified 122:7</p> <p>queries 136:12</p> <p>question 13:19,22 19:22 22:12,18 23:9 28:11 32:24 33:4,14,22,25 35:23 36:2,2,3 37:15 44:10 49:20 51:6 52:20 56:8 72:19 81:18 84:20 86:21 89:6 92:21 98:5,18,19 105:13 106:25 107:7,8</p>	<p>108:7 111:24,25 111:25 112:2 114:19 115:6 116:11 125:8,10 126:16 128:11 131:18 134:22 135:23 136:25 137:3,11 141:12 141:17 147:9 156:24 157:21 158:23 159:5 160:24 161:5 162:2,10</p> <p>questionable 52:14</p> <p>questioning 23:23 23:24 54:5,6</p> <p>questions 27:23 35:7,8,8,9 36:1,14 36:15,22,24 40:17 44:4 50:10 54:3 84:19,19 85:9 92:18 96:4 109:13 128:8 129:19 132:16 133:9 136:3 137:12,18 140:23 141:2,4 156:2 158:2 165:13</p> <p>quickly 62:9</p> <p>quite 4:5,7 9:3 11:5 11:13 12:5 17:16 29:25 41:18 43:22 46:15 49:17 56:5 58:19 63:12 68:3 68:4 73:18 87:2 93:15 100:6 105:25 106:23 111:20 119:11,20 124:10 135:23 138:7 142:14 143:2 144:12 149:13 166:19</p> <p>quotation 34:17</p> <p>quote 34:17 37:13 37:14,15,16 150:8</p> <p>quoted 156:4</p>	<hr/> <p style="text-align: center;">R</p> <hr/> <p>radiation 26:5 29:20 45:11 69:15 70:1,14 74:4,6 84:23 85:2,8,16 85:21 86:3,17 92:9 94:24 95:1 95:12 96:13,14,15 96:16 100:23 101:13 103:7,12 103:14,19 104:2 104:14,16,17,18 104:22 105:14,16 113:15 114:12,13 116:8,9 138:14,16 143:18 146:13,16 147:18,20,25 148:5,11,16,19 149:7,18,19 150:3 153:16,22 155:4,6 155:10 156:25 157:3,22 160:7,9 160:12 161:19 162:13 163:20</p> <p>radiation' 69:15</p> <p>radioactive 116:13</p> <p>radioactivity' 69:13</p> <p>radiobiologists 36:23</p> <p>radiogenicity 92:9</p> <p>rainout 96:1</p> <p>rainy 128:14</p> <p>raise 19:3 32:24 33:13,25 53:25 68:1 88:11 100:18 103:9,12 131:18 137:12</p> <p>raised 33:20 47:1 60:13 69:8,24 70:3,5,10,18 71:24 73:21 74:9 77:21 79:3 156:3 162:3</p> <p>raises 27:23 36:22 36:24 44:4 60:21</p>
--	--	--	--	--

85:9 96:6 105:6 114:10 raising 33:22 49:20 83:25 84:18 102:24 ran 29:10 range 20:12 63:10 98:6 126:21 rare 13:4,7 25:24 rate 60:14 139:18 140:7 143:5 147:13 rational 56:4 57:23 58:2 Rayner 16:10 137:17,19,21 147:10,12 167:9 re-emerges 100:4 re-examination 141:5 re-read 133:12 re-reading 79:10 re-recorded 154:1 re-visit 2:25 reach 20:1 57:24 71:20 77:12 95:17 98:12 reached 4:23 73:19 82:19 97:3 122:6 reaches 59:10 reaching 122:2 read 1:14,15 3:16 14:8,11 29:5 32:10 77:3,7,25 87:8 98:16 118:12 120:15 122:20 125:2 127:6,7,9 127:10,12,14,23 128:15 129:1,6 139:25 143:2 146:23 149:3 158:13 167:5 readable 139:23 reading 14:12 46:22 49:25 59:25 66:18,23 69:16	79:9 87:7 96:25 97:2 110:24 112:23 141:24 156:18 real 7:11 14:16 19:21 23:21 26:18 80:17 realised 62:5 realising 72:2 reality 131:24 166:18 really 23:24 39:19 43:12 46:19 59:17 60:1,13 68:3 79:20 80:25 98:9 106:23 109:13 110:6 133:23 164:16 realm 43:18 rearrangements 148:7 reason 20:11 34:10 77:10 106:4 115:21 134:6 reasonable 7:6 19:3 19:14,22 20:5 21:16,21 23:7 28:11,13 29:23 31:6,10 35:10 38:5 43:18 51:6 51:11 63:10,24 66:8,20,25 67:5 67:17 68:2 69:9 69:24 70:2,5,9,17 71:23 72:3,16 74:7 75:14,15,18 75:21,23 76:11,13 76:15,21 77:21 79:3,7 80:25 81:9 82:12 83:8,10,19 83:25 86:19 88:3 88:24 89:14,25 90:7 91:10,14 92:3,3 96:7 98:7 103:12 106:3,8,20 107:16 108:23,25	110:17 112:9 114:13 120:9,13 125:3,17 126:21 128:20,24 155:25 156:2 reasonableness 76:22 112:20 reasoning 30:8 38:17 81:20 82:11 84:9 89:20 92:12 94:17 113:12 reasons 14:10 15:3 17:3,16,17 23:22 27:9 29:2 30:15 31:17 36:19 39:6 71:20 82:16,18 92:15 93:2,6,8 98:10 101:6 129:21 132:6 159:8 reassigned 119:15 rebuttal 4:21 recall 114:18 receive 5:12 48:15 68:23 73:11 received 1:8 116:24 118:11 119:18,19 133:24 receptive 55:22 recites 130:1 recognise 24:21 38:2 61:16 recognises 149:13 recollect 118:17 recommendations 143:16 reconsider 16:16 16:20 reconstruct 131:2 reconstructing 155:16 reconstruction 32:21 150:10 151:5 record 55:5 94:15 133:21	recorded 32:25 33:15 45:20 69:18 94:22,25 96:15 134:9 142:20 147:10 156:1 recording 73:22 134:5 147:7 records 163:1 recover 109:21 redetermine 31:20 redoing 36:9 redress 168:4 reduce 51:21 reduces 3:18 reducing 104:3 refer 36:13 65:9 147:9 reference 8:4 11:3 70:21 73:21 77:4 78:13 82:17 83:9 83:25 89:17 91:7 91:23 99:11 