

1 THE INQUIRY RESUMED ON TUESDAY, 22ND SEPTEMBER 2026, AS
2 FOLLOWS:

3
4 CHAIRMAN: Good morning, Mr. Greaney.

5 MR. GREANEY: Sir, good morning. In the witness box is 09:59
6 Dr. John Morrison, who's going to help us with certain
7 aspects of dissident republicanism. But before he's
8 sworn, can I make an announcement about the timetable
9 for later this week?

10
11 Currently there is slated, for Thursday, I think during 10:00
12 Thursday morning, the playing of the recording of the
13 evidence of Detective Superintendent Emmet Casserly to
14 the extent that it bears upon our Part 2. It seems to
15 us, on reflection, that there is a material chance that 10:00
16 we will have an opportunity to play that evidence not
17 on Thursday morning but in fact on Wednesday afternoon.
18 So tomorrow afternoon. So can we invite everyone,
19 including the press, so everyone who has an interest in
20 the evidence to make their arrangements on the basis 10:00
21 that that may be the position.

22
23 Sir, having said that, could I ask that Dr. Morrison be
24 sworn.

25 CHAIRMAN: Good morning, Dr. Morrison. 10:00

26 THE WITNESS: Good morning.

27 CHAIRMAN: I'll invite the usher to swear the oath.
28
29

1 DR. JOHN MORRISON, HAVING AFFIRMED, WAS QUESTIONED BY
2 MR. GREANEY AS FOLLOWS:

3
4 1 Q. MR. GREANEY: would you be begin by telling us your
5 full name please.

10:01

6 A. My name is Dr. John Morrison.

7 2 Q. Dr. Morrison, are you an Assistant Professor in
8 Criminology at the School of Law and Criminology at
9 Maynooth University?

10 A. I'm an Associate Professor in Criminology, apologies,
11 there was a promotion since the documentation was
12 submitted.

10:01

13 3 Q. Thank you very much for putting me right about that.
14 I'm going to go back to your academic training and what
15 was your first degree in, Dr. Morrison?

10:01

16 A. My first degree was in psychology in University College
17 Dublin.

18 4 Q. And did you, after that, carry out a Masters?

19 A. Yes, I carried out a Masters in Forensic Psychology in
20 University College Cork.

10:02

21 5 Q. And from there did you develop a particular interest?

22 A. Yes, during my Masters I did a dissertation looking at
23 why and how people become involved within paramilitary
24 republican groups with, particularly, the Provisional
25 IRA, and I then went on to do a PhD following on that
26 interest looking at splits in the Irish republican
27 movement from 1969 until 1997.

10:02

28 6 Q. Having started out in psychology, over a period of time
29 you developed an interest in dissident republicanism?

1 A. That's correct, yeah.

2 7 Q. And by 2010 you were completing your PhD in
3 international relations dealing, in particular, with
4 splits in the republican movement between 1969 and
5 1997? 10:02

6 A. That's correct.

7 8 Q. Which is the very topic that I'm going to be asking you
8 to help us with today.

9

10 what other aspects of your work have involved research 10:02
11 into violent dissident republicanism?

12 A. Well, my career has focused predominantly on violent
13 dissident republicanism. After I completed my PhD I
14 went on to do postdoctoral research at Pennsylvania
15 State University where I was the project manager in 10:03
16 what was called the Violent Dissident Republican
17 Project, where we analysed, through open source data,
18 the violent dissident republican activities, violent
19 activities, as well as those people who would have been
20 involved with these. 10:03

21

22 From there, I continued my research from when I was at
23 University of East London, when I was at Royal Holloway
24 University and now at Maynooth University where I've
25 looked at a variety of aspects in relation to violent 10:03
26 dissident republicanism, their activities and how they
27 wish to represent them.

28 9 Q. And over the years have you published extensively in
29 relation to that topic?

1 A. Yes, I published my PhD as a book which was called The
2 Origins and Rise of Dissident Irish.
3 Republicanism, and I've also published many
4 peer-reviewed academic articles, approximately about
5 23, looking predominantly at violent dissident 10:04
6 republicanism, as well as provisional republicanism.
7 10 Q. And what we're told in your report at paragraph 3.5, is
8 the analysis of violent dissident republican
9 activities, organisations and membership has been your
10 primary focus in terms of research and expertise for 10:04
11 many, many years now and up until the present day?
12 A. That is correct, yes.
13 11 Q. And did you bring all of that expertise to bear in
14 preparing the reports that you prepared for this
15 Inquiry? 10:04
16 A. I did.
17 12 Q. Now, I've just mentioned your reports; have you
18 prepared two reports for the Inquiry?
19 A. Yes, I prepared a primary report and then one that was
20 responses to observations that was put to me after the 10:05
21 submission of my primary report.
22 13 Q. And so, just so everyone knows exactly what you just
23 mentioned, your first report which was the main
24 report --
25 A. Yeah. 10:05
26 14 Q. -- is dated 23rd December 2024?
27 A. That's correct.
28 15 Q. And as you indicated, you subsequently prepared a
29 second report which was responsive to questions that

1 had been posed by Core Participants?

2 A. Mm-hmm.

3 16 Q. And you're nodding your head?

4 A. Yes, correct.

5 17 Q. And that report is dated 7th September 2025? 10:05

6 A. That is correct.

7 18 Q. Now, just so everyone knows what we're going to be
8 doing today and what we're not going to be doing today,
9 as you know, Doctor, today we are not going to be going
10 through your reports in detail? 10:05

11 A. Yes.

12 19 Q. And that will, though, come later. The purpose of your
13 evidence today is to provide us with a high level
14 introduction to the emergence of so-called dissident
15 republicanism? 10:06

16 A. Mm-hmm, that's correct.

17 20 Q. Along with an identification of the key groups within
18 dissident republicanism?

19 A. That is correct.

20 21 Q. And in a later chapter you will return to deal with the 10:06
21 substance of your reports in much more detail, is that
22 correct?

23 A. That is correct.

24 22 Q. Now, as a starting point, could you tell us, perhaps
25 just in a few sentences, what you have used as the 10:06
26 basis for forming your opinions?

27 A. So, I've used a variety of sources, I triangulated my
28 sources. I've used a lot of open source data. While
29 there hasn't been as much published on violent

1 dissident republicanism, the quality is still good, so
2 I've utilised books that have been published by people
3 such as Marisa McGlinchey, by Ed Maloney, John Mooney,
4 Michael O'Toole, and others. I've also utilised the
5 CAIN Archives hosted by the University of Ulster, 10:07
6 excellent resource which contains statements and
7 chronology of events. And I've also utilised the
8 Violent Dissident Republican Database that I created,
9 alongside my college Dr. John Horgan at Pennsylvania
10 State University, during that postdoc that I mentioned 10:07
11 previously, as well as other sources.

12 23 Q. Does it come to this, there isn't the volume of open
13 source material about dissident republicanism that
14 there is about, in particular, the Provisional IRA?

15 A. Yes. 10:07

16 24 Q. No doubt as a consequence of the fact that it is a
17 newer concept?

18 A. That is correct.

19 25 Q. But there is, nonetheless, a substantial volume of such
20 material? 10:07

21 A. That is correct, yeah.

22 26 Q. And the material that is available to you, is of a good
23 quality?

24 A. I believe so, yes.

25 27 Q. So that as a result, you have not felt inhibited in 10:07
26 terms of sources from reaching firm views about the
27 questions that you have been posed?

28 A. I have not felt inhibited.

29 28 Q. Next I'm going to ask you to help us with certain

1 terms?
2 A. Yes.
3 29 Q. During the course of our opening remarks yesterday, we
4 used the terms "dissident republicans," and "violent
5 dissident republicans," and those are terms that will 10:08
6 be used over and over during the course of this
7 Inquiry. Could you help please by providing us with an
8 introduction to those terms?
9 A. So, it is an important distinction to have between
10 dissident republicans and violent dissident 10:08
11 republicans. The term "dissident republicanism," is
12 contested, as many of the terms that are used within
13 inquiries such as this are, but what it generally means
14 is those who have moved away and disagree with the
15 politicisation of the Provisional IRA and Sinn Féin. 10:08
16 So the groups that we are looking at would be
17 classified by dissident republicanism. But there is a
18 differentiation between dissident republican and
19 violent dissident republicanism.
20 30 Q. And what is that? 10:09
21 A. That differentiation is, there are those who are
22 disagree with the politicisation of Sinn Féin and the
23 Provisional IRA but do not believe that there should be
24 violent, armed paramilitary activity. Whereas the
25 groups that we will be looking at throughout the 10:09
26 Inquiry, and you are looking at, are those who are
27 classified as violent dissident republicanism groups
28 because they do espouse the continuation of what they
29 would refer to as the armed campaign or the armed

1 struggle.

2 31 Q. Let me just unpack that to make sure that I've
3 understood it. So, there are a group of people who
4 disagree with the direction taken by the Provisional
5 IRA and Sinn Féin on ideological grounds? 10:09

6 A. That is correct.

7 32 Q. But they do not espouse violence as a means of
8 achieving their aims?

9 A. That is correct.

10 33 Q. And we might describe those people as being dissident 10:09
11 republicans?

12 A. That is correct.

13 34 Q. But there is a subgroup of that group who do believe in
14 violence to achieve their aims?

15 A. That is correct, yes. 10:10

16 35 Q. They are violent dissident republicans?

17 A. Yes.

18 36 Q. And examples of violent dissident republican groups
19 would be the Real IRA?

20 A. That is correct. 10:10

21 37 Q. And the Continuity IRA?

22 A. That is correct.

23 38 Q. Which are two organisations that we will focus over the
24 course of the next 50 minutes or so.
25 10:10

26 Along the way of your answer, you mentioned that there
27 is some issue about the term "dissident" --

28 A. Mm-hmm.

29 39 Q. -- and is that because groups like the Real IRA would

1 regard the Provisional IRA as being the dissidents, not
2 them?

3 A. That is correct. They say that they are the true
4 republicans who have continued the same path and that
5 it is the Provisional IRA and Sinn Féin who have 10:10
6 changed and who have moved -- who have veered off the
7 path of what they would refer to as true republicanism.
8 The strategy has changed from the provisionals and that
9 it is those dissidents who have continued the same
10 route, the continuation of the armed struggle and 10:11
11 continuation of their proposed political approaches as
12 well.

13 40 Q. But notwithstanding who they believe are or not the
14 dissidents, it is conventional, these days, to describe
15 organisations such as the Real IRA as violent dissident 10:11
16 republicans?

17 A. That is correct, and that is the phraseology I use;
18 others have put forward phrases like "radical
19 republicans," "republican ultraists" and others, but I
20 believe that "dissident republicanism," "violent 10:11
21 dissident republicanism" are the phrases that best
22 describe these groups.

23 41 Q. That is the terminology that we propose to apply in the
24 course of the oral evidence hearings. That's helpful
25 in terms of those descriptions. Another term you can 10:11
26 help us with please is "paramilitarism"?

27 A. Yep.

28 42 Q. Can we start by establishing whether that word,
29 "paramilitarism" has a different meaning from

1 "terrorism"?

2 A. I believe it does. "Terrorism" and "paramilitarism"

3 are not synonymous, they are not the same.

4 "Paramilitarism" is the term that is widely used in

5 reference to these groups across Northern Ireland. I 10:12

6 refer to the First Independent Monitoring Commission

7 Report where they used the term "paramilitarism" and

8 they say that that term -- that they are not just

9 focused on terrorism or the sectarian violence of these

10 groups, they are focused on all of the activities, 10:12

11 violent and otherwise, that they're involved in and

12 they put forward in, I believe the second paragraph of

13 their first report that "paramilitarism" is the phrase

14 that they would utilise for this. This is not saying

15 these groups do not use terrorism, this is saying that 10:12

16 there are multiple violent and non-violent tactics that

17 they utilise and one of them is terrorism. They also

18 are involved in what used to be called punishment

19 attacks but now readily called paramilitary-style

20 attacks, they're involved in organised criminality, as 10:13

21 has been pointed out at the Northern Ireland Affairs

22 Committee recently, and other violent and non-violent

23 activities.

24 43 Q. So, have I correctly understood that "paramilitarism"

25 is broader term than "terrorism," but is capable of 10:13

26 including terrorism and often will do?

27 A. That is correct. And it is important to understand

28 that within the context of Northern Ireland because

29 paramilitarism in other areas such as South America

would have different meaning but we need to understand the utilisation of these terms within the context in which they find themselves.

44 Q. So, when we think about the Real IRA, would you, applying that terminology, describe it as a paramilitary organisation?

10:13

A. I would.

45 Q. But you certainly are not saying that it has not
engaged in terrorist activity?

A. I am not saying that and I believe that the Omagh bombing is a clear example of a terrorist activity that's been committed by this paramilitary group.

10:13

46 Q. Absolutely. There is no doubt that that organisation has engaged in terrorist activity of the most terrible type?

10:14

A. Yeah. If you look at the definitions of "terrorism," this attack and others do meet those legal and academic definitions of "terrorism."

47 Q. Now, next, Dr. Morrison, we need to deal with the splits within the republican movement over quite a lengthy period of time. But focusing in on those two organisations, the Continuity IRA and, in particular, the Real IRA. And for anyone that's following this in the reports of Dr. Morrison I'm now at page 28 of the first report.

10:14

10:14

Now, let's start right back at the beginning and when had what we now know as the Official IRA come into existence?

1 A. That would have been in 1969, we first saw the Official
2 IRA. This was after a split in what was then just
3 called the IRA. You saw the Official IRA led by
4 Cathal Goulding and others forming, and the group that
5 split away from them were what were to become known as 10:15
6 the Provisional IRA. This was coming for a number of
7 years, dating back to the late '50s, early '60s with
8 the failure of what was called the Border campaign or
9 what they referred to Operation Harvest. A change of
10 leadership during the '60s where they were proposing to 10:15
11 move away from violent activity; they were proposing
12 more left-wing politics. They were proposing more
13 involvement in taking their seats in politics, dropping
14 what was called the abstentionist policy, dropping it
15 in relation to Dáil Éireann, the Parliament in Dublin, 10:15
16 dropping it in relation to Stormont and dropping it in
17 relation to Westminster as well. This was an old
18 policy that dates back a long time within Irish
19 republicanism and for some it was a poor aspect of the
20 political approach. 10:16

21 48 Q. So, we have the old or established IRA, however one
22 wants to describe it, and then in 1969 there is a split
23 which results in the Official IRA --

24 A. That is correct.

25 49 Q. -- and the Provisional IRA? 10:16

26 A. That is correct.

27 50 Q. And which of those terrorist organisations becomes
28 predominant?

29 A. The Provisional IRA ultimately becomes predominant.

1 However, at the time of the split it was an even split
2 but then as the conflict -- because this is at the time
3 of the birth of The Troubles as well, as the conflict
4 went, on the Provisional IRA became dominant and that
5 became a cause of concern for a number of people within 10:16
6 the official IRA as well.

7 51 Q. So this is the first significant split in 1969?

8 A. That is correct.

9 52 Q. And where does Sinn Féin fit into that picture in '69
10 moving into 1970? 10:17

11 A. So, the split first took place within the paramilitary
12 group of the IRA and in January 1970, at the Ard Fheis
13 or the annual convention of Sinn Féin there was a
14 further split, a walkout from the Sinn Féin Ard Fheis,
15 where there was a vote put forward about dropping the 10:17
16 abstentionist policy, while it passed, it did not pass
17 with the two-thirds majority that was needed to change
18 it constitutionally, however, a further proposal was
19 put forward by Seamus Costello who said there should be
20 approval of what was approved at the General Army 10:17
21 Convention of the Provisional IRA just months previous
22 that didn't need a two-thirds majority. With that
23 there was a walkout and what became known as Sinn Féin
24 or Provisional Sinn Féin was formed.

25 53 Q. So we have a split in the IRA in '69, and then in 1970 10:18
26 that is effectively mirrored by a split within
27 Sinn Féin?

28 A. That is correct.

29 54 Q. And emerging out of that is Provisional Sinn Féin (as

1 it was then called) --

2 A. Correct.

3 55 Q. -- which is associated with the Provisional IRA?

4 A. That's correct.

5 56 Q. And over time, Provisional Sinn Féin has become known 10:18

6 just as Sinn Féin?

7 A. That is correct, yeah. And while there has always been

8 the denial of the connection between the two, it is

9 widely believed and widely reported of that connection

10 during that time and afterwards. 10:18

11 57 Q. And the Provisional IRA and Provisional Sinn Féin, are

12 they sometimes referred to together as the provisional

13 movement?

14 A. That is correct.

15 58 Q. In 1974, was there a further split within the 10:18

16 republican movement?

17 A. There was, this was a split within the Official IRA and

18 it was a split that saw the formation of the INLA in

19 1974, led by Seamus Costello who had become

20 disillusioned with the paramilitary campaign of the 10:19

21 Official IRA that it was not meeting, it was not

22 meeting the same intensity as the Provisional IRA, that

23 it was more in a defence and retaliation capacity and

24 he believed that there needed to be a different

25 approach. And he, in the time leading up to the '74 10:19

26 split, he was trying to organised a group and was

27 ultimately expelled from the Official IRA, went on to

28 form the INLA and their political wing, the IRSP, was

29 formed as well. A number of people who joined up were

1 not aware of the existence of the INLA and when the
2 existence of the INLA became clear they left as well.

3 59 Q. So, '74, a split within the Official IRA results in the
4 creation of the INLA --

5 A. That is correct. 10:20

6 60 Q. -- and its political wing as well?

7 A. That's correct.

8 61 Q. And then we can deal with this very quickly at this
9 stage because we're going to delve into the detail in a
10 few minutes. In 1986 was there a further split? 10:20

11 A. There was a further split in the provisional movement.
12 That was a split which saw the formation of the
13 Continuity IRA and Republican Sinn Féin.

14 62 Q. So, the Continuity IRA and its political wing, the RSF
15 or Republican Sinn Féin? 10:20

16 A. That is correct.

17 63 Q. And then in 1997, a further split of particular
18 importance to our work was there a split which resulted
19 in the creation of the Real IRA?