102:15 129:9 146:10,22 167:12 167:19 references 2:5 7:18 7:19,21,24 73:3 92:1 133:20 149:3 referred 8:12,13 28:24 45:18 68:9 73:12 146:2 150:4 referring 79:12 152:13 refers 65:24 73:7 reflect 129:21 reflects 81:17 Regan 15:18 95:1 117:14 Regan's 94:22 regard 72:25 73:20 74:10 82:12,16 84:16 90:5 116:5 128:16 regarded 25:8 33:22 84:17 94:6 97:19 149:20	regarding 20:8 regional 136:7 regular 76:11 rehearing 13:2,3 reinstating 20:12 reiterate 73:20 reject 18:23 19:23 21:25,25 22:1,12 36:16,17,19 46:6 52:15 57:12 71:22 72:2,23 79:24 80:12 81:4 98:9 100:1 144:14 rejected 20:10,14 22:9 34:14 40:23 43:6 46:3 83:11 91:22 99:23 100:3 102:18 rejecting 95:25 rejection 66:19 69:20 relate 142:7 related 29:22 150:3 153:17 159:22,23 relating 27:16 60:10 85:13 88:5 88:9 89:4 121:21 148:24 relation 22:7 32:17 53:1,2 63:18 69:25 92:19 103:9 114:1 115:9 121:14 129:4 132:14,22 143:19 145:16 152:11 relative 89:1 relatively 11:23 136:11 relevant 9:13 14:6 14:7 29:7 38:18 46:24,25 89:2,16 156:14 159:11 reliable 18:19,24 51:7 60:4 66:9 77:18 83:19 88:25 89:14 96:6 102:21
--	--	--	--	---

102:23 110:4 112:20 166:7 relied 11:25 40:2 69:21 71:25 83:8 83:23 90:12 91:9 91:25 96:24 99:15 relies 28:12 41:14 57:21 86:5 rely 33:5 58:6 99:17,25 101:9 131:19 143:20 150:24,24 relying 101:8 124:21 remain 39:11 42:20 89:25 remains 153:23 remake 17:11 remaking 30:20 remarkable 127:13 132:1 144:12 remember 8:11 11:5 24:14 42:13 56:22 57:17 113:22,24 116:16 125:25 127:5 130:25 131:1 136:20 146:5 162:21 remind 87:18 reminding 10:5 remitted 70:15 repeat 15:18 76:14 91:10 126:15 144:19 repeatedly 97:16 replicate 144:2,8 replicating 159:8 reply 4:21 report 9:13 12:1 27:23 32:6,14 36:13 41:14 44:8 59:5 60:25 72:1,2 73:8 97:22 98:6 114:3,10 117:8 118:20 121:19	123:2 128:15 129:7 142:16 143:15,23 144:16 146:4,12,20 147:3 147:7,16,21 148:21,24 149:6 150:14 152:10,22 153:1 154:1 155:3 155:8,9,12,19,22 156:5,6,12 reported 147:25 148:11 153:6 reports 12:6,7 34:3 57:10 63:23 72:22 73:1 95:3 99:4 125:9 126:2 127:20,21,23 130:9 representative 136:14 represented 124:12 124:19 represents 99:3 reprocessed 28:10 require 19:23 137:13 required 15:1 42:5 51:17 82:8 129:19 145:22 requirement 82:22 82:24 requires 25:4 60:16 80:4 rerun 13:11 rerunning 44:20 research 27:8,19 57:14 92:12 116:18 155:4 162:25 166:1,2 reservations 154:17 resolve 95:14,23 resolved 111:3 respect 13:11 35:14 48:2 52:2 95:22 96:2 98:15 99:8	122:9 152:15 respected 34:4 150:6 152:1,5 respectively 95:5 respects 12:24 20:12 35:2 51:20 154:12 respond 49:7 responded 49:6 respondent 90:17 117:10 respondent's 90:15 125:9,23 130:13 respondents' 98:15 response 25:5 30:24 48:11 134:25 responses 29:16 responsibility 42:7 46:16 rest 112:25,25 113:1 159:3,4 restudy 8:22 result 18:10 22:23 63:17,19 85:22 95:16 100:23 103:11,13 107:24 157:23 162:13 resulting 146:14 results 25:13 32:23 33:13,24 35:3 138:13 147:22 148:3 164:5 resume 167:24 retained 8:19 retaliation 168:14 retrospective 145:14,19 revealed 159:15 reverse 56:15 76:17 review 55:8 57:6,8 71:6 93:24 95:6 97:6 117:1 130:13 133:22 155:17 reviewing 93:17 130:9 150:20	revisit 89:22 rhetorical 108:24 right 4:14,23 5:1,8 6:2,5,12,21 7:8 9:1 10:4,23 11:19 14:18,20 17:3 23:22,23 24:15 25:22 27:9,10 30:11,15 31:15 49:14,15 50:9 51:13,21 52:8,17 54:23 56:11,16 57:22 64:16,18,23 66:2 72:20 81:2 84:15,15 85:4,6 85:17 86:9,11,15 88:4 93:13 97:10 98:14 101:11 104:25 105:21,25 106:2 107:6 108:8 110:9 120:2 121:16 125:10 127:18,25 128:7 133:14 134:4 138:20 141:8 142:13,21,24 145:2 147:8 151:3 151:16 156:9 157:10,16,24 158:17 167:9,23 168:16 rightly 12:5 31:12 rise 4:1 26:21 28:11 60:17 66:10 73:24 74:21 83:7 84:23 86:25 89:13 114:13 155:25 risk 3:18 70:7 104:3 122:21 robust 165:6 Roche 71:14 72:18 73:11 Roche's 72:24 73:1 rocket 24:12 rogue 148:8,16 role 76:11 102:20	102:23 122:3 123:6 room 8:20 root 34:14 50:16 51:15 roots 53:4 rouge 148:12 roughly 168:8 round 55:15,24 91:3 117:17,24,24 121:4 125:22 127:20 rounded 123:24 roundly 100:3 route 2:16 56:11 124:10 129:22 Rowland 11:25 32:8 33:20 34:5 35:20 40:3,11 41:9 43:9,17 84:10,14 85:17 86:7 114:2,10 132:22 135:18 143:15,23 145:24 146:4,12 147:16 147:21 148:21 149:20 150:2 151:5 152:10 153:1 155:13,20 155:24 156:11,17 165:22 167:11 Rowland-type 142:2 Rowland/Wahab 34:20 Royal 66:9 rule 28:12 53:2 75:19 101:16 ruled 60:20 88:1,8 92:19 115:9 rules 9:3 30:22 rummage 131:16 run 22:7 43:16 44:22 107:17 109:2 115:15 168:7