20 A. There was. 10:20

21 64 Q. And alongside that, was there the creation of another
22 organisation?

23 A. There was. Internally within Sinn Féin there was an
24 organisation that was formed called the 32 County
25 Sovereignty Committee which was established first of 10:21
26 all internally within Sinn Féin. Members were expelled
27 and they then changed the name to the 32 County
28 Sovereignty Movement.

29 65 Q. So, the Real IRA comes into existence in circumstances

1 that we will look at. The 32 County Sovereignty
2 Committee initially is a part of Sinn Féin?

3 A. Correct.

4 66 Q. Its members are expelled?

5 A. That is correct. 10:21

6 67 Q. And at that stage it becomes not the Committee but
7 instead becomes the 32 County Sovereignty Movement?

8 A. That is correct.

9 68 Q. Let's just pull some of those strands together by
10 playing on the screen, if we're able to, some figures 10:21
11 that are contained within your report at page 29, which
12 show, in graphical form, what you've just. Can we have
13 Figure 1 on the screen, first of all, please? So the
14 IRA at the top, the older established IRA splitting in
15 '69 to result in the creation of the Official IRA and 10:22
16 Provisional IRA. A split within the Official IRA in
17 '74 to create the Irish National Liberation Army, the
18 INLA. And splits within the Provisional IRA first of
19 all in 1986 to create the Continuity IRA and then in
20 1997 to create the Real IRA? 10:22

21 A. That is correct.

22 69 Q. And there is an equivalent figure to show the splits
23 within what you've described as the political wings of
24 the terrorist organisations, that is Figure 2 please.
25 So, Sinn Féin splitting in 1970 to create official 10:22
26 Sinn Féin and Provisional Sinn Féin; a split within
27 Official Sinn Féin in 1974 to create the Irish
28 Republican Socialist Party or the IRSP; and splits
29 within Provisional Sinn Féin mirroring splits within

1 the Provisional IRA in 1986 to create Republican
2 Sinn Féin, and in 1997 to create first of all the 32
3 County Sovereignty Committee and then the 32 County
4 Sovereignty Movement?

5 A. That is correct.

10:23

6 70 Q. Thank you very much we can take those from the screen.

7
8 Now, next, as I indicated we would, we're going to
9 drill in further detail into the creation of the
10 Continuity IRA in 1986 and then, in particular, into
11 the creation of the Real IRA in 1997. So for anyone
12 that's following us in the report, I am now at pages 39
13 to 43 of your first report, Doctor.

10:23

14
15 Now, in order to understand the emergence of the
16 Continuity IRA, do we need to understand the concept of
17 abstentionism?

10:24

18 A. I believe we do. This is a core part of the split in
19 1986.

20 71 Q. Bearing in mind that we are just dealing with things at
21 a high level on this occasion that you are giving
22 evidence, could you describe for us in just a small
23 number of sentences what that concept is or involves,
24 please?

10:24

25 A. The concept of abstentionism is that if a member of
26 Sinn Féin becomes elected to Dáil Éireann, Westminster
27 or Stormont that they will not take their seat. And
28 that is what was proposed to be changed in the 1960s by
29 the Goulding leadership, one of the core parts of the

10:24

1 split, and in 1986 there was a proposal to change just
2 abstentionism to Dáil Éireann. So, therefore, if a
3 member of Sinn Féin was elected as a TD in the Republic
4 of Ireland they would take their seat, but was the
5 proposed changed, that it wouldn't change within 10:25
6 Stormont or Westminster.

7 72 Q. Let me make sure that I have understood this. So there
8 is this concept which was long-established by 1986?

9 A. Yes.

10 73 Q. But in the lead-up to 1986 within the provisional 10:25
11 movement there was a change in thinking in relation to
12 that concept?

13 A. Yes, there was a change in thinking dating back to the
14 1970s, a lot of the discussions came within the
15 prisons, proposals being put out in letters called the 10:25
16 'Brownie letters' which have been attributed to Gerry
17 Adams, calling on members of Sinn Féin and Provisional
18 IRA to reconsider the political path and to reconsider,
19 in particular here, abstentionism to Dáil Éireann.

20 74 Q. And was a decision, ultimately, made to change that 10:26
21 principle in relation to the Republic of Ireland?

22 A. A decision was made in 1986 to change that, and that
23 led to -- was one of the major factors leading to the
24 split.

25 75 Q. I'm going to ask you to pause for a moment and we'll 10:26
26 just take this in stages. So there was a change in the
27 principle in 1986?

28 A. There was.

29 76 Q. And were there persons within the republican movement

1 who were idealogically opposed to that change in
2 relation to the concept of abstentionism?

3 A. There were people idealogically opposed, most notable
4 this would have been Ruairí Ó Brádaigh and Dáithí Ó
5 Conaill, they would have been the core leaders involved 10:26
6 opposed to this change.

7 77 Q. And was that an important reason, as I believe you've
8 said a moment ago, behind the emergence of the
9 Continuity IRA?

10 A. This was an important change and important reason for 10:26
11 the emergence of the Continuity IRA and Republican
12 Sinn Féin.

13 78 Q. which, as we've established already, occurred in 1986?

14 A. That is correct.

15 79 Q. Now, in due course we're going to get into this in much 10:27
16 more detail, but was the Continuity IRA able to mount a
17 campaign of violence, violent terrorist activity
18 straight away?

19 A. They were not, they did not have the capabilities to do
20 so. 10:27

21 80 Q. why did they not have the capabilities to do so?

22 A. Because in the lead up to the split in 1986, those who
23 would remain in the provisional leadership had prepared
24 and gotten the majority of the membership on side, so
25 those who went to form the Continuity IRA were small in 10:27
26 almost and limited in access to weaponry and artillery.

27 81 Q. So, they weren't able to mount a campaign, at that
28 stage, and we'll come to the reasons for the answer
29 you're about to give in a moment, but was that in stark

1 contrast to what happened following the emergence of
2 the Real IRA in 1987?

3 A. That is correct in stark contrast.

4 82 Q. I'm going to ask you to help us with two questions that
5 have been posed by a Core Participant before we move on 10:28
6 to the Real IRA.
7

8 Did the Provisional IRA have a particular leadership
9 structure?

10 A. The Provisional IRA did have a particular leadership 10:28
11 structure. I'm happy to go into details of it now if
12 you wish.

13 83 Q. Not details, but if you can just indicate, at a high
14 level, what that structure was?

15 A. At a high level, at the top of the leadership structure 10:28
16 the General Army Convention, when that sat that was
17 deemed to be the supreme leadership of the Provisional
18 IRA, however, that did not regularly sit for security
19 reasons.
20 10:28

21 One of the purposes of that was to elect Army Executive
22 and that Army Executive would elect then the Army
23 Council. The Army Council, when the General Army
24 Convention was not sitting, were the leaders, the
25 supreme leadership of the IRA. 10:29

26 84 Q. And what we're going to see just to get ahead of
27 ourselves for a moment is between '94 and 1997,
28 considerable tension between the Executive and the
29 Inner Council?

1 A. That is correct.

2 85 Q. Anyway we'll get to that in due course. So that was
3 the structure of the Provisional IRA.
4 Mmm

5 86 Q. Did the leadership structure of the Continuity IRA 10:29
6 mirror that structure or was it different?

7 A. It is sought to mirror that structure, as far as I can
8 see.

9 87 Q. Did the Provisional IRA operate a system of cells and
10 active service units? 10:30

11 A. They did.

12 88 Q. Did the Continuity IRA seek to mirror that approach or
13 do it differently?

14 A. I believe they sought to mirror that approach.

15 89 Q. Now, let's turn next to the Real IRA. And I'm now at 10:30
16 page 44 of your first report. And we need to
17 understand out of what the Real IRA emerged, so out
18 what political situation --

19 A. Mm-hmm.

20 90 Q. -- and historical circumstances emerged. And is it 10:30
21 helpful - and tell me if it isn't - to start with the
22 1994 ceasefire of the Provisional IRA?

23 A. I believe that that is helpful.

24 91 Q. And just in very simple terms what, therefore, happened
25 in 1994? 10:30

26 A. So, in 1994, this was after we had the Downing Street
27 Declaration, which the Army Council rejected but not
28 publicly, made a statement about. There was -- there
29 was a proposal put forward by the Taoiseach of Ireland,

1 Albert Reynolds, a 14-point proposal which ultimately
2 led to the ceasefire being called in August 1994. In
3 the years leading up to it post the 1986 split you saw
4 the growing politicisation in the provisional movement.
5 You had the Hume-Adams talks, talks between Gerry Adams 10:31
6 and John Hume of the SDLP, which did not become public
7 until the late 1990s, but started in the late 1980s.
8 So you saw that move towards that. However, with the
9 calling of a ceasefire and we'll see with the future
10 calling of a ceasefire in the late 1990s, there was 10:32
11 tension growing between the Executive and the Army
12 Council.

13 92 Q. I'm going to ask you to pause there because that's what
14 we need to look at. So in 1994 there is ceasefire, but
15 within the Provisional IRA was there growing tension? 10:32

16 A. There was.

17 93 Q. Or friction between different parts?

18 A. That is what has been reported by sources that I trust.

19 94 Q. And is it one source or more than one source that
20 described that friction? 10:32

21 A. This is multiple sources who've described that
22 friction.

23 95 Q. And was the friction between the Army Executive and the
24 Army Council?

25 A. That is correct. 10:32

26 96 Q. And as you understand it from the material that you
27 have considered, was that, in large part, because the
28 Army Executive considered that it had been isolated
29 from the processes which had been under way?

1 A. That is what has been reported, that there were
2 isolated -- that they were not informed of the
3 processes and in some instances with regards to a
4 ceasefire were not told of the calling of the ceasefire
5 till a couple of days beforehand and it's -- so we 10:33
6 did -- it is reported that there were tensions as a
7 result.

8 97 Q. And that tension, that friction that is starting in
9 1994, does that ultimately lead to the split which
10 creates the Real IRA in 1997? 10:33

11 A. That builds and leads to the split of 1997.

12 98 Q. So we need to understand that build.
13
14 First of all, we need to know something about the
15 personalities concerned and not just the Army Executive 10:33
16 and Army Council. On the basis of the materials that
17 you have considered, who on the Army Executive were the
18 key figures?

19 A. The key figures on the Army Executive would have been
20 Michael McKeivitt, would have been a man who used the 10:33
21 alias of Frank McGuinness as well, and they would have
22 been two of the core individuals there.

23 99 Q. And in your report you tell us that the discontent, so
24 the discontent on the part of the Army Executive was
25 being led primarily by the Quartermaster General, 10:34
26 Michael McKeivitt?

27 A. That is correct.

28 100 Q. Seamus McGrane, the Executive Chair?
29 A. That is correct, yep.

1 101 Q. Brian Gillen the OC of Belfast Brigade?

2 A. That is correct, initially.

3 102 Q. Initially because his position --

4 A. His position changed in '97.

5 103 Q. And you added to that list, the Director of Engineering 10:34
6 of the Provisional IRA, a man who went by the name of
7 Frank McGuinness?

8 A. That is correct.

9 104 Q. But that is believed to be an alias?

10 A. That is an alias that he used internally within the 10:34
11 provisional movement, as well as, as he's referred to,
12 in the sources.

13 105 Q. And so, those are members of the Army Executive who are
14 experiencing discontent as a result of being squeezed
15 out of what is going on? 10:35

16 A. That is correct.

17 106 Q. And on the Army Council, who do the sources that you
18 have consulted to prepare your report indicat were the
19 key figures?

20 A. This has been challenged by a number of individuals, 10:35
21 and it isn't as clear. It has been reported a number
22 of times that Gerry Adams would have sat on the Army
23 Council, he obviously denied this as well. There would
24 have been reporting that Kevin McKenna as well would
25 have been on the Army Council. Others such as 10:35
26 Martin McGuinness were reported to have been on the
27 Army Council as well. Again, all of these would have
28 been denied by the individuals as well.

29 107 Q. And so, on the basis of the materials that you have had

1 access to, the open source materials, the friction is
2 between those two groups of people forming those two
3 parts of the Provisional IRA, the Army Executive and
4 Army Council?

5 A. That is correct. 10:36

6 108 Q. And in the period from 1994 that friction is building?

7 A. That is building, yes.

8 109 Q. Now, did the ceasefire of the Provisional IRA come to
9 an end on 9th February 1996?

10 A. That did come to an end then with the bombing of Canary 10:36
11 wharf.

12 110 Q. Now, you mentioned earlier in your evidence the
13 convention and what form does the Provisional IRA
14 convention take?

15 A. The convention is where representatives from across the 10:36
16 structure of the Provisional IRA will meet. Similar to
17 -- the equivalent of the Ard Fheis for Sinn Féin or the
18 convention for Sinn Féin. So you try and get
19 representatives from across the island of Ireland
20 representing all the different units to meet together. 10:37
21 Obviously, this takes significant planning, for
22 security reasons, and so it didn't meet regularly. So
23 there had been a call from the Executive to have a
24 General Army Convention at the beginning of that year
25 but it could not take place until October. 10:37

26 111 Q. So, initially, the convention had been called for, I
27 think as early as January of 1996 but in the result it
28 took place in October of 1996?

29 A. That is correct.

1 112 Q. And when you return we can delve into the detail of
2 what happened, but during the course of that convention
3 did the friction between the two groups that you have
4 told us of increase yet further?

5 A. That did increase yet further. However, there was one 10:38
6 significant change within that, there was a man by the
7 name of Brian Keenan who would have been on the side of
8 the Executive, would be dissident, who changed his
9 position, that's all.

10 113 Q. So he changed his position to support those who were on 10:38
11 the Army Council?

12 A. That is correct.

13 114 Q. So as a result were the Army Council gaining further
14 power in the dispute that existed between the two parts
15 of the organisation? 10:38

16 A. Not just from him but the people who he could take with
17 him as well.

18 115 Q. Now, then during 1997 were there a number of important
19 developments in relation to this issue?

20 A. There were political developments external from the 10:38
21 movement. The election of the Labour Party into
22 Government in the United Kingdom. And with Mo Mowlam
23 being Northern Ireland Secretary of State saying that
24 Sinn Féin would be able to take part in the peace talks
25 as well. 10:39

26 116 Q. Just pause for a moment. So in May of 1997 Tony Blair
27 is elected the Prime Minister?

28 A. Yes.

29 117 Q. With a substantial majority?

1 A. Mm-hmm.

2 118 Q. Mo Mowlam is appointed Secretary of State for Northern
3 Ireland?

4 A. That's correct.

5 119 Q. And she indicated at an early stage of her time in that 10:39
6 role that if the Provisional IRA called a ceasefire she
7 was willing to let Sinn Féin into peace talks without
8 the obligation of decommissioning?

9 A. That is correct.

10 120 Q. So there was a change in political temperature? 10:39

11 A. That is correct. This obligation of decommissioning
12 was now no longer being put forward and, therefore,
13 that was seen as an opportunity for Sinn Féin to join
14 the talks.

15 121 Q. And did that result in a further ceasefire on the part 10:40
16 of the Provisional IRA?

17 A. That, ultimately, did result in a further ceasefire.

18 122 Q. Was that ceasefire called on 19th July 1997?

19 A. It was.

20 123 Q. And which part of the Provisional IRA was it that made 10:40
21 the decision to call a ceasefire?

22 A. That would have been the Army Council.

23 124 Q. And had the Army Executive been able to vote as part of
24 that process?

25 A. As far as I can see, no, they would not have been 10:40
26 involved in that process.

27 125 Q. Now those people who were on the Executive such as
28 Michael McKevitt, Seamus McGrane, were they supportive,
29 as you understand it, of the ceasefire?

1 A. They were not.

2 126 Q. And, as you understand it, did those members of the
3 Provisional IRA, as they were at that stage, believe
4 that it would lead to a weakening of the Provisional
5 IRA? 10:41

6 A. They believed that it would.

7 127 Q. So the tension between the two groups is increasing all
8 the time?

9 A. Correct.

10 128 Q. And indeed is coming to a head? 10:41

11 A. Yep.

12 129 Q. What, ultimately, was it that finally brought the
13 dispute between the two groups to a head?

14 A. This would have been the proposal of the Mitchell
15 Principles, this is how it was framed and part of this 10:41
16 proposal of the Mitchell Principles was to partake in
17 talks, that it would be a declaration that you would
18 pursue political agendas through purely peaceful means.

19 130 Q. And so, once the Mitchell Principles had been signed up
20 to what was it that occurred? 10:42

21 A. This further tension led to a belief among those in the
22 Army Executive and their supporters that if the
23 Provisional IRA signed up -- if the provisional
24 movement signed up to the Mitchell Principles that this
25 would go against what Irish republicanism stood for and 10:42
26 it would sell out opportunities to further engage in
27 armed struggle which they deemed to be legitimate and
28 justified.

29 131 Q. Did a further convention take place in October of 1997?

1 A. It did, yes.

2 132 Q. And, again, we can go into the detail of this when you
3 return, but could you describe for us please, in
4 headline form, what happened at that convention?

5 A. What happened at that convention is that one of the 10:42
6 core bits, similar to Brian Keenan moving,
7 Frank Gillen, who was referred to earlier he changed
8 his sides as well. The Executive are appointed, there
9 is still those members on the Executive who are against
10 the trajectory of it but the main point that moves is 10:43
11 that those members of the Executive leave to form the
12 Real IRA.

13 133 Q. So the materials that you have seen indicate that
14 during the course of the convention the Army Council
15 gained yet more power within the Provisional IRA? 10:43

16 A. That is correct.

17 134 Q. And then that led to members of the Army Executive
18 splitting away?

19 A. That is correct.

20 135 Q. And who do you understand were the members of the 10:43
21 Executive who resigned and who went on to form the Real
22 IRA?

23 A. The members are those who I had named previously;
24 Michael McKeivitt, Seamus McGrane, Frank McGuinness.

25 136 Q. And in your report, I'm at page 52, you indicate that 10:44
26 led by Michael McKeivitt, Seamus McGrane, Liam Campbell,
27 Frank McGuinness, and Pascal Burke, the new grouping
28 was to become widely known as the Real IRA?

29 A. That is correct. They first took, used the name

1 Óglaigh na hÉireann which all of these groups use and
2 also the Irish Military used they became widely known
3 as the Real IRA, a title that they then went on to
4 adopt as well.

5 137 Q. In terms of numbers or personnel, was the split a major 10:44
6 one?

7 A. In terms of numbers this was not a major split, no.

8 138 Q. So, most people remained with the Provisional IRA as
9 opposed to leaving to join the Real IRA?

10 A. That is correct. 10:45

11 139 Q. So not major in terms of numbers but, in terms of the
12 nature of the personnel who had left was this a
13 significant split?

14 A. This was a significant split in terms of the nature of
15 the personnel, largely because you had people there 10:45
16 from the quartermasters department as well as the
17 engineering department who had moved away and they had
18 that expertise in terms of the identification of where
19 weapons were, but also in relation to the development
20 of weaponry as well. 10:45

21 140 Q. So as you told us earlier, two of those who were
22 dissidents and who left the Provisional IRA to form the
23 Real IRA were Michael McKeivitt --

24 A. Correct.

25 141 Q. -- the Quartermaster General? 10:45

26 A. That is correct.

27 142 Q. And the person known as Frank McGuinness, the Director
28 of Engineering?

29 A. That is correct.

1 143 Q. So, significant operational components of the
2 Provisional IRA --

3 A. Yes.

4 144 Q. -- are moving to form the Real IRA?

5 A. That is correct. 10:46

6 145 Q. Does the material that you have had access to indicate
7 that within a matter of weeks of leaving the
8 Provisional IRA, Michael McKevitt began to develop a
9 new paramilitary force?

10 A. Yes, it does. 10:46

11 146 Q. Incorporating a terrorist force?

12 A. That is correct, yes.

13 147 Q. Which would become widely known in due course as the
14 Real IRA?

15 A. Yes. 10:46

16 148 Q. As you understand it, what was the aim of
17 Michael McKevitt in creating the Real IRA?

18 A. What this group wanted to achieve is the
19 destabilisation of the Peace Process. They wanted to,
20 in a way, try and push the unionists to leave the peace 10:47
21 talks and therefore delegitimising it. They also
22 wanted to show their own membership and support that
23 they will continue what they referred to as the armed
24 struggle or armed campaign, and that the Provisional
25 IRA and Provisional Sinn Féin, as they used to be 10:47
26 known, or Sinn Féin as they were known then, they had
27 abandoned it and that's what they wanted to do - the
28 disruption of normality within the Peace Process.

29 149 Q. And the way you summarise it in your report at page 53

1 is:
2
3 His aim [Michael McKeivitt's aim] it is
4 Proposed, was to pursue a strategically timed bombing
5 campaign in Northern Ireland and Britain, and 10:47
6 ultimately seize back control of the PIRA."
7
8 A. That is what some of the sources indicated, yes.
9 150 Q. And do sources also indicate that particular people
10 were appointed to particular roles within the Real IRA? 10:48
11 A. Yes, they do. They note that Frank McGuinness, as he
12 was known, was the first Chief of Staff;
13 Michael McKeivitt was the Quartermaster General;
14 Liam Campbell was to be the Director of Operations;
15 Seamus McGrane, the Director of Training; and I believe 10:48
16 Pascal Burke Director of Finance as well.
17 151 Q. So, of those you've just mentioned, to make sure I
18 heard you correctly, Frank McGuinness, Chief of Staff?
19 A. Mm-hmm, correct.
20 152 Q. Michael McKeivitt, Quartermaster General? 10:48
21 A. Yes.
22 153 Q. Liam Campbell, Director of Operations?
23 A. Correct.
24 154 Q. Seamus McGrane, Director of Training?
25 A. Correct. 10:49
26 155 Q. And Pascal Burke, Director of Finance?
27 A. That is what has been noted, particularly in the Mooney
28 and O'Toole book as well as within Ed Maloney's book
29 and other reporting as well.

1 156 Q. Do the materials indicate what tactics the Real IRA
2 were considering utilising in their terrorist campaign
3 at that point in time?

4 A. They do, they indicate this was some form of
5 disagreement at the outset. Frank McGuinness was 10:49
6 proposing attacking military targets whereas
7 Liam Campbell, as Director of Operations, was proposing
8 a car bombing campaign and, ultimately, it was the Real
9 IRA sided with Liam Campbell's approach and
10 Frank McGuinness did come to accept that as well. That 10:49
11 is what had been reported.

12 157 Q. So, Frank McGuinness, essentially had as the intended
13 aim killing soldiers?

14 A. Targeting military capability, yeah, and that may have
15 included killing soldiers. 10:50

16 158 Q. Do the materials indicate that he was against the use
17 of car bombs in towns?

18 A. He was against it initially, however, when the majority
19 came to support that he came alongside that as well.

20 159 Q. And do the materials indicate that McGuinness believed 10:50
21 that car bombs in towns were liable to kill innocent
22 civilians?

23 A. Yes.

24 160 Q. As, of course, we know tragically was to occur on 15th
25 August 1998? 10:50

26 A. That is correct.

27 161 Q. But Liam Campbell argued in favour of car bomb attacks?

28 A. Yes.

29 162 Q. Because the bombs were cheap and easy to manufacture

1 and easy to transport?

2 A. That is correct.

3 163 Q. And he came out on top?

4 A. Tragically so.

5 164 Q. The materials indicated, you told us earlier, that 10:51

6 around this time there was also emerging the 32 County

7 Sovereignty Committee, later the 32 County Sovereignty

8 Movement?

9 A. That is correct, yes.

10 165 Q. And do the materials indicate that there was a 10:51

11 relationship or association between the Real IRA and

12 those organisations?

13 A. This is an association that was always denied by both

14 parties, however, that is the tradition within the

15 political and paramilitary relationships within the 10:51

16 Irish republican movement. But, yes, the materials do

17 indicate that. If you look, for example, at

18 Sophie Whiting's analysis of the 32 County Sovereignty

19 Movement's newspaper The Sovereign Nation, she points

20 out that 4% of the articles there include what was 10:52

21 titled war news, declaring what the Real IRA were doing

22 as well as containing the statements of the Real IRA.

23 And this was, if you also look at the Nally Report from

24 the Republic of Ireland, the Irish Government clearly

25 believed there to be that connection. As 10:52

26 Martin Mansergh, who was adviser to Bertie Ahern, the

27 then Taoiseach at the time, was meeting with the

28 32 County Sovereignty Movement to discuss with them to

29 see if that the Real IRA could step away from their

1 paramilitary campaign.

2 166 Q. And, potentially, providing further support for all of
3 that --

4 A. Correct.

5 167 Q. -- Michael McKeivitt was a significant figure within the 10:52
6 Real IRA?

7 A. That is correct.

8 168 Q. Who was the first chairperson of the 32 county
9 Sovereignty Committee?

10 A. That would have been Francie Mackey. 10:53

11 169 Q. Did there come a time when Bernadette Sands McKeivitt
12 had a role within the 32 County Sovereignty Committee?

13 A. Yes.

14 170 Q. What was the role that she was to have?

15 A. She was a leading figure within the 32 County 10:53
16 Sovereignty Movement, one of the figureheads of the
17 movement.

18 171 Q. Was she married to Michael McKeivitt?

19 A. Yes, she was.

20 172 Q. Now, again I'm going to ask you some questions, some 10:53
21 helpful questions that have been posed by a Core
22 Participant, they mirror those that I asked earlier in
23 relation to the Continuity IRA. Did the leadership
24 structure of the Real IRA mirror or differ from that of
25 the Provisional IRA? 10:53

26 A. It mirrored that of the Provisional IRA.

27 173 Q. Did it operate a system of cells and active service
28 units or operate in a different way?

29 A. It did operate those, however, due to the smaller

1 number there would have been fewer cells.

2 174 Q. And was there a particular geographical area in which
3 the Real IRA was based?

4 A. They were most prominent within the Border counties, in
5 Louth but also within Dublin and within Cork. 10:54

6 175 Q. And yesterday, in our opening statement, we described
7 Dundalk as being a place which was home for and base
8 for operations of a number of significant figures in
9 the Real IRA, and would you regard that as being an
10 accurate statement? 10:54

11 A. I regard that as accurate.

12 176 Q. Now, finally, because we do need to finish your
13 evidence on this occasion within an hour, there'll be
14 more time available to us next time, I want to deal, in
15 summary, with two topics connected with the Real IRA. 10:55
16 The first relates to the size of the Real IRA at the
17 time of the Omagh bombing and I'm in, for those
18 following it, your second report, paragraph 10.20,
19 page 26. And you felt able to express a view about the
20 size of the Real IRA at the time of the Omagh bombing? 10:55

21 A. I did. However, it must be noted as a clandestine
22 organisation it is difficult to be fully accurate but
23 based on the sources I believed I could form an
24 opinion.

25 177 Q. And you have listed the sources in your second report? 10:55

26 A. That is correct.

27 178 Q. We won't go through them now but what you state at that
28 paragraph number that I gave is this:
29

1 "Considering the above, it is clear that the RIRA at
2 the time of the Omagh bomb was a new group with a
3 relatively small membership of up to 90 members."
4

5 A. That is correct, and of those 90 members there would 10:56
6 have been approximately a third who would have been
7 violently active.

8 179 Q. Of those who were members of the Real IRA you say:
9

10 "However, while the membership was small they had 10:56
11 significant experience, expertise, and access to
12 weaponry within their membership to be able to engage
13 in extreme violence from the outset."
14

15 A. That is correct. 10:56

16 180 Q. And that's the difference between the position that the
17 Continuity IRA was in in 1986 as opposed to the Real
18 IRA 1997?

19 A. Yeah. When you look at the Continuity IRA they did not
20 appear until really the mid 1990s because they did not 10:56
21 have that capability to do so.

22 181 Q. Whereas the Real IRA did have that capability?
23

24 182 Q. And then, as we're going to look at when you return,
25 really from the very early days of the existence of the 10:57
26 Real IRA, they are mounting a campaign of terrorism
27 across Northern Ireland?

28 A. They are.

29 183 Q. Often utilising the tactic that Liam Campbell had

1 argued for, namely car bombs in towns?

2 A. That is correct, you see that in places such as

3 Banbridge in the lead up to the Omagh bombing.

4 184 Q. And the second point and the final point that we'll

5 deal with today, is that in your report, your first 10:57

6 report, you observe that Liam Campbell developed an

7 operational coalition with the Continuity IRA and the

8 INLA?

9 A. That is correct. It's reported that he even sought to

10 develop an active service unit which would bring 10:58

11 together the Continuity IRA, INLA and the Real IRA, or

12 members within them to mount a campaign; that is what's

13 reported in the Mooney and O'Toole book in particular.

14 185 Q. In your report, your second report between pages 27 and

15 30 you list a series of points dealing with 10:58

16 co-operation between those different organisations and

17 at paragraph 11.14, you expressed this view overall:

18

19 "With the above points all considered some form of

20 operational co-operation for the Omagh bombing between 10:58

21 the RIRA and CIRA in particular is deemed likely, even

22 with the leadership of the RIRA being the lead

23 instigators of the attack."

24

25 A. That is correct. 10:59

26 MR. GREANEY: Dr. Morrison, thank you very much indeed

27 for answering my questions on this occasion. We have

28 just finished within the hour, there are pressures on

29 today, as you know.

1 THE WITNESS: I understand.

2 MR. GREANEY: Sir, I'm just going to check whether you

3 have any questions that you wish to ask Dr. Morrison?

4 CHAIRMAN: No, thank you, not at this stage.

5 MR. GREANEY: Could we have a short break before we 10:59

6 hear the evidence of Prof. Angela Gallop, could we

7 return at 11:15?

8 CHAIRMAN: Thank you in the meantime, Dr. Morrison.

9 THE WITNESS: Thank you very much Chair.

10 10:59

11 THE INQUIRY ADJOURNED BRIEFLY AND RESUMED AS FOLLOWS:

12

13 CHAIRMAN: Mr. Greaney.

14 MR. GREANEY: Sir, thank you very much. In the witness

15 box we have Prof. Angela Gallop and can I ask that she 11:17

16 be sworn please.

17 CHAIRMAN: Good morning Prof. Gallop.

18 WITNESS: Good morning.

19 CHAIRMAN: I will ask for the usher to swear.

20 11:17

21 PROF. ANGELA GALLOP HAVING BEEN SWORN WAS QUESTIONED BY

22 MR. GREANEY AS FOLLOWS:

23

24 186 Q. MR. GREANEY: Professor, would you begin please by

25 telling us your full name? 11:18

26 A. Angela Mary Cecilia Gallop.

27 187 Q. Professor, I know that at considerable inconvenience

28 you have delayed starting a holiday in order to give

29 your evidence today, so many thanks for putting

1 yourself to that inconvenience.

2 A. Thank you.

3 188 Q. And I also know that it is vital that your evidence is
4 concluded just before 1:30 so that you can catch a
5 flight? 11:18

6 A. Thank you.

7 189 Q. And you have my promise that we will meet that time.

8 A. Yes, thank you.

9 190 Q. What I said of your role in the Inquiry yesterday
10 during opening remarks, was this Professor: 11:18

11

12 "Prof. Gallop is a leading figure in the world of
13 forensic science. She has been instructed by the
14 Inquiry to lead a multidisciplinary team of forensic
15 scientists. That team has written two reports for the 11:19
16 Inquiry so far, one introducing their forensic science
17 disciplines and setting out the standards in 1998; and
18 the second focused on the findings of the police
19 investigation into the Omagh bombing."

20 11:19

21 So that is what I said.

22

23 Professor, as you appreciate, you will be giving
24 evidence a number of times in the course of the
25 Inquiry's oral evidence hearings? 11:19

26 A. Yes.

27 191 Q. And that includes giving evidence on a second occasion
28 during the course of this chapter?

29 A. Yes.

1 192 Q. So, today, what we will be dealing with is an
2 introduction to forensic science and the scientific
3 techniques that were available to police investigations
4 in 1997 and 1998, and scientific standards. That your
5 first report is 168 pages long, we are certainly not 11:19
6 going to be descending into the detail of that report.
7 we'll be dealing with things at a high level today, it
8 is really just an introduction that we seek from you.
9
10
11 Now, Professor, you have prepared a slideshow to help 11:20
12 us move through your introductory evidence efficiently;
13 is that correct?
14 A. Yes, that's right.
15 193 Q. And what we're going to do is to use that as the basis for 11:20
16 your evidence. What I'll aim to do is to give page
17 references to the report as we go along, so that if
18 anyone wishes to cross-reference in due course they can
19 do so.
20
21 So the slideshow, the PowerPoint presentation has the 11:20
22 IQ reference, 0489371. So there we see
23 background/overview of the scientific tests and
24 techniques available in 1997/1998, based upon your
25 Report 1, which was originally dated January of this 11:21
26 year but was updated to reflect comments by Core
27 Participants in April of this year?
28 A. Yes, that's correct.
29 194 Q. So can we go to page 2 please, where you deal with your

1 professional background qualifications and experience.

2

3 So, we learn from that, Professor, that you have been a

4 practising forensic scientist for 50 years?

5 A. Yes. 11:22

6 195 Q. And initially did you train as a forensic biologist in

7 the Home Office Forensic Science Service?

8 A. Yes, I did.

9 196 Q. You tell us that your career was split equally between

10 prosecution and defence work? 11:22

11 A. Yes, roughly.

12 197 Q. So that would be in the context of criminal

13 proceedings?

14 A. Yes.

15 198 Q. Both at first instance and in the Court of Appeal? 11:22

16 A. Yes.

17 199 Q. What was the - with the emphasis on was - the Forensic

18 Science Service?

19 A. The Forensic Science Service was a service run by the

20 Home Office which supplied initially for all police 11:22

21 needs in forensic science sense in England and Wales.

22 200 Q. And we won't get into the rights and wrongs of this,

23 but did there come a time when the Forensic Science

24 Service ended?

25 A. Yes, in 2012 the service was shut down. 11:22

26 201 Q. Did you start your professional career in the Forensic

27 Science Service?

28 A. Yes, I did.

29 202 Q. As I've indicated, as a forensic biologist?

1 A. Yes.

2 203 Q. And since then what has been the trajectory of your
3 career?

4 A. Well, I've done all sorts of things. When I left the
5 Forensic Science Service in 1986, I did so to set up an 11:23
6 organisation to help lawyers representing people
7 accused of crimes, so looking at the other side of
8 forensic science for the defence. And I did that for a
9 while and then partly because of what I noticed while I
10 was doing that work, then in 1997 and '98, which 11:23
11 happens to be exactly the timescale that we are talking
12 about here, but I set up with a couple of colleagues an
13 independent laboratory for police to try and improve
14 standards there. And that was in competition with the
15 Forensic Science Service which was obviously still 11:24
16 running at the time. And then later on, in 2010, I
17 left that sort of work and looked overseas and set up a
18 company with some other people providing criminal
19 justice services, particularly in parts of the world
20 which are conflict affected and so have very poor 11:24
21 criminal justice systems. Most of that work was for
22 the UK Government.

23 204 Q. And in the 2015 Queen's Birthday Honours were you
24 awarded a CBE for services to forensic science?

25 A. Yes, I was. 11:24

26 205 Q. Over the years you have been involved in many, many
27 significant and complex cases?

28 A. Yes.

29 206 Q. You have specialised in historical case

1 reinvestigations?

2 A. Yes.

3 207 Q. And at the bottom of that page we see a number of
4 photographs; does each photograph represent a case?

5 A. Yes, it does. 11:25

6 208 Q. And which cases, I mean we will recognise many if not
7 all, which cases do they represent?

8 A. Going left to right that's a picture of Lynette White
9 that was killed and the Cardiff Three were convicted of
10 her killing. And so it was the work after that, to 11:25
11 discover who actually killed her because it wasn't
12 them.

13 209 Q. Yes.

14 A. Then Damilola Taylor is the next one. Then the Coastal
15 Path Murders is the third image. Rachel Nickell is the 11:25
16 fourth image and Stephen Lawrence is the fifth image.