--	---	--	---	---

running 9:24 22:20 106:10 107:13,22	says 22:5,22 24:11 27:19 36:21,24 40:10 44:7 61:2 62:22 71:12 75:4 78:14 94:4,11 100:10 101:15,20 106:14 124:3 136:15,15 137:5,6 137:6 144:7 149:11 152:22 153:11 160:1 161:2 SB 8:6,7,8 68:20 150:16 151:8 SB1 6:11 64:22 145:6 SB11 32:3,5 149:1 SB14 139:5 140:9 140:12 SB18 6:24 SB20 151:9 SB20/11 151:13 SB20/150 151:12 SB7 137:20 SB7/123 135:18,20 146:10 SB7/tab 145:25 SBs 8:24 scale 18:18 20:3 118:24 scans 161:16 scenario 51:1 scene 13:9 science 45:20 56:12 scientific 16:17 21:12 22:21 23:17 27:2 30:25 52:3 54:7,7,11,12,18 54:20 55:1,12,17 56:2,7,13 57:20 74:15 80:14,16 84:18 138:21 scientifically 52:21 53:24 160:25 scientist 16:10,11 46:20 58:5 59:18	75:4 76:7 137:10 143:25 144:6 159:7 scientists 16:19,24 26:3 36:6 43:18 63:11 score 78:21 79:4,11 81:7 scored 130:25 second 5:20 50:7 52:20,20 53:23 123:7 145:18 158:9 Secondly 22:9 50:15 73:3 Secretary 2:10,19 3:18 6:7 15:5 18:20 20:9 21:23 22:4 27:22 28:9 32:15,16 33:17 34:3,7 35:19 40:6 41:2,22 42:2,24 44:18 45:19,23 46:2,13 47:1,13 49:5 50:14 53:1 55:15 59:25 60:23 62:16 63:4,12 64:9 68:8 74:21 74:23 75:13 81:23 85:19 86:5 88:21 91:20 96:23 98:3 98:8,22,22 99:9 99:14,24 100:5,10 107:17 111:21 113:12,17 114:22 115:13,14,19,20 116:19 121:1 126:1 128:2,22 129:14,18,20 142:1 143:14 151:25 152:16 153:7 156:12 161:14 162:18 163:17 166:23 168:12 section 14:6,8,10	14:17 65:5 78:8 93:15 145:15 sections 7:10 Security 70:25 see 2:21 5:10 15:22 19:20 20:4,23 21:23 26:22 28:23 29:15 32:12 35:1 35:9 37:22 42:22 44:24 46:18 55:3 55:19,19,20 56:9 57:19 58:6 59:15 59:16 63:23 64:2 64:9 66:1,4 71:16 71:18 72:14 74:14 74:24 76:23 81:17 89:18 93:3,6,22 95:19 98:17 103:16 115:13 122:15 123:22 129:13 130:16,16 131:16 136:8 141:9 149:5 150:22 152:20 154:2 158:24 161:4 165:6 seeing 47:17 54:3 80:10 seek 14:1 39:2 59:3 86:21 seeking 10:9 40:20 41:15 119:13 seeks 157:6 seen 15:24 42:6 48:3 53:6 54:14 61:9 121:21 127:2 131:7,24 137:15 148:12,21 153:25 selected 119:14 selective 163:8 Sellfield 155:6,10 sense 2:1 17:2 21:17,22 35:1,17 38:12 39:17 44:16 61:21,25 62:1 91:16 99:23	102:13,22 110:25 116:21 130:1,15 158:22 162:20 sensitive 31:5 sent 13:1 sentence 33:12,24 34:19 70:24 77:25 134:17 154:3 separate 54:17 130:6 158:10 sequencing 138:4 158:6 series 35:7 69:2 164:7 serious 36:24 seriously 31:1 55:2 served 3:15 service 18:16 67:19 68:11 102:25 103:19 104:2 servicemen 25:16 141:24 set 12:25 40:24 41:15 45:6 62:14 63:8,9,11,18 77:13 81:21 83:20 84:1 94:4 97:21 121:25 122:25 130:11 146:21,23 148:20 149:11 152:11 154:2,17 165:6 sets 93:25 94:2 139:19 setting 13:9 Shackleton 118:14 118:15,21,22,23 121:6 shaken 124:6 share 115:3 135:11 139:9 she'd 137:16 sheep 119:15,16 ships 64:6 121:22 153:17 short 84:12 87:15
---	--	--	---	---

113:2 134:20 shorter 2:12 shortly 10:24 15:23 129:12 show 17:21 22:15 61:12,12 64:16 66:19 75:8 85:20 101:10 139:21 showed 85:16 113:18 143:23 164:5 showing 86:5 shown 23:5 78:16 99:20 shows 27:8 40:4 100:21 104:4,8 135:25 144:9 150:3 side 78:21 82:14 109:2 123:12 124:18,19 132:19 135:3 sides 76:24 sidestep 62:18 Sienkiewicz 99:15 99:25 sift 133:16 sign 85:16 signature 148:1,18 signed 95:4 significance 69:9 107:15 significant 14:19 73:7 101:1 143:24 144:9 145:21 significantly 94:24 similar 67:10 70:18 94:17 101:21 156:3,25 161:2 166:22 Similarly 63:9 121:18 simple 18:16 75:17 100:20 106:20,22 150:24 simply 3:3 7:3 11:2	14:24 21:2 22:20 26:5,14 27:8 30:1 36:17 47:17 49:22 52:10 57:14 63:7 64:21 70:9 73:18 77:1,12 92:20 98:23 101:25 107:5,7 124:5 130:9 154:23 163:9 165:1 166:14 single 45:8 71:2 situation 25:12,15 75:7 six 96:20 size 136:4,13 skeleton 38:3 skim 11:3 sleeping 111:14 sleeve 46:17 49:18 slightly 54:13 60:2 118:9 119:23 130:14 132:18 slimmer 5:21 slow 100:7 slower 168:7 small 32:19 135:16 136:4,11,13 142:17 153:4 smoking 67:19,22 smoothly 