17 210 Q. Thank you. So that's you, Professor. We're going to
18 turn next to other members of the team because it is
19 correct that you were appointed to lead a
20 multidisciplinary team? 11:25

21 A. Yes.

22 211 Q. So a team of forensic scientists from different areas?

23 A. Yes, that's right.

24 212 Q. Within that team, Chris Hester, who specialises in
25 explosive devices? 11:26

26 A. Yes.

27 213 Q. Keith Norman who specialises in explosive substances?

28 A. Yes.

29 214 Q. Kevin Kershaw specialising in fingerprints?

1 A. Yep.

2 215 Q. Philip Avenell, specialising in DNA profiling?

3 A. Yes.

4 216 Q. Roger Robson specialising in textile fibres?

5 A. Yes. 11:26

6 217 Q. Sarah Jacob specialising in marks and traces?

7 A. Yes.

8 218 Q. And Melanie Pugh specialising in questioned documents?

9 A. Yes.

10 219 Q. During the course of Chapter 3 we will hear, I believe, 11:26

11 from each of those experts save not at this stage from

12 Chris Hester or Keith Norman, we'll hear their views

13 from their own mouths, but you're going help us today

14 to understand the summary of the conclusions that they

15 each of them reached? 11:27

16 A. Yes.

17 220 Q. Thank you. Could we go next please to page 4. So in

18 order to help you and your team to discharge your

19 instructions, were you provided with very large number

20 of documents? 11:27

21 A. Yes, that's correct.

22 221 Q. More than 2,000 from various sources?

23 A. Yes.

24 222 Q. And were you given instructions to do a number of

25 things? 11:27

26 A. Yes, that's right.

27 223 Q. And I'll just list those; to provide an overview of

28 forensic science and its role in criminal

29 investigations?

1 A. Yes.

2 224 Q. To explain how it has changed since the 1990s?

3 A. Yes.

4 225 Q. So as we're going to hear from you in certain respects
5 there have been advances in the techniques and 11:27
6 technology since then?

7 A. Yes, there have been.

8 226 Q. To explore technical subject areas in turn answering
9 specific questions about tests and techniques available
10 in 1997 and '98, perceptions of their reliability, and 11:28
11 how FSANI might have compared to other UK forensic
12 laboratories?

13 A. Yes.

14 227 Q. To identify where these forensic laboratories were and
15 what they did? 11:28

16 A. Yes.

17 228 Q. And to address quality standards and forensic strategy
18 setting?

19 A. Yes, that's right.

20 229 Q. Now, next I'm going to ask you to help us with what 11:28
21 forensic science is, and what the common considerations
22 might be and to explain also the concept of a forensic
23 strategy. So could we go to page 5 first of all
24 please. I'm just going to ask you, Professor, rather
25 than me talking if you could take us through that slide 11:28
26 that you have prepared?

27 A. Yes, absolutely. well, forensic science encompasses a
28 very wide range of different sorts of physical traces
29 that can be used to explore and link a suspect with a

1 crime scene or with a victim. And it can do a number
2 of things in relation to this. It can confirm that a
3 crime has been committed in the first place because
4 that's not always the case. I mean if you think of
5 blood-soaked scene or something like that, it might be 11:29
6 an accident or it might be a crime.

7
8 To understand the sequence of events at the crime
9 scene, and as my career has progressed I've discovered
10 how incredibly important it is to understand this 11:29
11 because it's this sequence of events which tells you
12 where to look for what sorts of traces for something
13 that could have come from the offender. So it's a
14 really important aspect of the work that forensic
15 scientists do. And then it can might help you identify 11:29
16 something which might lead to the suspect, obviously as
17 part of that, for example, fingerprints and DNA are two
18 very common areas --

19 230 Q. Yes.

20 A. -- to confirm or eliminate suspects. So if you find 11:30
21 something, say you find a DNA profile and it doesn't
22 match a suspect, then that can mean that maybe the
23 police have got the wrong person.

24 231 Q. Yes.

25 A. So it can do that. And also where you've got 11:30
26 conflicting accounts of events in relation to a crime
27 it can help to indicate who's telling the truth.

28 232 Q. Thank you very much for that summary. We'll turn next
29 to common considerations. And, again, could I ask you

1 to talk us through this slide?

2 A. Yes. It's not just finding or looking for and finding
3 traces but it's thinking about, in all sorts of other
4 things around that. First of all, you have to think
5 about how long physical traces are likely to last, is 11:31
6 it worth looking for them. In the past we've assumed
7 far too much about that and we've learnt an awful lot
8 from some of the reinvestigations of cold cases, but it
9 is important to think about that. For example, with
10 biological traces they can perish or go off, basically. 11:31

11 233 Q. Yes.

12 A. So you don't get a result after a certain length of
13 time. I'm thinking particularly of the old blood
14 grouping tests where six weeks was the very longest
15 that some of them would be able to give you a result. 11:31
16 If it was longer than that it wasn't worth doing them.

17 234 Q. And on some surfaces, by way of another example --

18 A. Yes.

19 235 Q. -- fingerprints might last for a very short period and
20 others for a longer period? 11:31

21 A. Absolutely. Sorry, my examples will always tend to be
22 biological. I'll try not do that. How large or small
23 they are, obviously, you use different -- you know, you
24 might need to enhance some of them, you might need to
25 use a microscope to find some of them so it's important 11:32
26 to understand that.

27 236 Q. And did the approach that, in certain respects, have
28 changed over time?

29 A. Yes.

1 237 Q. So whereas in the 1990s a large amount of DNA might be
2 required for a sample to profile --
3 A. Yes.

4 238 Q. -- these day a smaller sample?
5 A. Yes, that's true of a lot of things, a lot of traces, 11:32
6 chemical traces too.
7

8 And then how common or rare they might be. Sometimes
9 if something is so common like, for example, blue denim
10 fibres, it probably isn't worth looking for, unless 11:32
11 there's something rather special about it because so
12 many people wear clothing made of blue denim, whereas
13 if it's something like, for example, a printed cotton
14 fibric where you have one single fibre with several
15 different types of dye stuff on it, different colours 11:32
16 on it, then that would be pretty rare, generally
17 speaking, so it would be definitely something you'd be
18 interested in looking for. And then any mixtures of
19 things or patterns in them. One of the most important
20 patterns we look for is blood pattern analysis, because 11:33
21 that's the other side of the coin from DNA. DNA will
22 tell you from whom the blood or other body fluid could
23 have come, which is really important, but then the
24 blood pattern will tell you how it's likely to have got
25 there. And patterns, generally, in forensic science 11:33
26 are really important.

27 239 Q. And, for example, in blood, where blood has been caused
28 to be shed in a particular way --
29 A. Yes.

1 240 Q. -- by a blow, it may have a characteristic appearance
2 on what it lands on?
3 A. Yes, absolutely. And get split up in a way that blood
4 just dripping passively doesn't.
5 241 Q. Yes. 11:33
6 A. Then there are two other things that forensic
7 scientists are also very concerned to understand about
8 and the first thing is, how sure you can be that the
9 thing you're looking at is the thing you think you're
10 looking at and should be looking at. And so unbroken 11:34
11 chains of custody we like to see which means that
12 you've got continuity from the crime scene all the way
13 to the laboratory, and so when you do tests on
14 something it is the thing that everybody assumes you're
15 doing tests on. 11:34
16
17 The other thing is the integrity of the item and that's
18 to say how sure you can be that there hasn't been any
19 opportunity or any realistic opportunity for it to be
20 contaminated and for the traces that you're finding to 11:34
21 have got there in some other way, sort of before or
22 after the event and so. Particularly, with more
23 sensitive techniques these days we are very concerned
24 to make sure that we aren't merely analysing something
25 that is a contaminant. 11:34
26 242 Q. You would be having regard to those matters, not only
27 because it is the right thing to do to ensure that your
28 work has integrity, but you would be also be bearing in
29 mind that in the context, for example, of a criminal

1 prosecution, a conventional way of attacking a
2 scientific finding would be by seeking to challenge
3 continuity or the integrity of the exhibit?
4 A. Yes, I think we'd like do it for ourselves, first of
5 all. 11:35
6 243 Q. Absolutely. Page 7 next please, as I indicated,
7 forensic strategy, thank you.
8
9 we're going to look a little bit later at how a
10 forensic strategy comes about, so the relationship 11:35
11 between the forensic scientist and senior investigating
12 officer in a criminal case?
13 A. Yes.
14 244 Q. Please talk us through this slide at this stage?
15 A. Yes, I think this is just -- there seems to be a 11:35
16 tendency to think about forensic science as just a
17 series of tests. So we're very sensitive about this,
18 and this is why I make these comments here. It isn't
19 just tests, they're terribly important but it's the
20 evolving strategy which binds them altogether that is 11:36
21 really absolutely critical. And this requires careful
22 planning, because, you know, you've got to know what
23 you're doing before you touch anything or you might
24 damage really important evidence. So, it's all about
25 deciding which items - and sometimes many hundreds in a 11:36
26 really large case - you should be spending your time on
27 and what you should be looking for and who should be
28 doing it and where they should be doing it, which labs
29 they should be doing it to avoid any contamination

1 within the lab itself, and then in what order you
2 should perform your tests so you don't compromise one
3 form of evidence just by looking for something else
4 first. And then how to interpret and evaluate the test
5 results and particularly in the context of the case 11:36
6 because the context can turn, you know, something that
7 you assume might be really important it can make it
8 completely meaningless and so you've got to be really
9 careful about that.

10 245 Q. I did say that I would give page references within your 11:37
11 first report as we went along. And we have been
12 looking over the last few slides at pages 13 to 14 of
13 that report.

14
15 Now, next I'm going to ask you to help us by reference 11:37
16 to Slide 8 with the role of forensic in a criminal
17 investigation. So this is Slide 8 and pages 14 to 15
18 of your report. So, the slide starts:

19
20 "Pivotal role in SIO's evolving investigation 11:37
21 strategy."

22
23
24 So first, what is the SIO?

25 A. The SIO is the senior investigating officer, so he's a 11:37
26 police officer leading the investigation.

27 246 Q. And what would you expect the relationship to be
28 between the senior investigating officer and the
29 forensic scientist?

1 A. Very collaborative.

2 247 Q. And would you expect that the senior investigating
3 officer would set the policy for the investigation?

4 A. Yes, he would decide, yes, the avenues of
5 investigation, the sort of general -- control the whole 11:38
6 of the investigation, forensic science would just fit
7 into that where it could.

8 248 Q. You would expect a collaborative relationship between
9 the scientist and the SIO?

10 A. Yes, yes. 11:38

11 249 Q. In which the SIO would be indicating what his areas of
12 focus were and forensic scientist would be explaining
13 what he or she could bring to bear?

14 A. Yes, exactly.

15 250 Q. That's how it ought to work? 11:38

16 A. Yes.

17 251 Q. And that's how it ought to work now in 2026?

18 A. Yes.

19 252 Q. Is that how you would have expected it to work back in
20 1997/1998? 11:38

21 A. Yes, and particularly for really large complicated
22 cases.

23 253 Q. Such as the Omagh bombing investigation?

24 A. Yes, absolutely.

25 254 Q. Or other investigations that we know were conducted 11:39
26 into attacks and attempted attacks in '97 and '98?

27 A. Yes.

28 255 Q. "Pivotal role in SIO's evolving investigation
29 strategy."

1 would you then speak us through the ways in which
2 forensic science makes a contribution?

3 A. Yes. I mean, this is just a very sort of slimmed down
4 version of the kinds of input that forensic scientists
5 can have. Their input normally starts if there's a 11:39
6 crime scene, as there usually is, with a briefing about
7 the crime scene and then the forensic scientist will go
8 there and interpret, help interpret what's happened.
9 And, as I said, the sequence of events and that sort of
10 thing. And also help collect evidence because they are 11:39
11 very aware of the sorts of tests that are likely to be
12 required on it and, therefore, the best way to collect
13 certain sorts of evidence and the -- yeah, that's where
14 it really mainly starts.

15 11:40
16 And then visiting, obviously, any associated locations
17 such as suspects' addresses and that sort of thing,
18 which are regarded as a sort of associated scenes
19 really as part of the forensic process.

20 11:40
21 So, there's that part of it. Then there's what happens
22 in the laboratory. Forensic science, obviously, is
23 really important in providing quick, or as quick as we
24 can manage it, effective and importantly an independent
25 steer for the investigator on specific suspects or 11:40
26 items from specific suspects that have been examined.
27 And also suggesting new lines of inquiry and that goes
28 on right from the very beginning through the
29 examinations and analyses.

1 256 Q. I'm going to ask you to pause for one moment before we
2 get to court. And that idea of providing an
3 independent steer is a very important one?
4 A. Yes.

5 257 Q. Later on, we're going to look at a slide that 11:41
6 illustrates how thinking has developed over time in
7 relation to independence and so --
8 A. Yes.

9 258 Q. -- we won't jump ahead.
10 A. Yes. 11:41

11 259 Q. In relation to suggesting new lines of inquiry, should
12 the forensic scientist, where the relationship
13 investigation is working well, be proactive and suggest
14 ideas to the senior investigating officer or should
15 they be merely reactive and just do what they are asked 11:41
16 to do?
17 A. No, they absolutely should be offering suggestions of
18 tests and techniques that could be applied, and they
19 should be mentioning anything new that's on the horizon
20 but has passed all the validation tests and everything 11:41
21 that might be appropriate. So they should be taking an
22 active role in that, not just a passive role.

23 260 Q. And if you have a situation in which an exhibit has
24 been tested using one technique and has shown no
25 result, but there is another technique that might be 11:42
26 used to investigate the issue, would you expect the
27 forensic scientist to suggest that to the SIO or simply
28 to crack on and do it?
29 A. No, I don't think the forensic scientist, more

1 particularly these days, but I don't think they'd crack
2 on and do anything because budgets are so tight that
3 you have to be very sure that the police are happy with
4 what you're suggesting, and they usually are, so that
5 they will be prepared to pay for the effort when it's 11:42
6 put in.

7 261 Q. And the situation that you are describing of
8 collaboration, of suggesting ideas to the
9 investigators, but, ultimately, if they don't want to
10 do a particular thing, for whatever reason not doing 11:42
11 it, are you describing a situation in 2026, in 1997/98
12 or at both times?

13 A. I think at both times really because the laboratory
14 would be completely overwhelmed with work, and in fact
15 that's what happened through the late 1970s, early 11:43
16 1980s, the laboratories got totally overwhelmed and so
17 there had to be some sort of, it was called "cell
18 activity" but there had to be better selection of items
19 that were going to be examined. So for one reason or
20 another, more recently it has been budget driven but 11:43
21 certainly in the 1990s I think there would be a good
22 awareness that you shouldn't be doing things that you
23 don't have to do.

24 262 Q. So I invite you to pause before moving on to, "at
25 court" would you now turn to deal with that please? 11:43

26 A. At court, obviously, the forensic scientist can be
27 important in summarising and presenting the evidence
28 that they have found as a result of all their
29 examinations and analyses. And then, again, in

1 providing impartial testimony about this for the court
2 to hear.

3 263 Q. Now, that leads to a question that one of the Core
4 Participants has posed which I'll seek your help with.
5 Let's imagine a situation in which the forensic 11:44
6 scientist has given evidence as part of a prosecution
7 case and the prosecution has not resulted in that
8 individual being convicted, they have been found not
9 guilty, would you expect the forensic scientist to
10 proactively carry on with their scientific 11:44
11 investigations or wait to be tasked with that some
12 work? Does that make sense as a question?

13 A. Yes, but certainly we wouldn't proactively carry on
14 with investigations if we haven't discussed and agreed
15 it with the police. 11:44

16 264 Q. And is that the position back in '97 and '98 just as
17 much as now?

18 A. Absolutely. They're not our exhibits, it's not our
19 money.

20 265 Q. As we all know, science doesn't stand still and does 11:45
21 that apply to forensic science as much to any other
22 form of science?

23 A. Yes, absolutely.

24 266 Q. I'm going to ask you to help us with change in forensic
25 science since the late 1990s, and, obviously we can 11:45
26 only deal with this at a very high level.

27

28 So, science and crime that it is seeking to address are
29 constantly evolving?

1 A. Yes.

2 267 Q. And the science rate of change reflects funding,
3 technological advances and police needs?

4 A. Yes.

5 268 Q. Then you've listed the most change in four main areas 11:45
6 and does that mean the four areas in which there has
7 been most change in forensic science?

8 A. Yes.

9 269 Q. And we'll list them, first of all, and then look at a
10 little of the detail. The first is digital forensics 11:46
11 and is in a different colour from the others; is there
12 a reason for that different colour being selected?

13 A. Yes, that's simply because it's an expertise outside of
14 that of anybody in the team that I have been leading.
15 And so, it's not appropriate for us to talk in any 11:46
16 detail about it, I just mention it in passing because
17 it is so important.

18 270 Q. That's very responsible, as you say, an area which the
19 world looks very different now as compared with 1997/98
20 is digital forensics? 11:46

21 A. Yes.

22 271 Q. So the devices that each of us have now and what can be
23 deduced from them?

24 A. Yes.

25 272 Q. Secondly, DNA big changes? 11:46

26 A. Yes.

27 273 Q. Thirdly, chemical analysis --

28 A. Yes.

29 274 Q. -- significant changes. And, equally, for the

1 evaluation and presentation of forensic evidence?

2 A. Yes, that's right.

3 275 Q. Let's just look at each of those in just a little more
4 detail starting at page 10 and bearing in mind your
5 caveat. Starting with changes in digital forensics. I 11:47
6 should say within your first report we are at pages 17
7 to 19. Would you talk us through that slide, please?

8 A. Yes, I mean digital forensics has become a real thing
9 obviously in the 10 or 20 years, with lifestyles
10 absolutely dependent on these digital devices. And 11:47
11 these devices can say a lot about, or store a lot of
12 information about what the person who owns the digital
13 device has been doing, and that's combined with other
14 sorts of digital devices. Notably, CCTV has become
15 increasingly important to police and police 11:47
16 investigations. And they themselves have special tools
17 to analyse it and they also make use of it themselves
18 in their investigations.

19 276 Q. Yes.

20 A. So it's been not just something that they're trying to 11:48
21 keep up with, but something that they're actively using
22 themselves.

23 277 Q. We read about the use of mobile vans in London that are
24 utilising facial recognition technology?

25 A. Yes, absolutely. And I understand that there's a 11:48
26 separate expert for the OBI who is dealing with some of
27 that.

28 278 Q. Yes, quite so. Now, next slide, "Changes in DNA
29 Profiling"?

1 A. Yes, we now need much less DNA in order to be able to
2 get a DNA profile. The DNA doesn't need to be visible
3 in order to get a full profile, which, obviously,
4 produces some challenges itself. The profiles we get
5 are much more discriminating because they've got much 11:48
6 more information in them and we've gone from a
7 situation where at the time we're talking about, the
8 late '90s a full profile would occur in about one in a
9 few million people, but now we actually stop the
10 statistics back a bit but we say that it's one in one 11:49
11 billion people if you get a full profile --
12 279 Q. Yes.
13 A. -- as a likely frequency of occurrence. The national
14 database is now much larger, it was in its infancy in
15 1997/98, in 0.2 -- in '98 it had 0.2 million people 11:49
16 profiles on it, it's now got six million profiles, so
17 you've got a much better chance of finding a match
18 these days than you had in those days.
19
20 Degraded DNA, which was always something which was 11:49
21 difficult to cope with in the late '90s, is now much
22 more possible and it's integrated in our standard DNA
23 profiling techniques.
24
25 We can now look at male-only DNA which is very useful, 11:49
26 particularly where you've got a mixture of male and
27 female DNA, that you can pull out, you know, don't
28 swamp it with so much DNA you can pull out just the
29 male-only bit. And the processes are now automated and

1 it means they're much faster than they used to be and
2 they're much less costly for the police.

3 280 Q. So there have been strides forward between '97, '98 and
4 2026?

5 A. Yes. 11:50

6 281 Q. But we mustn't get the impression that in 1997/98 the
7 technique of DNA profiling was completely new?

8 A. Yes, no, it started in the late '80s and then
9 developed, and it had gone through several iterations
10 and several different technologies to 1998. So it was 11:50
11 already quite powerful but nothing like it is today.

12 282 Q. By 1998 there was about 10 years of experience of DNA
13 profiling --

14 A. Yes.

15 283 Q. -- as a law enforcement technique? 11:50

16 A. Yes, that's correct.

17 284 Q. Next page, page 12, "Changes in Chemical Analysis"?

18 A. This is quite similar to DNA, we can analyse much
19 smaller amounts, we can pick up minor components which
20 means that we can be much more confident about 11:51
21 discriminating between potential sources, or if these
22 minor components are the same, between two things we're
23 trying to compare we can say it provides much stronger
24 evidence of a connection than we used to be able to
25 say. And we also, our instruments these days have 11:51
26 libraries of compounds built into them so we don't
27 have, once you we get a print-out - you can see the
28 sort of print-out you get on the right-hand side there
29 in that image - once we get a print-out we don't have

1 to search through loads of other similar profiles until
2 we get one that actually matches. But the machine does
3 it for us and so it basically tells us what the thing
4 is.

5
6 And, again, like DNA, we have much more automation so
7 the processes are faster and they're more cost
8 effective than they were.

11:51

9 285 Q. So, next page 13, "Changes in Evaluation of Forensic
10 Evidence," and this is what I referred to earlier when
11 I suggested that there has been an increasing awareness
12 of the need to bring truly independent thinking to an
13 investigation on the part of a forensic scientist?

11:52

14 A. Yes.

15 286 Q. And a recognition of the need be aware of and avoid
16 confirmation bias?

11:52

17 A. Yes, yes.

18 287 Q. So this looks a little complicated but I know that
19 you're going to explain it?

20 A. Yes. Essentially, forensic scientists, when I started
21 my career, they considered the extent to which their
22 results supported police suspicions. So the police
23 would tell them who they thought was guilty and then
24 say, 'You just need to look for a bit of evidence of
25 that.' And so that's how the scientists operated. And
26 they were very aware, over the years, that this was not
27 really right. And, eventually, the Forensic Science
28 Service produced this statistical model which is really
29 helpful in getting or enabling the scientists to think

11:52

11:52

1 about both sides of a case. Now, what the prosecution
2 might say and what the defence might say and looking
3 for tests which it were able to distinguish between the
4 two which was -- if you have got results which
5 proposition they were more likely to support. 11:53

6 288 Q. Yes.

7 A. So it's basically just a way of doing that. So they
8 help with what tests you're going to apply because
9 they're the ones that can help distinguish between
10 these respective prosecution and defence positions and 11:53
11 then what the results of the tests mean, which of the
12 two propositions they support, they best support.

13 289 Q. And what we have on the screen is the case assessment
14 and interpretation, the CAI model?

15 A. Yes. 11:54

16 290 Q. And when was this model created about?

17 A. It was created -- it took a long time and there were
18 lots of scientific papers and discussion about it, but
19 it was basically -- it probably started in the late
20 1980s but certainly through the '90s into the 2000s you 11:54
21 got this debate about this and how we could apply it to
22 our forensic environment.

23 291 Q. So this is the model that you'd expect to be applied
24 now?

25 A. Yes, it should be applied in forensic science 11:54
26 laboratories.

27 292 Q. But, to get here, forensic science has been on a
28 journey?

29 A. Yes.

1 293 Q. And we can work out, because you have told us that you
2 have been a forensic scientist for 50 years?
3 A. Yes.
4 294 Q. That you started your career in the 1970s?
5 A. Yep. 11:54
6 295 Q. And explain to us what the position was in the 1970s,
7 sorry, go ahead.
8 A. It was very much the police would write on the
9 submission form, they would say, 'well, you know, this
10 is the suspect, we think he's done it, can you look for 11:55
11 anything which might support our view?'
12 296 Q. And over the view since then, we've now reached a
13 better position with the CAI model?
14 A. Yes.
15 297 Q. And in the late 1990s, '97/'98, tell me if I've 11:55
16 understood correctly, we certainly hadn't reached the
17 position we've reached now but we were on an arc that
18 has got us to this position?
19 A. Yes, that's correct.
20 298 Q. Now, next, and we picked up some of this already, we 11:55
21 are going to move to page 14 of the slideshow, we're
22 there already, and the scientific tests and techniques
23 that were available in 1997/1998, because obviously the
24 assessment of what was done in relation to
25 investigations in '97/'98, needs to be done on a fair 11:56
26 basis which involves an understanding of what tests and
27 techniques were available back then?
28 A. Yes, absolutely.
29 299 Q. And we're now at page 22 of your report, so please talk

1 us through this slide?

2 A. Well, as I said earlier, any kind of physical trace can
3 potentially be relevant in complex investigations and
4 that means we need a wide range of different tests and
5 techniques to analyse and compare these traces. And 11:56
6 most commonly, they involve the seven subject areas
7 that we're talking about here that we have experts for.
8 And our focus, obviously, has been on the tests and
9 techniques in the UK in the late 1990s. But it's
10 important to remember that not only should we be 11:56
11 concerned about the tests and techniques themselves but
12 also finding traces to tests. This is incredibly
13 important and in some of these reinvestigations that
14 I've been involved with, it's actually not so much
15 anything new about the tests and techniques used but 11:57
16 actually it was finding the traces. So we mustn't
17 forget that. And highlighting risks, contamination
18 risks especially with smaller traces and especially if
19 you're continuing to apply scientific tests when
20 they've already been tested, the trace has already been 11:57
21 tested once.

22 300 Q. On the right-hand side of the slide we can see various
23 photographs and are those illustrating the kind of
24 apparatus that was available in the late 1990s, and
25 also the kind of traces that might be expected to be 11:57
26 analysed if available?

27 A. Yes. Obviously, microscopy was really important, it's
28 still extremely important in forensic science. And
29 there's one of the large machines, I think it's a

1 chromatography machine below it. But I was trying to
2 find some examples of things to show the wide range of
3 different traces. So we've got a footwear mark and
4 then there's a feather and there's some pollen grains
5 and some soil I think, and some seashells and the 11:58
6 stripy bit at the bottom are two plastic bags, the
7 stress marks on two plastic bags, which show up under
8 polarised light, so you can compare those. There's the
9 two bags there end on end, just to show you the sorts
10 of things that we're looking at. But the range is so 11:58
11 wide it's difficult to encompass it in just a few
12 images.

13 301 Q. This is part of the skill of the forensic scientist to
14 see a trace and to have the imagination to realise that
15 it may be relevant? 11:58

16 A. Yes, absolutely.

17 302 Q. So, something mundane, soil at the bottom of someone's
18 shoe --

19 A. Yes.

20 303 Q. -- might be highly relevant because it may be able to 11:59
21 show, because of the type of soil, that they were in a
22 particular location which was the site of a deposition
23 of a body?

24 A. Yes.

25 304 Q. That is something which has been experienced within 11:59
26 forensic science often?

27 A. Yes, absolutely.

28 305 Q. We're going to go next to slide 15 which is headed "The
29 Structure of Technical Sections" in Report 1; would you

1 explain this to us, please.

2 A. Yes. This was just to introduce the structure of the
3 reports, especially when it came to the technical
4 sections and the sorts of things that we were asked to
5 consider. And, first of all, there's a brief 11:59
6 introduction saying, you know, the background to the
7 expert, there's more details later on in the annex
8 where their full CV is included. Then the tests and
9 techniques available for police investigations in
10 1997/98. How widely these were used and any 11:59
11 limitations on their use. How they were used
12 practically, so that's how the scientists applied them
13 to the actual material. What sort of material they
14 applied them to and how much was required. And then
15 perceptions of the test's reliability both then and 12:00
16 looking back from our position now.
17

18 And then at the end of the section they provide a brief
19 summary of their main points.

20 306 Q. So, what you're going to help us with next, Professor, 12:00
21 is, as I indicated earlier a brief introduction to each
22 of the other members of your team, tests and techniques
23 that were available and what the high level of
24 conclusions were?

25 A. Yes. 12:00

26 307 Q. So let's go first of all to the expert in explosive
27 substances, page 16 please. And so, the expert within
28 the team that has addressed this issue is Keith Norman?

29 A. Yes, that's right.

1 308 Q. You describe him or he is described as an acknowledged
2 expert in forensic chemical analysis, especially drugs
3 and toxicology, explosive substances, manufacture and
4 usage, and post blast scene examination. He's based in
5 Australia but worked in the UK for an extended period 12:01
6 and also in fragile and conflict affected regions on
7 behalf of the UN?

8 A. Yes.

9 309 Q. There's then a heading "Tests and Techniques" what is
10 this part of the slide telling us? 12:01

11 A. This is just talking about the kind of tests and
12 techniques that you would expect to be used in
13 explosive substance analysis.

14 310 Q. And expect to be used now or in '97?

15 A. Then. 12:01

16 311 Q. Used then. So these are the techniques that were
17 available then. Different types of explosives used for
18 detonator booster and main charge?

19 A. Yes.

20 312 Q. Indicated by simple preliminary tests, for example, 12:02
21 chemical and burn tests?

22 A. Yes, that's right.

23 313 Q. And then followed by more sophisticated chemical
24 analysis. And what is being described in that
25 sentence? 12:02

26 A. Just the main types of technique, for example,
27 spectroscopy, that's where you're measuring the
28 absorbance, reflectance, and transmittance of infrared,
29 light of infrared lengths, to produce a line graph and

1 you can compare one graph with another from one sample
2 with that from another. So that's one thing you can
3 do. You can use chromatography, which is -- there's
4 lots of forms of chromatography but it's about
5 separating out the components in a mixture, the two 12:03
6 most common are liquid chromatography and gas
7 chromatography, and this involves simply the most --
8 one of the most common forms is having a long tube,
9 often rolled up into a coil, and inserting your sample
10 at one end and pushing it through the tube. It's lined 12:03
11 with a sort of powder, a special kind of chemical
12 powder, and you push your sample in from one end and
13 get it out the other. And you do it with liquid or you
14 do it with gas, so they are the two main carriers for
15 it, and when it comes out the other end you can see the 12:03
16 components coming off and you can identify them with
17 some detector on the end. So that's a very common form
18 of chromatography and it's useful in analysing
19 explosives.

20 314 Q. Now back in '97/'98, were these tests and techniques 12:03
21 regarded as being ones that generated reliable results?
22 A. Yes.

23 315 Q. In the period since 1997/1998, has any thinking or any
24 experience within the scientific community generated
25 any concern as to the reliability of these techniques? 12:04
26 A. No.

27 316 Q. Page 17 next please. And you have summarised the
28 conclusions of the expert in explosive substances;
29 would you tell us what those are please?

1 A. Yes, that the analytical methods used for FSANI for
2 explosive substances were fit for purpose. The
3 analytical protocol focused on a very small number of
4 explosive compounds but that was because these were the
5 ones they were coming across in previous incidents. 12:04
6 The main limitation that Keith Norman noticed was that
7 there was no routine screening for other compounds but
8 on the other hand, then it's not always helpful and
9 particularly for example, with IEDs where ammonium
10 nitrate is supposed to have been used because of the 12:05
11 large number of sources, this is stuff that components
12 are available very widely. So there are a large number
13 of sources from it. And, also, you can get differences
14 between samples with just the mixing and the processing
15 and the transporting. And even the explosion can 12:05
16 change the chemical composition of traces that you find
17 afterwards. And so it's not really particularly
18 helpful to look for these other compounds in certain
19 circumstances. That's why we've said here "although
20 not always." 12:05
21
22 The Forensic Explosives Laboratory is the place to go
23 if you want a definitive list of tests and techniques,
24 and I understand you've involved them.
25 317 Q. We are in touch with them. What you have just 12:06
26 summarised in a couple of minutes is the part of the
27 report between pages 24 and 37?
28 A. Yeah.
29 318 Q. So, next, "Explosive Devices," please. And the

1 relevant expert is Chris Hester, described as a
2 national security and threat specialist with extensive
3 operational experience of high profile investigations
4 into critical security incidents across Great Britain.
5 Specialist in assessing and investigating improvised 12:06
6 explosive devices, IEDs and active terrorist networks
7 within a high level counterthreat unit. He served as a
8 national bomb scene investigator and was the post blast
9 investigator for the 2017 Manchester Arena attack.

10
11 And, again, the techniques that are listed there, are
12 they the techniques available in '97 and '98?

13 A. Yes.

14 319 Q. Managing the bomb scene, searching for IED components
15 and any enhancements at the scene, in debris recovered 12:07
16 from the scene, and making comparisons with devices
17 from previous incidents?

18 A. Yes, that's correct.

19 320 Q. So, looking at the devices, seeing how they are made up
20 and then seeking to make an assessment of whether they 12:07
21 are similar to or even very similar to devices used in
22 earlier attacks?

23 A. That's right, and trying to fit the components that you
24 might be picking up, trying to fit them back together
25 to see what the device actually looked like before it 12:07
26 was exploded.

27 321 Q. And is that because, if you do find devices of a
28 similar construction involved in different attacks,
29 that might provide some support for the proposition

1 that the same individual or organisation have been
2 involved in those different attacks?

3 A. Yes, that's correct.

4 322 Q. And were those techniques regarded as producing
5 reliable results in 1997 and 1998? 12:08

6 A. Yes.

7 323 Q. He has anything occurred in the period since then to
8 cause the scientific community to doubt the reliability
9 of those tests?

10 A. No. 12:08

11 324 Q. At page 19 you provide a summary in relation to the
12 topic of explosive devices and would you take us
13 through that, please?

14 A. Yes. Chris Hester describes in detail the difference
15 between conventional military devices and those 12:08
16 improvised by terrorists which is a good background to
17 understand it.

18

19 He describes the substantial additional challenges
20 presented by bomb scenes to investigators and forensic 12:08
21 scientists. Including, for example, the enormous
22 amounts of debris that are recovered from bomb scenes
23 and needs to be searched diligently to find these tiny
24 parts of devices.

25 12:09

26 The five essential components of an explosive device,
27 he describes that and how two bombs built by two
28 different people - which is the point you were just
29 making --

1 325 Q. Yes, indeed.
2 A. -- can help to distinguish, you know, whether or not
3 they were likely to have been made by the same person
4 or organisation as another. And this is the so-called
5 bomb maker's signature, that's what it's known as. 12:09
6 326 Q. Thank you very much. I'm just going to ask you to bear
7 with me for one moment whilst I check something.
8 [Short pause].
9
10 We have a stenographer and the burden on her is 12:10
11 substantial and I was just checking that she was fine
12 to continue, and she's very helpfully said she will do
13 her best to continue until you're finished, so I'm very
14 grateful for that.
15 12:10
16 So we're next going to deal with fingerprints, so
17 page 20 - and we are well on track to finish you before
18 1:30. So the relevant expert is Kevin Kershaw, he was
19 formally the head of forensic identification services
20 for Greater Manchester Police, and also worked 12:10
21 extensively with the Metropolitan Police on terrorist
22 incident investigations. He created the first National
23 Fingerprint Training Programme, the blueprint for other
24 forensic training and was seconded to the Home Office
25 to consider ways of improving police technical services 12:10
26 nationally.
27
28 And in common with the other areas of expertise, you
29 have listed the tests and techniques that were

1 available in 1997 and 1998?

2 A. Yes.

3 327 Q. There were a wide range of techniques for visualising
4 and enhancing fingerprints including oblique light,
5 light sources, photography, powders, and a range of
6 chemicals.

12:11

7 A. Yes, that's right.

8 328 Q. Fingerprint assessment and comparison processes
9 involved an assessment for sufficient detail?

10 A. Yes, that's right.

12:11

11 329 Q. So were there enough ridge characteristics?

12 A. Yes.

13 330 Q. To use probably some old-fashioned language.

14 Comparison with another specific fingerprint.

15 searching fingerprint databases, local and national

12:11

16 collections; terrorist-related fingerprints and active
17 files; and fingerprint identification and verification?