127:17 Social 70:25 soldiers 116:24 solid 23:24 24:1,3 24:24 59:1 solvents 153:17 somebody 23:16 25:23,24 44:8 58:18 106:19,24 107:9 109:10 116:22 122:22 130:9 133:16 152:5,8 somebody's 54:8 54:11 somewhat 9:5	soon 140:7 161:24 sophisticated 19:18 sorry 7:19 31:25 39:16 40:17 53:10 61:21 76:4 80:8 115:3 150:7 151:19 sort 17:25 19:19 58:13 99:2 131:8 132:13,19 162:20 164:20 168:15 sorts 38:19 60:21 62:2 SOSD 146:17 Sotto 131:14 sought 126:1 156:23 sound 18:2 sounds 6:19 30:5 47:15 source 96:12 149:18 160:9 sources 69:23 138:17 south 85:3 121:10 space 9:24 24:13 speak 15:16 49:24 62:9 154:1 speaking 5:25 specialises 44:9 specialist 49:13 163:5 speciality 165:15 specific 115:6 specifically 76:2 spectrum 29:16 speculations 161:22 speech 142:17 speed 4:11 spell 42:24 162:8 spelt 93:23 spend 16:5 spent 166:23 spite 143:14 spotlight 86:10	spots 94:13,24 stable 152:23 stage 16:17,17 20:23 22:2 39:8,9 88:22 91:6,11 105:11 150:14 154:21 158:4,9 stages 79:21 92:3 stall 42:24 stamped 29:11 stand 165:11 standard 19:24 20:1 31:16 78:11 78:22 82:6 83:9,9 83:25 89:18 154:16 standards 158:19 165:11 standing 8:2 stands 72:12 start 3:2 10:5 25:9 31:1,2 41:20 55:16 56:2 60:13 109:20 141:3 145:15 started 42:15 61:25 141:13 168:10 starting 39:23 58:21 93:17 starts 78:9 114:8 state 1:18 2:19 3:18 15:5 20:9 21:23 22:4 28:9 32:15 32:16 33:17 34:7 35:19 40:6 41:2 41:22 42:24 44:18 45:19,23 46:2,13 47:1,13 49:5 50:14 53:1 55:15 62:16 63:4,12 64:9 68:8 71:2 74:21,23 75:13 81:23 86:5 88:21 91:20 96:23 98:3 98:8,22,22 99:9 99:14,24 100:10	111:21 113:17 114:22 115:14,20 116:19 121:1 126:1 128:2 129:18,20 142:1 148:8 151:25 156:12 161:14 163:17 166:23 State's 2:10 6:7 18:20 27:22 34:3 42:2 59:25 60:23 85:19 100:5 107:17 113:12 115:13,19 128:22 129:14 143:14 152:16 153:7 162:18 168:12 state-of-the-art 149:21 stated 57:3 70:21 70:23 71:7,8 statement 40:13 57:5 116:23 statements 6:3 statistical 60:9 62:24 74:7 75:8 101:24 106:3 107:15 108:24 statistically 136:18 145:21 statisticians 111:17 statistics 108:6 110:2 136:9 stats 157:3 statute 10:16 statutory 78:11 90:4 154:15 stays 156:5 steer 9:8 stem 138:11 stenographers 168:1 step 2:23 5:20 20:21 21:17,21 157:16 stepping 79:5 82:10
---	--	---	---	---

82:15 83:6,22 88:1 89:2 stepping-stone 81:8 steps 10:4 30:1 48:23 79:22 sticks 55:4 stimulation 148:13 stone 79:5 88:1 stones 82:10,15 83:7,22 89:2 stop 34:18 38:11 74:18 84:8 166:23 167:6 stopped 1:10 stopping 74:1 83:13 136:20 store 46:24 stored 1:17 story 108:20 straight 58:24 59:3 strange 138:13 strategy 163:13 Street 18:14 streets 49:23 strength 26:19 80:23 strong 8:21 66:6 67:1,3,6,14 109:6 stronger 75:10 strongly 101:22 struck 10:17 structured 35:20 Stubbs 142:6 studied 136:2 studies 43:17 52:4 72:22 129:8,9 134:10 136:13 137:22 study 8:17,22 14:19 32:17,19,24 33:6 33:13,20,25 34:5 34:21,24 35:20 38:5 40:4 41:9 45:13 61:2 85:17 92:6,21 103:17	104:8 135:4,18 136:5 141:2 142:2 143:8 144:2,8 145:24 146:3,12 147:16 149:20 150:3 154:12 155:13,17,21,24 156:17 158:21 159:8 160:1 167:11 study' 92:2 studying 60:9 118:24 stuff 67:3 subject 16:21 56:17 88:13 134:12 subjects 121:23 submission 5:16 18:20 23:16 38:2 57:18 59:20 75:20 91:21 100:2 106:7 108:4,5,15,16 111:10,11 112:25 113:8 122:17 133:8 134:24 submissions 2:9 3:2 3:15 4:5 5:2,5,23 6:8 7:11,12,18,20 8:21 21:24 28:24 35:23 39:13,18 42:2,25 44:24,25 46:4,19 50:8 51:21 59:25 90:16 97:7 100:5 102:10 102:16 109:24 115:13 127:17 129:14 130:16 134:9,23 138:25 144:18,20,23 145:11,16 162:9 167:6 168:12 169:2 submit 18:22 67:3 144:21 146:11 submitted 111:9 129:21	submitting 6:1 subsequently 133:1 substitute 30:17 subtle 54:6 subtleties 55:9 succeeded 120:14 success 14:16 29:10 successful 12:10 15:8 suddenly 133:11 suffer 100:22 103:21 suffered 99:20 103:11,13 suffering 126:6 suffers 101:7 suffice 73:15 sufficient 23:16 26:9 33:10,12 36:7,15 59:7 74:11,12 76:18 104:12 111:7,9 suggest 39:9 47:7 97:15 106:23 115:18 143:15 154:13 162:12 163:16,17 164:18 165:14 suggested 19:14 46:2 99:24 103:18 103:23 154:25 155:17 159:21 suggesting 108:5 160:4 suggestion 158:16 suggestions 164:20 suggests 9:12 37:12 138:9 164:4 suits 163:20 sum 166:10 summarise 147:2 summarises 33:2 summary 15:25 65:18 summing 76:12 supplementary	6:17 8:3 9:21 42:23 support 58:1 67:13 72:24 73:17 90:12 108:22 supported 21:12,13 69:16 supportive 146:15 150:2 supports 164:3 suppose 50:10 160:24 Supposing 47:8 108:1 Supreme 11:18 12:12,13 14:8,11 14:22 99:16,23 sure 4:10 8:18 43:14 55:8 58:16 59:22 64:5 88:3 88:18 102:1,4 104:24 105:18 106:19 107:9 108:18 112:1 121:16 124:9 125:2,14,21 131:19 134:16 135:23 138:20 139:8,18 157:8 159:24 161:13 surprise 3:14 surprised 2:20 31:23 surprising 148:14 165:18 surprisingly 99:22 surrebuttal 4:22 survey 27:23 36:6 59:6 84:10 103:22 145:17 148:22 160:18 surveys 121:20 162:25 surviving 160:19 suspect 7:7 109:14 122:8	sustainable 41:5,6 swipe 135:3 sympathetic 72:11 sympathy 4:9 syndrome 124:6 system 148:15 <hr/> T <hr/> tab 6:17 7:13 64:25 68:24 87:18 113:23 137:20 140:12 145:1 146:5 149:1 151:9 151:14 table 6:2,16 tackled 44:14 tainted 51:10 take 6:9,10 7:13 8:19 10:6 15:19 22:14 25:14 26:21 32:3,12 34:15 35:24 36:4 42:7 43:23 46:21 47:21 48:17 50:8 53:9 59:2 60:11 63:2 64:15 65:2,22 70:20 80:15,20 83:5 89:1 90:5 98:23 100:20,25 101:11,13 102:8 103:15 107:21 108:21 113:19 116:22 117:10 120:25 123:11 124:11,23 127:3 135:6 139:3 140:9 140:17 144:18,22 152:14 160:5 taken 2:19 3:17 5:20 12:7 28:10 31:8 34:11 39:16 44:1 47:3 51:24 61:21,24 62:20 77:16,19 80:8,22 82:10 83:14 115:3 115:11 149:22
---	--	---	--	---

<p>154:6 159:2,5 165:3 takes 78:21 125:3 158:3 talk 67:23 talking 25:20 task 9:5 38:11 51:22 56:13 Tawn 155:3 teachers 139:22 team 45:5 125:9 130:13,21 131:23 150:22 156:23 teams 1:21 technical 4:11 technically 153:2 technique 137:24 152:23 155:9 156:21,23 techniques 138:2 technology 44:9 154:23 155:1 158:5 teeth 143:1 telegrams 133:25 134:1 telephone 1:11 telescope 24:12 tell 8:23 10:25 22:23 25:25 26:3 26:7 62:22 102:20 106:16 118:16 131:19 161:15 telling 38:10 47:15 116:13 tells 105:3 121:24 temporarily 69:12 temptations 58:24 ten 26:6 109:20 165:25 167:25 168:17 tends 16:17 ter 1:19 2:15 3:4,8 3:10,12,23 4:4,8 4:13,15,20 5:2,3,7 5:16,19,24 6:4,10</p>	<p>6:13,19 7:5,9,17 8:4,8,11,25 9:2,15 9:19 10:1,5,12,19 10:23 11:8,11,15 11:19 12:10 13:15 13:17 14:18 15:3 15:10,13,16,19 16:5 17:13 18:3,8 19:1,12 20:7,19 20:25 21:5,8,14 23:13,16,20 24:2 24:6,19 25:6 28:1 28:4,17,19,22 29:7,24 30:3,7,11 30:14 31:9,12,21 31:23 32:1,8,12 35:13,17 37:6,9 37:15,18 38:12 39:4,10,13,19,22 40:17,20 42:9,11 42:17 43:1,5 45:18 46:1,8,25 47:12,19,24 48:2 48:10,20 49:2 50:7,19 51:18,23 52:7,12,19 53:6 53:10,16,20 54:22 55:6,11,14,21,24 56:2,6,16,25 57:12,23 58:13,16 58:21 59:4,15,20 61:8,11,18,20,24 62:7,9 64:19,21 64:24 65:2,5,8,14 65:21 67:7,10 68:1,8,16,18,20 68:24 69:2,4 71:11 74:8,18 75:6,17,19,22 76:2,6,16,19,22 77:3 79:13,23 80:1,6,10,15 81:3 82:4 86:13 87:4 87:10,13,17,20,22 87:24 88:22 93:5 93:10,12,14,21,24</p>	<p>100:9,13,17 101:1 101:3 102:4,8,14 102:23 103:4 104:7,12,18 105:2 105:10,13,25 106:9,13,23 107:5 107:7,17,22 108:9 108:11,15 109:1 109:10,17 110:8 110:19,22 111:1,4 111:10 112:10,12 112:16,22 113:4,9 113:25 114:8,20 114:25 118:3,9,25 119:2,7,17,24 120:11,17,25 124:9 125:5,8 126:10,12,14 127:7,10,13,22 128:1,12,15 129:3 129:25 130:6,20 130:23 131:3,5,9 131:12 132:3,7 133:5,23 134:2,12 134:16,22 135:6 135:10,12,14,16 135:20 138:18,24 139:3,10,14,18,21 140:1,6,9,14,17 140:21,23 141:6,9 141:16 142:25 143:5,7,11,13 145:1,3,5,8,10 146:8 147:2,6,9 149:4 150:11,15 150:21 151:7,13 151:15,17,20,22 151:25 152:4,19 152:22 153:1,9,25 156:8,10 157:8,15 157:21 158:3,8,14 159:1,3,18 160:17 161:5,9,13,23 162:2,8 164:2,7 164:15 165:10 166:12,16 167:2</p>	<p>167:13,17,22 168:5,15 169:2 term 73:12 terms 12:6 14:12 25:21 32:2 42:5 44:21 108:3 121:4 124:25 152:4 164:23 territory 26:4,19 31:13 59:17 110:8 112:8 116:15,25 126:7 140:11 test 12:7 16:4 29:25 31:5,10 32:8,20 37:7 38:21 42:16 57:19 58:16 59:2 63:2,18,25 65:6 71:6,7 75:16,17 76:5,20,22 78:4 78:11,12,17 79:14 81:15 82:9,19 83:5 84:1,7 91:5 91:16,21 92:19 93:8,23 96:9,19 97:1,4 98:14,17 99:1,2,10 104:7 108:5 109:4 110:16 111:23 125:17,22 146:3 153:4 154:15,22 155:23 156:15 158:17 161:3,10 162:11,14,14 166:17 