18 A. Yes, that's correct.

19 331 Q. Same question: Back in 1997/1998, were those tests and
20 techniques regarded as producing reliable results?

12:12

21 A. Yes, there was a growing concern about cognitive bias,
22 because so much of it is subjective, so much of the
23 analysis and comparison process and whether or not
24 preconceptions about what any matches you might find,
25 how much that affected results and how they were
26 reported. So there was growing concern about that and
27 there were certainly some changes made, and
28 Kevin Kershaw talks about all of that to try and limit
29 that.

12:12

1 332 Q. So there was concern around confirmation bias?
2 A. I think particularly in the light of the McKie case in
3 Scotland. It had always been rumbling that there might
4 be an element of cognitive bias in it. But anyway, a
5 lot of work was put into it and Kevin can explain about 12:13
6 that if you're interested in detail.
7 333 Q. Yes.
8 A. But, anyway, it certainly changed the way some of those
9 features there were conducted.
10 334 Q. Was the McKie case the case of the young female police 12:13
11 officer in Scotland?
12 A. Yes, that's right.
13 335 Q. In the period since '97/'98 have those concerns about
14 confirmation bias disappeared or is there still a
15 concern that back in 1997/1998 there was a risk of 12:13
16 confirmation bias operating in relation to fingerprint
17 identification?
18 A. I wouldn't say that it's disappeared completely, I
19 think wherever you've got subjective judgments being
20 made you will get some nervousness about it, you're 12:13
21 sort of almost bound to. But in fingerprints it was a
22 larger concern than in some other areas, and that
23 certainly helped a lot, the sort of measures they've
24 put in place since then.
25 336 Q. When you look back, in '97/'98 was there an awareness 12:14
26 of that risk of confirmation bias?
27 A. Yes, I think -- I can't remember exactly, it would
28 certainly be the late 1990s but into the 2000s, there
29 were lots of papers written by, particularly Itiel Dror

who was an expert in it, an academic expert, and he did lots of tests and showed, you know, it included DNA as well as fingerprints. So, you know, it was definitely something that people were becoming aware of.

337 Q. This is something that we'll explore more with
Mr. Kershaw later in Chapter 3, but the answer in terms
of reliability to some extent different to the answer
you've given earlier in relation to the other areas of
expertise?

A. Yes, in relation to that anyway.

338 Q. At page 21 of the slides you summarise the conclusions
of Mr. Kershaw the fingerprint expert and would you
talk us through those, please?

A. Yes. He talks of a wide range of physical and chemical techniques that were in use and the databases that were available to help identify prints.

He says that the RUC was apparently not taking these more detailed tact prints from terrorist suspects, that's more parts of the hand are captured. Because, of course, with fingerprints you never know precisely which part is going to come into contact with something and if someone is being incredibly careful not to leave their fingerprints it might be just the edge of a finger or the bottom of the palm, or whatever it might be, so it is important to have a full set of fingerprints. And so he was wondering about that, and thinks that maybe there was an opportunity to make identifications that could conceivably have been missed

1 because of that. And he also mentions the fact that
2 there appears to have been no interaction between the
3 RUC and the Met Police in relation to fingerprints in
4 terrorists cases and particularly the active files that
5 they would keep on terrorists and groups of terrorists. 12:16
6 I think the RUC certainly had their own active files,
7 but it was the extent to which they were working with
8 the Metropolitan Police that he was interested in.

9 339 Q. Thank you very much. Just to bring us up to date, the
10 part of the report that addresses explosive devices is 12:16
11 page 38 to 48. And part of the report that addresses
12 fingerprints is page 49 to 63. And we're going to turn
13 next to DNA which is the part of the report from page
14 64 to 75. DNA page 22, thank you very much.

15
16 So, Philip Avenell is the expert who will help with DNA
17 profiling and has helped with it. He is described as h
18 highly experienced forensic biologist who has
19 successfully led large, convoluted forensic
20 investigations involving complex DNA analysis and 12:17
21 interpretation and combining this with other types of
22 forensic evidence. He has also held senior laboratory
23 roles in managing forensic science casework, quality
24 management and research and development?

25 A. Yes. 12:17

26 340 Q. And I've used the term "DNA profiling" a number of
27 times now, it's not just about DNA profiling, is it?

28 A. No.

29 341 Q. It's about a number of aspects of interpreting DNA

1 where it's found, what it's found on, along with
2 profiling so as to link it to an individual?

3 A. Absolutely.

4 342 Q. The tests and techniques in '97/'98 are identified,
5 history of development of DNA profiling. Finding DNA, 12:18
6 chemical tests and microscopy.

7

8 Four-stage analytical process involving extracting the
9 DNA, quantifying how much DNA is captured. Copying the
10 DNA. Polymerase chain reaction (PCR) to provide 12:18
11 sufficient to analyse. Analysing DNA chromatography EP
12 to separate it into its component parts and then
13 interpreting the results, including direct comparisons
14 and local and national database searches?

15 A. Yes. 12:18

16 343 Q. In '97/'98 were those tests and techniques, the DNA
17 testing techniques regarded as producing reliable
18 results?

19 A. Yes, they were.

20 344 Q. You've told us that much progress has been made since 12:18
21 '97/'98, but does the current state of scientific
22 knowledge call into doubt the reliability of the tests
23 in '97 and '98?

24 A. No, and I think it's partly nowadays we're very worried
25 about contamination but it's partly because you needed 12:19
26 much more starting material, a much bigger body fluid
27 stain to be able to get a result in those days, and so
28 it wasn't such an issue has it's become subsequently.

29 345 Q. That is a direct result of the fact you can be testing

1 things which are absolutely tiny --

2 A. Absolutely.

3 346 Q. -- as opposed to needing something much more
4 substantial back in those days?

5 A. That's right, yes. 12:19

6 347 Q. At page 23 you provide us with the DNA summary, would
7 you take us through that?

8 A. DNA profiling techniques of the general type that are
9 still used today were widespread across the UK,
10 including FSANI, and databases were already 12:19
11 established, and they were beginning to prove their
12 worth, but as I said earlier with only 0.2 million
13 people profiles on the databases they were still fairly
14 embryonic. However, clearly visible, this is what I've
15 just been mentioning, clearly visible body fluid 12:20
16 staining was still required to produce a profile. And
17 it wasn't until later on, not long after 1999/early
18 2000s that you get the newer techniques which enable
19 you to get DNA profiles out of a surface which someone
20 has just touched. We didn't have that in 1997/98. 12:20

21 348 Q. Thank you very much. So next we'll deal with textile
22 fibres, which takes us to Slide 24. And that topic is
23 dealt with within the first report between pages 76 and
24 89. The expert who has contributed to the report on
25 this issue is Roger Robson? 12:21

26 A. Yes.

27 349 Q. He's described as a leading UK expert on forensic
28 examination of textile fibres, with an international
29 reputation. Specialised in the most complex criminal

1 cases. Has lectured and written extensively about
2 textile fibres, and been a member of international
3 working groups, professional standards committees, and
4 served for 10 years on the Forensic Science Regulator's
5 Advisory Council? 12:21

6 A. Yes.

7 350 Q. His report deals with the tests and techniques
8 available in 1997/1998. Namely recovering fibres from
9 items picking off or tape lifting. Deciding which
10 types to look for, reference fibres, amongst them. 12:21
11 Initial comparisons between recovered and reference
12 fibres, microscopy. More detailed comparison,
13 microscopy several types, with microspectrophotometry
14 (MSP) and chromatography, TLC, HPLC for colour and
15 microspectroscopy FTIR for fibre type. Interpretation 12:22
16 and reporting databases, manufacturer and distribution
17 data, all of which you will tell us about in due
18 course.

19 A. Yes.

20 351 Q. Back in '97/'98 were the tests and techniques that he 12:22
21 described in his report regarded as producing reliable
22 results?

23 A. Yes.

24 352 Q. And in the period of decades since then, has the
25 scientific community reached any different conclusion 12:22
26 about the reliability of the results produced by such
27 tests?

28 A. No.

29 353 Q. At page 25, you address Mr. Robson's conclusions, would

1 you take us through those, please?

2 A. Yes. He says that forensic textile fibre examinations
3 then were conducted very much as they are today, except
4 that evaluating the evidence they provide has developed
5 considerably. 12:23

6

7 Sensitivity and discrimination of analytical tests like
8 other forms of chemical traces, as I said earlier, is
9 now much more advanced. But it was pretty good in
10 those days anyway. 12:23

11 354 Q. Yes.

12 A. And then it was able to, you know -- we were able to
13 find tiny fibres and be able to compare, with good
14 confidence, in any matches found. So it has -- things
15 have improved but actually in those days they were 12:23
16 pretty good. And FSANI appeared to have equivalent
17 capabilities to the FSS and, interestingly, they both
18 embraced this linking fibres approach which was a sort
19 of fairly new idea then of comparing fibres from two
20 different places, even though you hadn't got an idea of 12:24
21 what the source might be.

22 355 Q. Yes.

23 A. But just the fact you've got two sets of matching
24 fibres was valuable in itself and there was some
25 forensic science institutes at that time that weren't 12:24
26 at all sure about this but now everybody accepts that
27 it's valuable and it's used widely across Europe now.

28 356 Q. Just to take an example; if one discovered a textile
29 fibre within the components of a bomb at one scene and

1 the same type of fibre, on analysis, was discovered in
2 a bomb at a different scene --

3 A. Yes.

4 357 Q. -- well, that might produce some support for the
5 proposition that the same individual or organisation 12:25
6 was responsible for the devices?

7 A. Yes. There are other things you would obviously want
8 to look at but yes, absolutely.

9 358 Q. Yes. It might not be determinative on its own but it
10 would be consistent with that proposition? 12:25

11 A. Yes, that's right.

12 359 Q. Next, marks and traces within. So the report this is
13 pages 90 to 110. And Sarah Jacob is the expert who has
14 contributed to this report who is, you tell us, widely
15 recognised as a highly skilled forensic chemist, 12:25
16 specialising in marks and chemical traces, including in
17 the most serious and complex of cases. She has
18 delivered training courses for the police, both in the
19 United Kingdom and overseas, delivered guest lectures
20 at several UK Universities. And recently she has 12:25
21 contributed the trace evidence chapter for the latest
22 edition of the Royal Society of Chemistry textbook
23 Crime Scene to Court - Essentials of Forensic Science.
24

25 The tests and techniques that she has identified in her 12:26
26 report, again, are they ones that were available in
27 1997 and 1998?

28 A. Yes, that's correct.

29 360 Q. So marks for example, instrument, footwear, tyres,

1 manufacturing and physical fits, visualisation and
2 enhancement, and recovery, electrostatic adhesive
3 lifting, photography, casting, examination and
4 comparison, measurement test marks, microscopy, the
5 recovery of associated traces, the identification and 12:26
6 evaluation use of databases, manufacturer, distributor
7 data.

8
9 Then the type of traces listed, glass, paint, glue,
10 makeup, waxes and polishes. 12:26

11
12 She describes the recovery, those in different ways.
13 Their examination and comparison in different ways,
14 including gas chromatography, mass spectrometry and the
15 identification and evaluation utilising databases and 12:27
16 manufacturer data?

17 A. Yes.

18 361 Q. The tests and techniques described in the report, were
19 they regarded by the scientific community, by your
20 community, as generating reliable results back in 12:27
21 1997/1998?

22 A. Yes.

23 362 Q. And over the period since then, up until 2026, has the
24 scientific community developed any material concerns
25 about the reliability of the results produced by such 12:27
26 techniques?

27 A. No, I think the only thing that you might say - and I'm
28 not quite sure whether it comes in the conclusion - is
29 that nowadays with more detailed, more discriminating

1 tests you might be able to distinguish between two
2 samples that you couldn't in those days, but on the
3 other hand the strength of evidence you'd give to it
4 would be much stronger than what it was in those days,
5 so it would have a lower strength of evidence then. 12:28
6 But that's about the only thing, but it's not that the
7 techniques aren't reliable.

8 363 Q. Thank you. At page 27 the conclusions are summarised,
9 it's on the screen; would you take us through those,
10 please? 12:28

11 A. So there's an enormous range of things that marks and
12 trace specialists look at. You know, we've just given
13 a flavour of that in this presentation, you've got a
14 flavour of it. As Sarah says, the main laboratories
15 appear to have approached the work in a similar way 12:28
16 with only minor differences in protocols, which you
17 probably would expect anyway.

18
19 Fundamentally, the examination techniques remain very
20 similar since then but the increased sensitivity of 12:29
21 analytical tests may mean that smaller traces are
22 detected these days and give you this increased
23 strength of evidence I've just mentioned of links
24 between items from different places.

25 364 Q. Thank you very much. Then, finally, I think in terms 12:29
26 of this exercise we're doing, of looking at what the
27 experts within your term concluded, we have "Questioned
28 Documents," which within the report runs from page 112
29 to page 128. Was Melanie Pugh the expert within your

1 team on questioned documents?

2 A. Yes.

3 365 Q. Does she specialise in the examination of handwriting,
4 signatures and disputed documents?

5 A. Yes. 12:29

6 366 Q. Carrying out work for, effectively, the prosecution,
7 for the defence, and for Government departments?

8 A. Yes.

9 367 Q. Appearing in criminal and civil courts both in the
10 United Kingdom and overseas? 12:30

11 A. Yes.

12 368 Q. And is she also an international quality standards
13 assessor representing QD - presumably questioned
14 documents - on the Forensic Regulator's Interpretation
15 Group? 12:30

16 A. Yes, that's correct.

17 369 Q. And has she, too, listed techniques and test that is
18 were available in 1997 and 1998?

19 A. Yes, she has.

20 370 Q. So handwriting and signatures, paper and inks being 12:30
21 examined, analysed and compared, utilising a different
22 number of techniques?

23 A. Yes.

24 371 Q. The work also including comparisons between something
25 we don't see very often these days, typewriters? 12:30

26 A. Yes.

27 372 Q. Looking at photocopiers and printers to see if there
28 are identification marks or codes?

29 A. Yes.

1 373 Q. Looking at traditional forms of printing?
2 A. Yes.

3 374 Q. And things such as stencilling and stamp marks?
4 A. Yes, that's right.

5 375 Q. In 1997, were the tests and techniques described by 12:31
6 Melanie Pugh thought able to produce reliable results?
7 A. Yes.

8 376 Q. Has any thinking occurred which has resulted in that
9 changing since then?
10 A. No. 12:31

11 377 Q. Page 29, you summarise her conclusions and would you
12 take us through those, please?
13 A. Yes, she talks about a very wide range of questioned
14 documents, tests and techniques and being available
15 from forensic laboratories across the UK. And then 12:31
16 you've gone through the various different types of
17 things. FSANI apparently provided a broadly comparable
18 range of services as other UK laboratories, although
19 she wasn't so clear in relation to the use of databases
20 and other shared resources. 12:32
21

22 Forensic science laboratories were not as accredited as
23 they are today but there's some evidence that quality
24 management systems were in place. But I think the key
25 thing here is that collaborative interlaboratory 12:32
26 exercises, which I think we'll come on to in a minute,
27 would show up differences in performance between them,
28 as would investigations on behalf of the defence of
29 evidence that the prosecution was intending to present

1 to court. And so there was nothing like that to
2 suggest that FSANI was any different.

3 378 Q. Thank you for taking us through those various experts
4 and their conclusions.

5
6 I'm going to move on in a moment to look at a number of
7 forensic science laboratories that existed in 1997 and
8 1998 but I'm just going to ask you to help us with a
9 small number of questions relating to testing first of
10 all.

11
12 where you have an exhibit, Professor, that you might
13 apply a series of different tests to, so say that you
14 think that it might yield explosives evidence or
15 fingerprints, or fibres, might it be the case that
16 carrying out one of those tests would prejudice the
17 ability to carry out another test?

18 A. Yes, it's conceivable.

19 379 Q. So where a number of different types of tests might be
20 carried out, how is a decision made as to which of them
21 ought to be performed?

22 A. Well, there'll be a lead scientist in the case who's
23 responsible for the overall conduct of the testing
24 within the laboratory, and he and the other scientists,
25 the specialist scientist in their own disciplines will
26 make sure they talk to one another about what's going
27 to happen first with a particular item. And so it's
28 very common for them to get together and talk about who
29 should do what first, what's the best route to take

1 because sometimes, you know, using up sample is
2 always -- well, it's not always but it's usually an
3 outcome and so you have to be really careful about
4 that. But they are very well versed in that, deciding
5 exactly what to do first.

12:34

6 380 Q. Next, sometimes it would be the case that one exhibit
7 yields a number of different results, so let me give
8 you an example. It might contain blood, it might
9 contain a hair, it might contain some evidence of
10 gunshot residue, I hope I'm making sense so far, that
11 exists as a possibility?

12:35

12 A. Yes.

13 381 Q. Obviously sometimes you might get nothing but sometimes
14 you might get a number of things?

15 A. Yes.

12:35

16 382 Q. Where you have a number of traces or a number of
17 results on a single exhibit, is it always possible to
18 tell whether they have been deposited at the same time?

19 A. It's not always possible but it's certainly something
20 that the scientist will be alert to and be looking out
21 for. I mean, a really good example of this is in the
22 case of Damilola Taylor where we found a textile fibre
23 embedded in a bloodstain which had DNA on it that
24 matched Damilola's DNA. This it on the back of the
25 trainer of one of the police suspects. And because the
26 fibre was embedded in the blood we knew that it had to
27 be deposited at the time when the blood was still wet
28 and so we knew you could associate those two types of
29 evidence.