tested 23:1 testing 97:8 111:12 127:21 162:14 tests 10:9 25:24 33:1,16 90:4 138:6 147:22 163:24 text 7:22 thank 5:1 6:7 38:3 38:4 69:3 134:18 139:20 140:8 158:13 159:1</p>	<p>168:16 theoretical 24:7 theoretically 160:20 theories 45:13,21 53:24 63:5 80:14 116:21 theory 27:11 34:10 37:10 40:11,21,21 54:18 55:1 57:3,5 58:2 60:19 61:12 92:11,13 118:20 they'd 94:4 thing 6:23 22:13 29:15,19 48:16 88:11 132:8,20 142:14 168:15 things 7:3 11:25 19:10,24 22:5 30:23 37:20 58:25 85:7 96:11 114:9 122:13 123:17 133:4 136:8 138:4 138:15 139:17 162:4 think 1:8,11 2:23 3:22 4:4 5:14,25 9:6,9,23 11:15 13:8 14:18 15:21 17:2 21:20 23:4 23:21 25:6 26:25 31:12 32:10 35:19 40:15 41:7 42:22 47:8,9 50:24 51:4 61:14 65:15,19 66:13 67:15 68:3 70:21 71:24 84:24 84:25 100:14 105:1 107:13 109:19 111:3 112:5 115:3 118:7 118:9 119:15 120:2,4 121:19 126:8 127:8 128:21 130:19 133:21 134:13</p>
---	---	---	---	--

137:25 138:3,7,21 139:6,13 140:1,4 140:23 141:6 142:13,18 143:22 143:23 150:5 158:3,18,24 159:21 161:25 167:15,22 thinking 25:21 60:14 80:25 106:24 128:7 164:12 thinks 58:25 68:14 121:2 Thomas 27:18 40:18 62:21 63:3 125:13 132:15,16 134:23 135:17 137:20 147:10,12 152:4 154:5,11,18 154:22 157:17 158:3,21 Thomas' 136:21 Thomas's 155:1,14 thoroughness 108:2 thought 1:13 58:25 59:1 60:16,18 67:24 108:17 110:12 118:5,5 120:7,14 163:3,3 168:9 thousand 100:22 100:23 101:12 103:5,17,24,25 104:1,9,14 105:5 105:15,15,21 106:17 thousands 164:4 three 30:1 92:2 130:11 143:3 threefold 153:3 threshold 19:6,7 22:6 throw 3:23 35:21 61:5 164:4	throwaway 134:8 throwback 108:24 throwing 59:21 133:10 throws 86:9 Thursday 4:4,16 8:11 64:4 109:20 141:20 tick 151:2 tie 144:19 tied 43:12 Tier 12:18,18,20,24 13:12 17:6 22:8 29:5 31:14 45:15 93:18 97:25 98:1 time 3:25 5:12 6:18 8:17 11:2,22 23:5 26:2 33:1,16 43:3 43:7 44:25,25 46:1,4 48:18 60:25 64:21 85:3 85:21 98:1 109:21 117:6,6,16 133:1 138:18 147:21 162:22 164:1,12 164:17 165:20 168:6,6,9 times 79:9 138:12 timescale 126:4 timetable 87:1 timing 125:25 tinges 132:17 tissue 157:2 today 2:3,4 3:25 4:15 154:3 158:18 158:20 164:24 165:1 168:6 today's 97:7 158:18 165:11 told 43:25 44:21 69:2 111:16 118:12 131:16 147:12 tolerably 150:11,16 tomorrow 4:15 109:20 140:6	167:23 top 32:13 67:11 74:13 95:8 142:18 147:6 153:1 topic 9:10 29:2 61:17 65:20 107:12 149:9 167:4 toss 39:1 totally 9:19 26:4,24 46:3,6 151:8 touch 24:3 61:4 touched 2:25 touches 142:10 touchstone 115:12 tough 67:22 track 167:14 traditional 58:9 trail 37:21 trailer 50:5 training 122:12 trajectory 55:23 119:1 trampling 31:13 transcript 7:18,21 7:24 48:15 55:8 74:24 102:16 127:21 133:12 135:6,7 137:18 transcripts 117:15 139:12,19 transformation 153:10 translate 104:5 translocation 136:1 153:13 157:13 translocations 146:4 152:24 153:4,21 transmogrified 123:3 transpose 76:17 trap 22:10 35:15 71:25 travel 9:4 103:16 121:9	treated 81:12 tremendously 122:23 triage 124:7 tribunal 1:23 2:8 2:23 4:1 5:10 6:1 6:11 10:6 11:20 12:18,18,20,22,22 12:24 13:9,12 15:7,20,24 17:5,6 17:7,19 20:10 22:8 26:12,20 29:5 30:16,16,19 30:22 31:14,19 32:6 34:13,25 36:16 41:3,5,6 43:15 44:22 45:2 45:15,22 46:1,9 46:12 47:20,21 49:21 51:5 54:1,9 57:24 59:7 60:5 60:18 62:15 63:2 63:15,19 64:11,15 64:24 66:12,14 67:16 69:7 70:16 71:19,21 72:22 73:4,5,16 77:12 87:18 91:19 92:18 93:18 94:1,18 97:25 98:1,14,24 99:15,25 100:3 102:18 112:1 115:2,4,9 121:2 122:4 123:8,16 124:4,21,24 125:5 126:23 127:1,2,15 133:15 137:4,11 138:21,24 139:10 142:6 155:22 157:25 158:15,17 162:3 167:5,19 Tribunal's 51:8 62:1,3,12 64:14 109:18 123:20 129:22 146:2 tribunals 72:15	90:7 132:11,20 tried 41:4 102:17 triggered 11:16 trip 28:20,22 118:23 trouble 58:21 111:2 troubled 110:25 true 23:5 38:20 43:9 133:18 160:16,16 truly 41:3 truth 166:17 try 16:22 111:21 131:2 136:20 167:16 trying 16:18 20:23 21:24 22:5 37:2 44:2 79:20 112:6 112:8 158:9 166:23 Tuesday 1:1 3:19 tumbling 136:22 turn 6:25 26:17 71:13 106:3 117:22 131:6 138:4 152:16 157:7 turned 9:17 turns 85:22 tutored 87:9 two 5:14 7:10,17 8:8 10:4 11:20 22:5 25:17,23 26:6 50:4,10 51:18,23 52:13 53:4,11,25 54:22 55:7 71:13 76:24 79:21,21 86:24 115:17,18 138:17 139:18 143:3,24 144:9 146:1,5 158:2,12 two-stage 19:20 20:8 91:21 157:16 type 138:2 154:4
---	---	---	---	--

U				
UK 159:7	76:10	uses 155:9	83:3 87:4,6 91:25	115:6 127:17
unacceptable 132:19	unlikely' 73:14,23	usually 31:2 75:5 76:13 138:6	97:18 99:3 115:4	137:23 144:22
uncertainties 21:19 21:20	unpack 53:4		118:6 123:18,21	164:11
uncharted 26:4	unpick 41:16	V	123:22,24 124:22	wanted 41:8 43:16
underlined 67:12 71:17	unpredictability 26:8	v 65:25 68:8 81:6 91:1,6 123:6	125:20 128:9,18	43:21 108:18
underlines 66:2	unreadable 140:3	valid 138:14	130:14 137:11	110:12 131:18
underlying 69:4	unreasonable 41:10	validated 32:22 151:4	152:22 153:25	158:12
understand 3:25 5:3 9:19 11:4	unreliable 19:11 33:18 52:23 72:23	validity 32:24 33:14 69:16	164:3	wants 55:15 79:22
18:19 20:15,17	77:24 78:3 154:14	137:24	viewed 148:10	85:14 112:15
47:10 50:11,12	unsafe 155:16	value 59:3	viewpoint 58:8 132:18	114:22
59:23 61:9 67:4	unsound 136:19	variance 136:8	views 63:10 91:7	war 10:7,9 12:6,10
109:3 111:1	unspotted 24:9	variety 144:2	97:22,23 98:6	12:17,19 18:16
114:18 115:5	unsuccessful 12:20	various 69:24 72:22 73:3 74:4	99:5 123:14,15	25:10,22 46:16
119:10,25 120:2	unsurprisingly 38:1 70:12	116:6,20	125:15 128:19,23	51:3,15 67:19,23
121:5 123:22	untenable 41:10	vary 118:1	133:18	102:25 105:17
128:24 137:10	unusual 13:3 59:17	varying 42:6	virus 148:13	109:3 153:10,14
144:13 159:18	unusually 31:5	vehicle 116:19	visible 24:12	156:6 166:4
164:9	Upper 6:11 12:22 12:22 15:7 17:5	verged 132:18	voce 131:14	warfare 25:12
understandable 71:25 134:4	20:10 30:16,19	version 139:22	volumes 9:20	warning 144:13
163:15	31:19 41:5,6	vessels 85:14 86:2	W	Warrant 66:9
understanding 25:1,4 101:18	44:22 45:2 47:21	veteran 10:9 25:11 106:14	Wahab 11:25 32:8	wasn't 2:20 18:15
156:20 160:1	62:1,3,12,15 63:2	veterans 10:9 11:21 12:10 33:5 103:22	32:17,19 33:6,20	30:8,11 42:17
163:23	63:19 64:11,14,15	136:17 137:8	34:5 35:19 40:3	75:1,2 118:3,7
understood 25:2	64:24 87:18 91:19	144:3 146:3,13	40:10 41:9 43:9	143:8 144:5 158:8
48:13 108:18	98:24 99:15,25	147:15 148:10,17	43:17 84:10,14	159:9
129:17	100:3 102:18	153:5,14 155:13	85:17 86:7 114:2	waste 164:1
undertake 141:23	115:1 127:2	160:19	114:10 132:22	water 53:19 59:22
undisputed 81:11 88:16	129:22 137:4	veterans' 149:14	135:17 150:3	59:23
unfair 47:11,12 54:16	upside 85:22	vi 81:13,17	151:5 155:13	way 11:17 15:5
unfortunate 163:7	upstairs 134:15	viable 12:3	156:11,17 165:22	16:14,21 20:25
unfortunately 28:19 103:21	urging 31:24	vicinity 26:1 69:18	167:11	21:2 28:1,8 29:9
unhappy 42:20	urine 165:3,7	victims 17:8	Wahab/Rowland 14:19 27:16,23	29:11 31:3,4 38:4
United 144:3 160:20	use 41:11 57:1 75:11 99:22	view 2:16 16:15 27:5 30:11,17	135:4 141:2	42:13 47:16 49:18
universe 25:1	102:17 138:3	31:12,18 34:1,5	144:16 145:16	51:25 53:21 55:6
unknown 28:20,22	155:15 158:19,20	34:13,13,14 43:9	wait 165:25 166:5	55:11,14,21,24
	163:14	44:13 58:7,17	waiting 166:18	56:16 57:10 62:17
	useful 1:16 2:2,15 2:18 42:2,18	59:16 63:6,6,8,11	walked 46:11	64:9,14 65:21
	58:17 87:4,6	68:5 73:18 82:5	want 8:17,23 35:1 37:1 41:11 52:8	70:1 71:7 73:10
	useless 38:11		54:23 60:8 70:20	80:23 86:10 87:11
			87:8,10 99:11	97:15 100:9 104:7
			108:5 109:13,22	105:16 106:13,24
			112:24,25 113:1	107:20,23 109:19
				111:12,12 112:17
				112:18,18,19
				113:9 114:21
				115:15 116:1

118:4 121:4 123:17 124:9,10 125:22 130:17 138:21 145:18 155:16 156:3 161:1 162:3 164:19 ways 133:6 we'll 4:16 5:12 10:3 19:17 22:17 23:8 28:13 29:1 61:17 65:21 76:23 81:17 87:1,12 108:20 134:14 140:3 150:22 161:24 167:20 we're 14:24 23:17 25:20 28:1,8 55:20 68:11 105:21 107:7 108:18 110:8,17 126:5 160:14 we've 2:2,3,18 5:20 7:12,20 8:13,14 28:23 32:10,10 37:25 39:13 49:7 58:1 62:12 134:9 144:22 145:4 154:2,3 156:4 weapon 129:15,15 weapons 163:14 wearing 88:13 Wednesday 168:20 week 12:5 18:21 47:4 50:2 week's 3:1 weigh 17:21 72:13 80:21,24 89:7,23 weighed 66:11 81:14 92:23 124:16 weighing-up 47:16 weighs 92:22 weight 70:6 79:1,17 80:4 89:8 122:19 152:9	weight' 73:7,10 welcome 34:23 well-founded 153:2 went 12:11 24:12 36:1 45:9 50:13 52:1,14 85:25 119:14 weren't 119:16 127:14 163:18 