12:35

12:35

1 383 Q. Or a fingerprint in blood?
2 A. Yes, absolutely.
3 384 Q. Next, just before we move on to the laboratories, there
4 do exists experts in forensic speaker comparison and
5 voice identification such as Prof. Peter French at the 12:36
6 University of York?
7 A. Yes.
8 385 Q. It may be that you can only answer this on the basis of
9 anecdotal knowledge. But in 1997/1998, within forensic
10 science, was the awareness of forensic speaker 12:36
11 comparison and voice identification something that was
12 known of?
13 A. Yes.
14 386 Q. Can we turn now turn then, please, to Slide 30 and page
15 128 of the report. UK forensic science laboratories in 12:37
16 1997 and 1998; so would you talk us through that,
17 please, in relation to the various locations?
18 A. Yes. In 1998 there were six Forensic Science Service
19 laboratories, the one at Aldermaston had just closed
20 but the Forensic Science Service had just gained the 12:37
21 one in London, which was historically the Metropolitan
22 Police Laboratory. So these were the six FSS
23 laboratories. There was some specialist laboratories
24 and I've just given some examples here. There was the
25 Forensic Explosives Laboratory, the FEL, which we've 12:37
26 talked about at Sevenoaks. There was the Transport
27 Research Laboratory, at Wokingham, that looked into
28 traffic accidents sort of thing. There was Mass Spec
29 Analytical in Bristol, based in the university there,

1 who looked at things like drugs on bank notes, that's
2 what they were particularly known for. So there was
3 sort of laboratories doing specific kinds of forensic
4 science. And then there was some private general
5 forensic laboratories, there was LGC, that was the 12:38
6 Laboratory of the Government Chemist, it was newly
7 privatised in 1997/98, I think it was about '95 or '96
8 it was privatised. That was based mainly at
9 Teddington. And there was document evidence based at
10 Birmingham which was basically the document division of 12:38
11 the Forensic Science Service that decamped and set up
12 its company in Birmingham.

13
14 Then there was Forensic Alliance, which was a company
15 that I set up with two other people, and that did a 12:39
16 fairly full range of forensic science -- provided a
17 full range of forensic science services for the police,
18 that was at Oxford.

19
20 And in Scotland there were four police laboratories, 12:39
21 the Strathclyde one at Glasgow; the Lothian and Borders
22 at Edinburgh; the Tayside one in Dundee; and Grampian
23 Police Laboratory at Aberdeen; and in Northern Ireland
24 that was, obviously, the laboratory in Belfast. So
25 that was the general picture. 12:39

26 387 Q. And at Slide 31 you explain the role of those
27 laboratories and, again, could I invite you please just
28 to talk us through that?

29 A. Yes. This very much reflects the role of forensic

1 scientists in criminal investigations and so the
2 headings are all the same really. But to assist at
3 crime scenes, absolutely, to advise about forensic
4 strategies. Conduct all of the subsequent laboratory
5 examinations and analyses of items and samples from 12:40
6 there and from scenes and elsewhere. Assess and
7 interpret results and write reports or witness
8 statements about them. Provide advice and expert
9 testimony at court. And also, of course, to keep the
10 whole thing moving forwards, it is a science, conduct 12:40
11 research and development. The Forensic Science Service
12 had a research laboratory that did a lot of forensic
13 research. And update police personnel at various
14 levels and ranks on forensic developments so they knew
15 what they might be able to expect and what they could, 12:40
16 perhaps, use in cases as they came up.

17 388 Q. Thank you. An obvious question for the Inquiry to pose
18 is whether the standards and approach within those
19 laboratories and, in particular, perhaps in Northern
20 Ireland, were common or standard or whether there were 12:41
21 differences in standard and approach. You address this
22 at page 32 of the slides. This is an issue that will
23 be looked at in detail when you return, but if you
24 could give us the headlines now please?

25 A. Yes. It seems that the laboratories were running along 12:41
26 standard lines, they contained the same sort of
27 equipment and they had quality management systems. In
28 terms of equipment we know that when both FSANI and the
29 FSS achieved agency status in the 1990s they had quite

1 an amount of new equipment and they were of the same
2 sorts and so it all looks as though they were pretty
3 equivalent there.

4
5 There was some specialist expertise, for example, FSANI 12:42
6 in explosives, they must have been one of the most
7 experienced forensic labs in terms of devices and
8 explosive substances in the world. They were, because
9 they had just so many cases of that type.

10 389 Q. Yes. 12:42

11 A. In Huntingdon, in the FSS Huntingdon lab they
12 specialised in firearms. As I said, the documents
13 people used to be in Birmingham but they got spread out
14 a little bit after they left, that was the mid '90s.
15 And there has been a long history of collaboration 12:42
16 between these laboratories, which is something I
17 remember directly, that these regular directors'
18 meetings that were held. And so that was at director
19 level, they were definitely connected. And there were
20 subject-specific committees for the scientists, they 12:43
21 were called the Interlaboratory Advisory Committees and
22 each main forensic science discipline had its own, it
23 had sometimes more than one of these advisory
24 committees deciding on best practice and interpretation
25 points and so on. 12:43

26
27 There were interlaboratory proficiency testing trials.
28 The Forensic Science Service generated them to begin
29 with, but then I think the laboratories took it in turn

1 and I think about this time they were probably not only
2 Forensic Science Service but other laboratories
3 producing trials, I'm not quite sure about the dates,
4 but it was around then.

5 390 Q. Just pausing there. Would that mean if there were 12:43
6 interlaboratory proficiency testing trials, that if one
7 particular laboratory was performing less well than was
8 to be expected, that would be picked up?

9 A. It would be picked up, yes, absolutely and noticed and
10 they would be helped with that. And then there were 12:44
11 collaborations with Forensic Science Service, the
12 Central Research Establishment there and some of these
13 operational laboratories would be involved in that and
14 that's another way of making sure that everybody is on
15 the same page and trying to move forward together. 12:44
16 Because I think the Central Research Establishment
17 found it did an awful lot of research and found it
18 quite difficult to get it adopted by these operational
19 forensic science laboratories so they wanted as much
20 contact with them as possible. So that was also 12:44
21 something that was definitely a feature then.

22
23 And then also participation in these broader working
24 groups and particularly with this organisation called
25 ENFSI, which is the European Network of Forensic 12:44
26 Science Institutes, and so there were representatives
27 from the UK forensic laboratories who attended those
28 meetings and took part in the working groups.

29 391 Q. Just to go back for a moment to the fact that some

1 laboratories had specialist expertise.

2 A. Yeah.

3 392 Q. Have you told, as you've told us already, here in
4 Belfast there was specialist expertise in explosives --

5 A. Yes. 12:45

6 393 Q. -- just because they were seeing quite so many?

7 A. Absolutely.

8 394 Q. And, indeed, we learn from the report that
9 Denis McAuley - a name we will become very familiar
10 with in the process, forensic scientist here in 12:45
11 Northern Ireland, the fact that he personally had been
12 involved in the investigation of over 170 improvised
13 explosive device incidents which is probably
14 unparalleled globally within a forensic setting?

15 A. Yes, absolutely. 12:45

16 395 Q. Moreover, also here in Belfast, FSANI was recognised as
17 a centre for textile fibre analysis?

18 A. Yes.

19 396 Q. I should have said that that section in the report
20 starts at page 131. 12:46
21

22 The next topic, is the development of formal quality
23 management, so this is the idea, is it, of not only
24 having standards but having some means by which there
25 can be a check that those standards are being met? 12:46

26 A. Yes.

27 397 Q. And at page 33 you set out a summary --

28 A. Yes.

29 398 Q. -- of what can be said about this issue, but in general

1 terms would it be fair to say that during the late
2 1990s, forensic science in the United Kingdom was still
3 on a journey in terms of regulation?
4 A. Yes. It still is.
5 399 Q. And still is. 12:47
6 A. Yeah.
7 400 Q. So would you talk us through that slide please?
8 A. I mean, originally, certainly when I joined the
9 Forensic Science Service we had laboratory manuals
10 which contained lots of advice and guidance about what 12:47
11 to do with specific sorts of cases and types of
12 evidence, but these were just advisory, just sort of,
13 you know, a general nudge in the right direction if you
14 weren't sure. But by the 1980s because of -- largely
15 in response to a series of miscarriages of justice, 12:47
16 some of which included forensic science, notably the
17 Birmingham Six where there was some problem chemical
18 analysis or the interpretation of the chemical
19 analysis, the Forensic Science Service decided that it
20 was time that it professionalised and standardised its 12:47
21 operations and its quality systems. And so you get
22 this embryonic quality management systems being
23 produced and these included standard operating
24 procedures for all the main types of tests and
25 techniques, and this time these were mandatory, so you 12:48
26 had to abide by them.
27
28 Then in 1985 - and I've put that in bold because this
29 is the moment that we are discussing - by 1985, the

1 National Measurement Accreditation Service (NMAS) was
2 set up. In 1987 it published this International
3 Standard 9001, which applied to goods and services. It
4 was a very broad standard and lots of firms got 9001,
5 but including forensic laboratories because it was the 12:48
6 only thing around that one could use at the time.

7
8 There were also, at that time, specific national DNA
9 database requirements and I remember personally when we
10 set up Forensic Alliance, the firm I talked about 12:48
11 earlier, we had to comply with the national DNA
12 database, or requirements in relation to the sort of
13 testing that we were doing and we had to demonstrate
14 that we were producing reliable results.

15 401 Q. Yes. 12:49

16 A. So that was also very much in operation then. Then in
17 1995, you get a development. From that you get the
18 UKAS being set up, but it didn't publish the new
19 standard for forensic science or for testing and
20 calibration laboratories, which is what forensic 12:49
21 science laboratories were categorised as, it didn't
22 produce that, that's 17025, until 1999. So it was
23 after the time that we are concerned with here.

24 402 Q. So UKAS came into existence before the time we're
25 concerned with? 12:49

26 A. Yes, but it didn't produce this until afterwards. And
27 it also takes some time for laboratories to, you know,
28 get their act together and make sure that they're
29 complying in every respect with these and get the

1 accreditation. So it wasn't really until the 2000s
2 that laboratories started to be accredited to 17025.

3
4
5 The Forensic Science Service was very much at the 12:50
6 forefront of forensic accreditation. It was very
7 influential both in other parts of the UK but also with
8 the European network. And also, and importantly, it
9 was now realised I had that these standards that
10 laboratories were having to adhere to also ought to be 12:50
11 applied to crime scene investigators or what were
12 called SOCOS at the time, so you get this confidence of
13 quality throughout the forensic chain, right from the
14 crime scene through to the laboratory and the testing.
15 So that was something that was really important. 12:50

16
17 In 2000, something I haven't got on here, the CRFP, the
18 Council for the Registration of Forensic Practitioners
19 was set up by the Home Office, and this was to certify
20 individual forensic scientists as competent to do the 12:51
21 job they were doing. This was really, really important
22 and welcomed by everybody in the forensic world.
23 Except that in 2009 it was dissolved because it was
24 thought to be too costly. But anyway we had that for a
25 few years. 12:51

26
27 And then in 2007 there was the appointment of the
28 Forensic Regulator and he got statutory powers in 2021.
29 And he has developed a series of codes which align and

1 sometimes overlap a bit with 17025. So that's another
2 helpful improvement in quality.

3 403 Q. The final topic before we reach the summary of the
4 conclusions is one that we've, I think, probably
5 largely dealt with, it's forensic science strategies. 12:51
6 It is Slide 34 and page 134 of the report?

7 A. Yes.

8 404 Q. So, ultimately, the senior investigating officer had
9 responsibility for investigative strategy which would
10 include the forensic strategy? 12:52

11 A. Yes.

12 405 Q. But the forensic strategy itself would be devised by
13 the lead scientist with other technical members of the
14 SIO team?

15 A. Yes, and other scientists within the laboratory as 12:52
16 well, if necessary.

17 406 Q. So, this is the idea that you described to us earlier
18 of there being a collaborative relationship between the
19 scientists and the investigators?

20 A. Yes, that's right, yes. 12:52

21 407 Q. The lead scientist would be responsible for delivering
22 the forensic strategy within the laboratory?

23 A. Yes.

24 408 Q. And the investigative and forensic strategies would be
25 kept under constant review as fresh findings and 12:52
26 information emerged from both laboratory and from the
27 investigation?

28 A. Yes, that's right.

29 409 Q. So the two need to work together?

1 A. Yes.

2 410 Q. And if the case were to be stalling, the senior
3 investigating officer could request a review or second
4 opinion at any time?

5 A. Yes, that's right. 12:53

6 411 Q. And that's the position that you would expect to apply
7 now?

8 A. Yes.

9 412 Q. And in 1997 and 1998?

10 A. Yes. 12:53

11 413 Q. At slides 35 and 36 you set out, in summary, the
12 conclusions which within the report it is page 136.
13 I'm going to ask you to talk us through those and then
14 my questions will be finished.

15 A. Yes. As I've said before, forensic science encompasses 12:53
16 a very wide range of physical traces and this is
17 reflected in the variety of tests and techniques that
18 are used and that have been described in the report.
19

20 Some fingerprint work in terrorist cases was conducted 12:53
21 by FSANI but it was to do with fingerprint discovery
22 and recovery and enhancement of fingerprints. The vast
23 majority of fingerprint work, that is the assessment
24 and comparison processes, were carried out within the
25 RUC Fingerprint Bureau, so it was kind of a split 12:54
26 responsibility that Kevin can talk about precisely what
27 that looked like.
28
29 The senior investigator was responsible for

1 investigative strategy, including forensic science, but
2 as advised by forensic science and other technical
3 experts and they could include pathologists and a raft
4 of other people who might have been involved in that.
5 But usually led by the lead scientist from the
6 laboratory.

12:54

7
8 Bomb scenes are amongst the most complex of crime
9 scenes and they present substantial additional
10 challenges to investigators and scientists. And I
11 think that has to be borne in mind when you're
12 considering the overall input that FSANI made.

12:54

13
14 Approaches to forensic work in 1997 and '98 remain
15 broadly similar to today although, as I have described,
16 technology has improved and, particularly, it's
17 provided increased sensitivity which means that you're
18 likely to get more evidence out of samples that look as
19 if they match. But there is a greater risk of
20 contamination because the more sensitive you get, it
21 particularly applies to DNA, but the more sensitive you
22 get your techniques the more easily you can mistake
23 traces for something that wasn't there to begin with
24 but has arrived by other means not connected with an
25 incident.

12:55

12:55

12:55

26
27 And then there's also provided enhanced discrimination
28 between similar but not identical samples. So you get
29 stronger evidence and more scientific way of deciding

1 the most useful tests to use and how to interpret the
2 results. And that should help with providing safer
3 evidence, more directly relevant and safer evidence.
4 In addition, you've got the improvements to quality
5 management systems and the appointment of the Forensic 12:56
6 Regulator and that should also contribute in a
7 different way to safer evidence.

8
9 It's not been possible to do a detailed comparison of
10 standards and approach to date, but the main UK 12:56
11 forensic labs, including FSANI, appear to have been
12 operating in a generally similar way in 1997/1998 using
13 the same sorts of instruments and with only minor
14 differences in protocols.

15 12:56
16 And any major discrepancies between them should have
17 been picked up by the sorts of things I was mentioning,
18 the collaborative interlaboratory proficiency testing
19 exercises and/or the reviews by defence experts in
20 specific cases. 12:57

21 414 Q. Thank you very much. Can I just pick up on one aspect
22 of the penultimate conclusion: That the main UK
23 forensic labs, including FSANI, appear to have been
24 operating in generally similar ways in '97 and '98
25 using the same sorts of instruments and so on? 12:57

26 A. Yes.

27 415 Q. Is it the position that it's not clear to what extent
28 FSANI had similar relationship with the Forensic
29 Science Laboratory in Dublin to the relationship it had

1 with the laboratories in other parts of the United
2 Kingdom?

3 A. Well, the only information we have about that comes
4 from the recent statements from the original
5 scientists, I think they were provided mostly earlier 12:57
6 this year, where they talked about limited engagement
7 with the Dublin laboratory or the FSI, mostly about
8 cross-border cases, sharing expertise and, on occasion,
9 providing analytical services to help with caseloads,
10 peaks and troughs in caseloads. For example, with DNA. 12:58
11 So that's what we have derived from those recent
12 statements.

13 MR. GREANEY: Thank you very much. I'm going just to
14 ask you to bear with me for one moment please. [Short
15 pause]. 12:58

16
17 Sir, as you know very well, we operate a Rule 10
18 protocol by which Core Participants can suggest
19 questions and indicate whether they wish to ask them
20 themselves or wish Counsel to Inquiry to ask them and 12:59
21 this is a matter for your discretion. Mr. McGuckin on
22 behalf of the bereaved and survivors that he represents
23 has permission to ask questions on a number of topics,
24 limited to ten minutes. I'm told that our stenographer
25 is content to carry on until he has finished his 12:59
26 questions?

27 CHAIRMAN: Before we do, could I just ask you one
28 question please, Prof. Gallop, it's a small matter.
29

1 PROF. GALLOP WAS QUESTIONED BY THE CHAIRMAN AS FOLLOWS:

2
3 416 Q. CHAIRMAN: Could I ask you to look back at page 30 of
4 your presentation with me?

5 A. Yes.

12:59

6 417 Q. You've there listed the various science laboratories
7 which operated in 1997 and 1998.

8 A. Yes.

9 418 Q. I remember there being a facility which did a very
10 substantial amount of work in relation to explosives
11 and I think it called itself, "The Defence Research
12 Establishment," it was based at Fort Halsted; is that
13 the laboratory you've listed at Sevenoaks?

13:00

14 A. Yes.

15 419 Q. It is?

13:00

16 A. Yes.

17 MR. GREANEY: I wonder if Mr. McGuckin could ask his
18 questions please.

19
20 PROF. GALLOP WAS QUESTIONED BY MR. MCGUCKIN AS FOLLOWS:

13:00

21
22 420 Q. MR. MCGUCKIN: Perhaps I should say, and as a starting
23 point, many of the questions I was intending to ask
24 have been answered in the course of your evidence. I'm
25 really constrained to one area of questioning, if you
26 please. It relates to stopping points in forensic
27 assessment vis-à-vis prosecution stopping points. I
28 suppose it goes to what you spoke to which was the
29 forensic strategy or the evolving forensic strategy and

13:00

1 the collaboration that forensic science has with the
2 senior investigating officer at that time in 1998. And
3 the question that I would like to ask is, once there
4 was enough evidence to prosecute one suspect, once you
5 had reached that point in the forensic assessment or 13:01
6 analysis, how would or how should the scientist decide
7 which testing could safely stop and which should
8 continue because it might, for example, identify
9 accomplices or connect this incident to different
10 incidents or other incidents? 13:01

11 A. The forensic scientists don't -- I mean, they work in
12 this collaborative way that I've been describing, but,
13 I mean, I think they might say once they'd been working
14 on sort of a series of tests and not getting any
15 results and not getting anywhere, they might say, 13:01
16 'well, you know, actually, we probably need to do
17 something different if we're going to carry,' or maybe
18 stop testing. But they wouldn't get -- they wouldn't
19 have a view about whether or not they should go on
20 testing for other reasons. 13:02

21 421 Q. So the line in the sand would be brought to bear by the
22 senior investigating officer in that regard, is that
23 right?