164:12 west 121:10 Westcott 71:14,15 whatsoever 75:8 whetted 167:16 whilst 10:19 70:1 139:7 wholly 80:13 149:9 wide 20:12 wild 38:17 wildly 25:8 win-win 151:6 wind 121:7 window 35:21 wisdom 147:19 wish 49:7 151:20 wishes 4:1 wishing 44:12 witness 19:2 22:3 22:10,22 33:18,22 50:3 52:9,16 54:14 55:4,16 60:4 80:12,18 122:5 140:17 153:7 156:7 witnesses 8:1 18:21 46:5 48:14 53:2 54:24 56:18 59:25 60:2 115:23 122:16 125:23 130:18 witnesses' 95:7 115:16 women 132:2 wonder 30:13 111:14,15,18 word 25:6 123:3	133:14 136:22,22 136:23,23 words 10:15 25:7 34:18 64:6,6 83:13 92:6,7 119:14 128:7 141:24 143:22 150:7 152:6 154:15 work 62:24 122:21 137:13 139:15 144:1 153:2 158:9 worked 24:16 workers 155:6,10 working 143:3 164:15 works 11:17 22:15 27:8 105:17 world 24:25 26:7 36:21,23 41:3 67:23 85:22 150:24 worried 64:5,7 worry 9:25 42:8 worse 9:22 worthless 77:23 78:2,4,20 83:12 83:14 84:3 88:8 92:14,22 154:14 wouldn't 2:4 23:1 37:1 43:6,7 124:22 164:23 165:11,18 write 26:25 37:2,9 54:10 writing 2:4 3:21 written 2:8 7:11 13:24 28:24 40:12 46:3 53:5 74:13 95:3 100:5 122:16 141:19 144:18,20 146:8 wrong 11:11 12:25 17:14 31:1 35:13 37:4,6 38:14 41:19 42:16,17	43:23 46:15 49:17 51:13 52:1,5 54:25 57:16 73:18 82:23 83:4 88:4 98:19 108:17 111:20 117:18 118:16,19 121:16 122:10 127:19 132:3 141:13 150:17 151:8 159:20 161:24 wrongly 31:12 41:2 142:20 <hr/> X <hr/> X 40:4 52:4 53:18 117:19 120:8 159:16 169:1 <hr/> Y <hr/> Y 40:4 52:4 53:18 117:19 year 42:1 43:13,13 years 13:6 24:8,11 25:14,19,20,21,23 26:6,6,6 107:13 148:1,4 165:25 166:1,3 years' 8:17 young 25:15 164:11 <hr/> Z <hr/> Z 40:4 117:19,19 Zealand 84:22 85:13 114:14 146:13 153:14 160:11 161:3 zigzag 119:3 121:10 zigzagging 118:25 119:1 <hr/> 0 <hr/> 0 78:21 79:4,11 0.01 110:15 0.1 106:7 107:20,21 108:10,12,13	110:15,25 111:22 112:8 <hr/> 1 <hr/> 1 29:18 57:25 68:24 78:21 81:7 105:24 117:24 127:20 141:20 145:1 149:1 157:16 1,000 110:1 111:16 111:16 1,001 104:22 1,100 104:23 1.05 87:14 1.10 64:25 87:18 10 25:14 103:20 106:6 112:14 168:10 10.00 168:20 10.30 1:2 100 76:8 87:22 103:20,24 101 88:23 103:25 104:4 147:6 102 147:9 107 91:18 109 91:18 149:5 11 3:20 151:9,14 11.00 1:4 11.30 1:12 110 102:16 104:4 149:12 111 150:7 112 91:23 113 102:17 115 152:20 116 153:9 118 154:2,4 12 147:14 120 104:4 122 154:8 123 137:20 145:25 146:5 123(iii) 93:5 125 93:7 155:11 156:16 157:25
---	--	--	---	---

158:3	211 102:19	47 152:17	91 81:17 82:4
13 25:19,20 135:17	22 85:12 113:23	48 32:18 44:5 93:14	145:17
137:19 141:3	141:15,16	93:15	92 83:3
14 68:24	23 8:9 67:10 70:24	49 93:25	93 137:18,19
15 87:7	24 8:9 9:20 69:5,5	499 100:23 101:5	98 82:25
150 8:17	25 134:14	101:11,12 103:5	99 76:9 103:25
16 129:4	250 100:25 101:1		99.9 74:3 105:23
160 93:17	28 1:1	5	107:20 113:10
164 93:25	29 168:20	5 26:6 66:9 73:21	114:20
168 94:3		135:7,13,14 169:2	
17 113:23 129:4	3	5(4) 73:20	
170 85:5 86:17	3 32:12 44:5 57:25	5.7 140:12	
114:4,15 146:15	77:8	50 94:3 110:5,6	
18 137:20	3.13 134:19	148:4 153:4 154:8	
185 94:10	3.25 134:21	50-year 138:12,16	
187 94:21	30 25:14 78:9	500 100:21	
19 65:2	33 14:6,8,10,17	501 101:5 103:7	
192 95:8	78:14	51 153:20	
1957/58 86:18	35 82:25 115:11,19	53 94:9	
197 95:19	115:22 122:6	54 94:10	
1996 148:11	123:7,8 125:2	55 95:7	
	129:14 130:14	56 72:20 95:8,19	
2	36 87:20 102:16	58 65:3	
2 7:13 29:19 51:3	38 91:18	59 99:13 102:19	
56:12 57:25 95:5	39 91:23 145:1,12		
111:22 117:24		6	
2,000 24:14	4	6 114:6,16	
2.00 87:16	4 66:8 114:1	60 65:22	
20 25:14 65:22	4.15 3:25 86:25	66 67:11	
110:10,13 112:14	134:17 168:18		
143:11,12 145:11	4.20 134:15	7	
2001 150:9	4.30 4:2	7 118:23	
2006 152:22	4.30/4.45 168:3	72 83:3	
2008 11:9,10,13	40 13:6 25:14,21	73 141:13	
2009 38:7 141:20	40-years' 164:11	74 141:2,3	
2010 38:7	41 92:25 93:2,4,5	75 142:18	
2011 38:8 95:5	41(1) 66:22 83:20	78 143:8,10	
2012 38:8	89:15		
2013 38:8 50:4	41(5) 65:6 66:24	8	
159:6 165:7	78:12,17 81:15	8 118:23 129:3	
2015 43:3 155:5,9	82:9,19 83:5 84:1	137:5 141:9	
2016 1:1 43:4 50:13	84:7 91:5 96:8,18	85 135:14,15	
50:13 168:20	97:4	86 137:5	
21 95:5	42 147:4,5,6	87 78:14	
210 99:14 100:2	450 110:1 112:7		
102:19	46 151:17	9	
		9.15 1:7	