24 A. Yes. I mean what they might say is, in their report,
25 'we've done this and we have found this, and you could 13:02
26 go on and do that,' they might very well, if they felt
27 they were going to be compromised in any way they will
28 usually try and get some point into it.

29 422 Q. So what you would anticipate, Professor, in a well-run

1 case in 1998 would be that you would expect a written
2 record of the scientific work that may well be
3 considered if a halt was being brought to proceedings,
4 as it were?

5 A. Perhaps you could explain just, explain again. 13:02

6 423 Q. I just mean in terms of, if it was a case that there
7 was, perhaps, the ability for a scientific officer to
8 link this incident to another incident?

9 A. Yes.

10 424 Q. But the examination, as it were, were constrained by 13:03
11 the senior investigating officer to a particular person
12 or incident, or would it be documented at that time,
13 'well, this might well relate to other incidents but I
14 understand I'm being brought to a stop as far as this
15 investigation is concerned in my forensic analysis'? 13:03

16 A. I'm not sure it would be that, I think it would be more
17 sort of there are other things you could do, there are
18 other tests you could apply. I think it would be more
19 general rather than being so specific, any comment that
20 was made. I don't know whether -- I mean I imagine 13:03
21 that FSANI behaved in the way that other laboratories
22 did and certainly if you were worried about something
23 in the laboratories I've worked in, you would certainly
24 want to put a marker down to protect yourself apart
25 from anything else. 13:03

26 MR. MCGUCKIN: I am grateful for your evidence, thank
27 you very much.

28 MR. GREANEY: Sir, could I ask whether you have any
29 further questions you wish to ask the Professor?

1 CHAIRMAN: No, thank you.

2 MR. GREANEY: Could we break now for lunch please until
3 2:05. At 2:05 Mr. de la Poer will call Dr. Matthew
4 Tart to ensure that by the end of the day we are much
5 more informed on the topic cell site analysis. 13:04

6 CHAIRMAN: well, Prof. Gallop, that you very much for
7 your introductory evidence and I shall look forward to
8 meeting you again.

9 THE WITNESS: Okay. Thank you.

10

11 THE INQUIRY ADJOURNED FOR LUNCH AND CONTINUED AS
12 FOLLOWS:

13

14 CHAIRMAN: Mr. de la Poer.

15 MR. DE LA POER: Good afternoon, Sir. Our next 14:05
16 witness, as already been trailed by Mr. Greaney, is
17 Dr. Matthew Tart and I wonder if we could begin with
18 him being sworn, please.

19 CHAIRMAN: Good afternoon Mr. Tart.

20 THE WITNESS: Good afternoon. 14:05

21

22 DR. MATTHEW TART, HAVING BEEN SWORN, WAS QUESTIONED BY
23 MR. DE LA POER AS FOLLOWS:

24

25 425 Q. MR. DE LA POER: we'll start, Dr. Tart, please, with 14:06
26 your full name?

27 A. Matthew Stephen Tart.

28 426 Q. Now, just by way of a small amount of scene setting,
29 you have prepared, on the instruction of the Inquiry,

1 two reports, is that correct?

2 A. Yes.

3 427 Q. The first report I'm going to describe as your overview
4 report, is that correct?

5 A. Yes. 14:06

6 428 Q. And the second looked in detail at cell site data
7 relating to the period 12th to 15th August 1998?

8 A. Yes.

9 429 Q. So that everybody knows where we're going this
10 afternoon, we are going to deal with the content of 14:06
11 your first report in this session. That first report
12 will be published on the Inquiry's website, so there'll
13 be no need for you and I to do every line of it. And
14 is this right, that you'll return next week, currently
15 schedule 1st October, to deal with your second report? 14:06

16 A. Yes.

17 430 Q. So, we'll begin please, in terms of the substance of
18 your evidence, with you just telling us a little about
19 your professional background and experience please?

20 A. Certainly. I have an honour's degree in applied 14:07
21 physics. I have a PhD with my doctorate being in
22 forensic inference from telecommunication records,
23 which is an academic way of saying cell site analysis.
24 I'm a Fellow of the Chartered Society of Forensic
25 Sciences. 14:07
26

27 I've a been a forensic scientist since 1993. I first
28 joined the Home Office Forensic Science Service in the
29 Central Research Establishment. I was there for

1 17 years until it was shut. During that time, I moved
2 between research and operations. While I was the
3 national development manager I proposed the service for
4 cell site analysis, I was part of the research team
5 that developed methods, validated them, set up quality 14:08
6 assurance and competency regimes and was one of the
7 first to take it actually into evidence into court.
8
9

10 I was made redundant in 2010 when I joined the largest 14:08
11 private sector digital forensics company in Europe, CCL
12 Forensics. They hold a UKAS accreditation in cell site
13 analysis - one of only four organisations in the
14 country that do so. I've specialised in cell site
15 analysis for over 20 years now. I can go on, if it 14:08
16 helps.

17 431 Q. I think that only needs this additional gloss, and even
18 that might be superfluous, is it also right that you
19 have published internationally on the subject?

20 A. Yes. Actually, I should mention, I've also worked with 14:08
21 the Forensic Science Regulator, in fact I still do and
22 have done for many years. I've chaired the Committee
23 that drafted the appendix for cell site analysis into
24 the Forensic Science Regulator's Code of Conduct. That
25 was back in 2016, it was LC 135. I'm a member of the 14:09
26 Interpretation Group which has just published guidance
27 as well on interpretation. I'm a member of BSI
28 Forensic Science Module 1, which has been advising the
29 International Standards Organisation on a new standard

1 specifically for forensic science, ISO 21043, which has
2 now been implemented.

3 432 Q. I'm certain that that is sufficient for our purposes
4 now, although I know there is more that you could say
5 about that. The full CV that you have will be
6 available for anybody who wants to see even greater
7 levels of detail.

14:09

8
9 We are going to turn now, please, to section 5 of your
10 report, which deals with the approach taken and
11 caveats. And we're just going to highlight some of
12 these at this stage. As I say, all of this will be
13 published in due course, so we're just focusing really
14 on what we need to understand as a core set of facts
15 before we go into the detail of this.

14:09

16
17 At your 5.5, you highlight a number of aspects of
18 contemporary expectations, so in other words the
19 standards of 2026. And we're just going to headline
20 each of those together. And these are the guiding
21 principles for a person in your position conducting
22 cell site analysis. The first is a requirement of
23 balance, is that correct?

14:10

24 A. Yes. It's worth qualifying that we're in evidential
25 use here rather than investigative use.

14:10

26 433 Q. Yes.

27 A. So this is post-charge, so yes, balance.

28 434 Q. So, if you were to provide a report for the purpose of
29 criminal proceedings this is the standard that you'd be

1 required to adhere to?

2 A. Yes.

3 435 Q. Logic, is the next category?

4 A. Yes.

5 436 Q. And for that, we're here dealing with ensuring that any 14:11
6 assessment of probability is correctly phrased and that
7 we don't fall into the so-called prosecutor's fallacy,
8 is that correct?

9 A. Yes, essentially, whether the data is expected given
10 the proposition that's under test rather than whether 14:11
11 the proposition itself is likely.

12 437 Q. The third standard is that of robustness, in other
13 words capable of withstanding scrutiny?

14 A. Yes.

15 438 Q. And the fourth standard is that of transparency, in 14:11
16 other words that you have set out your workings?

17 A. Yes.

18 439 Q. Now, those are the standards for an expert giving
19 evidence in 2026. Were those standards expressed in
20 that neat and clean way in 1998? 14:11

21 A. No.

22 440 Q. Nevertheless, in your analysis after the event, have
23 you been guided by those principles, firstly, in terms
24 of your own work?

25 A. Yes. 14:12

26 441 Q. And, secondly, in looking at the work of others to see
27 if they have, even if they didn't work to that
28 standard, nevertheless exhibited them?

29 A. Yes, and also to see if there were any issues with them

1 not complying.

2 442 Q. So, we'll remember those four features and come back to
3 them in due course.
4

5 We're going to turn now to the next topic, which is 14:12
6 mobile phone technology and cell site analysis. You've
7 prepared us a presentation which we're going to come to
8 in a moment but first some very obvious propositions.
9

10 The position in 2026 is much more technologically 14:12
11 sophisticated than it was in 1998; would you agree with
12 that?

13 A. Yes.

14 443 Q. Would you also agree that when we are thinking about
15 1998 we very much need to keep that fact in mind? 14:13
16

16 A. Yes.

17 444 Q. And so that we don't fall into a hindsight bias by
18 having expectations and standards of 2026 which simply
19 did not exist in 1998?

20 A. Yes. 14:13

21 445 Q. Now, everybody in this room, and I'm sure everybody who
22 is watching this evidence, will either own a mobile
23 telephone or know someone who does. We are operating
24 in 2026, in most parts of the United Kingdom, on the
25 fifth generation of the mobile telephone network, is 14:13
26 that correct?

27 A. Yes, new radio.

28 446 Q. And that is referred to in shorthand as "5G"?

29 A. Yes.

1 447 Q. when we go back to 1998, was the predominant system 2G?
2 A. Yes.
3 448 Q. 1G still existed, is that correct?
4 A. It did.
5 449 Q. 1G was, if we take it at its most simple form, what is 14:14
6 described as an analogue system, is that correct?
7 A. Yes, it was pre-digital.
8 450 Q. Pre-digital. And what 2G introduced was digital, is
9 that correct?
10 A. Yes. 14:14
11 451 Q. And we'll see in your report - and people will come
12 across it and we are really going to try and spare
13 everybody as many acronyms and technical terms as we
14 can - we'll see that 2G is described as GSM, is that
15 right? 14:14
16 A. Yes.
17 452 Q. Does that stand for global system for mobile
18 communications?
19 A. Yes, or Groupe Spéciale Mobile, they never did agree
20 what the actual acronym was for, but it's the same as 14:14
21 2G, yes.
22 453 Q. Now, obviously, because first generation still existed
23 in 1998, we just need to be clear about the data that
24 you have had access to and which generation of mobile
25 telephone network it derives from? 14:15
26 A. Yes.
27 454 Q. Can you give us a very short, I expect, answer about
28 which type of data we have access to now?
29 A. 2G.

1 455 Q. 2G?

2 A. Yes.

3 456 Q. And is the simple explanation for that, that the 1G

4 data just doesn't exist to be analysed?

5 A. That is my understanding. 14:15

6 457 Q. So, whenever we are talking in terms of the toll

7 tickets which are the products that we're going to have

8 a look at and which you've been able to analyse, that

9 is all derived from 2G?

10 A. Yes. 14:15

11 458 Q. And so, does it follow from that, that however the 1G

12 system was operating at the time, because we can't see

13 it in the data, it doesn't have any direct impact on

14 your interpretation of what we do have?

15 A. Yes, I can't answer questions on data I don't have. 14:15

16 459 Q. So, we'll turn now please to your presentation. That

17 is INQ 048914, and as we do this, Dr. Tart, although we

18 are largely following your section 6 of your report,

19 because a number of your slides are involved in what we

20 see later in your report, we're going to try and wrap 14:16

21 in some of those later sections as we go?

22 A. Yes.

23 460 Q. So we'll follow the route map laid out by your slides.

24 So, we begin at the most basic level.

25 A. Yes. 14:16

26 461 Q. When we're talking about a mobile phone there are two

27 components, the SIM card and the handset?

28 A. Yes.

29 462 Q. And because we're going to have to touch on again, in a

1 very light way, the technicality, is it right that the
2 IMEI, which we can see there, is effectively the unique
3 identifier of the hardware?

4 A. Yes.

5 463 Q. So, when we talk about IMEIs, that's the handset but is 14:17
6 there a unique identifier for the SIM card as well?

7 A. There are a number of unique identifiers, yes.

8 464 Q. Yes.

9 A. One is the IMSI, the international mobile subscriber
10 identity which does what it says on the tin, it 14:17
11 identifies the mobile subscriber and that's linked to a
12 telephone number. It's also got a number that's
13 physically on the card, which you can actually see on
14 this slide, called an ICCID but that's for the physical
15 actual item. 14:17

16 465 Q. With that information in mind, which I'm certain
17 everybody would already have known, but we will come
18 back to the IMSI at least, move on to your next slide,
19 please, which is page 3, which is a simplified
20 diagrammatic representation of the network. And here 14:17
21 do it we see that the mobile telephone that is making
22 the call on the top left-hand corner, that is connected
23 on a two-way basis via radio link to a transceiver, is
24 that right?

25 A. Yes. 14:18

26 466 Q. And it's a transceiver because it both transmits and
27 receives?

28 A. It is, yes.

29 467 Q. That in turn that transceiver is connected to the core

1 network?

2 A. Yes.

3 468 Q. That that network can then - moving up to the top
4 right-hand corner - connect the mobile telephone to
5 whichever number they are calling? 14:18

6 A. Yes.

7 469 Q. Be it a landline or another mobile?

8 A. Yes.

9 470 Q. And that the product for the customer, as we can see
10 coming out of the bottom of the core network, is the 14:18
11 bill?

12 A. Yes.

13 471 Q. If we move forward, please, just building this up,
14 again we're getting slightly more technical here, we
15 don't need to be too concerned about all of the detail 14:18
16 here. But we can see here that you have effectively
17 broken down the core network further and the way in
18 which the transceiver or the original base station
19 which receives contact from the mobile telephone
20 communicates with other parts of the infrastructure? 14:19

21 A. Yes.

22 472 Q. So, we can move forward please from that. And here, we
23 need to just pause slightly over this, again we can see
24 the same representation top left moving through the
25 telephone exchange it's described there, to the top 14:19
26 right. But, crucially for our purposes, we can see
27 that there is an output towards the bottom which is
28 labelled "call data record"?

29 A. Yes.

1 473 Q. Commonly shortened to CDR?
2 A. Yes.

3 474 Q. Just tell us please in a couple of sentences what the
4 differential between call data record is and what a
5 phone bill is? 14:20
6 A. So, the call data record can include non-chargeable
7 activity that's taken place, but it also includes
8 extended information, such as the cell ID, the cell
9 site and specific aerial on the cell site that was
10 used. And it will also give us the location of that 14:20
11 cell site. Not the phone, we never know where the
12 phone is but we know where the cell site was.

13 475 Q. So does it effectively contain all the necessary
14 information for the purpose of billing the customer but
15 it also contains a significant potentially portion of 14:20
16 additional data?

17 A. Yes. So the information is held by the network for
18 billing and engineering purposes. It can be
19 reformatted in a format where it can be repurposed for
20 forensic use with appropriate legal authority. 14:20

21 476 Q. You've mentioned the term "cell site," it's a phrase
22 that's been used already in Chapter 3, but let's move
23 to your next slide which is page 7 there where we can
24 see an example of the use of cell sites as they appear
25 in call data records. Now, the first thing for us to 14:21
26 say is this: we're not here looking at the
27 presentation of information as it was in 1998, is that
28 right?

29 A. That's correct. This would be, frankly, since the

1 beginning of my involvement in it 20-something years
2 ago.

3 477 Q. And just moving through the different categories of
4 data that we can see as they appear at the stage of the
5 development of the technology that allowed for it, 14:21
6 we've got a date, a time, a duration. We have the
7 calling number, the receiving number, the type of event
8 because it may not just be a telephone call, it could
9 be a short messaging service, in other words a text
10 message? 14:21

11 A. Yes.

12 478 Q. And in modern times it could be a data session
13 involving, in other words, connection to the Internet?

14 A. Yes.

15 479 Q. And then we have, perhaps, of most significance to us 14:21
16 today, a start cell ID which is a number, is that
17 right?

18 A. Yes.

19 480 Q. And that is unique number to the particular transceiver
20 that was dealing with that call? 14:22

21 A. For this purpose it is. There's other information that
22 comes with it that would make it unique, we're just
23 presenting part of it. But, yes, it should be unique.

24 481 Q. There's very often a name associated with the number,
25 often a description of the physical location? 14:22

26 A. So, that would be the cell site where the aerial is
27 based. The cell ID would be to do with specific area.
28 So we've got a contact immediately. We've got a cell
29 site and we've got a cell, which is the area served by

1 a given area, or a given a unique cell ID.

2 482 Q. But in a slide that follows we're going to see that in
3 a little bit more detail. But staying with this, we
4 have a postcode which, again, gives us a physical
5 location although not necessarily a precise one? 14:22

6 A. We do get eastings and northings or a precise location
7 as well, so that's usually part of the naming
8 convention, but we'll also know precisely where the
9 cell site is.

10 483 Q. And then more technical term "azimuth." Again, we're 14:23
11 trying not to blind with science here, can you just
12 explain, in simple terms, what the azimuth is a
13 reference to?

14 A. It's the direction in which the aerial is pointed, so
15 nought degreed would be north, 90 degrees would be 14:23
16 east, 180 degrees would be south, 270 west.

17 484 Q. And with that azimuth, to take an example, it sees 0,
18 so north, it's pointing directly north --

19 A. Yes.

20 485 Q. -- does that mean the mobile phone has to be precisely 14:23
21 aligned with north or is there an arc that it will
22 cover?

23 A. No, cells serve areas, they all serve areas. what
24 we're expecting with the azimuth is there'll be a lot
25 more service in a direction it's pointing than anywhere 14:23
26 else. They tend to - but they don't have to be - three
27 seconds per circle. So would you'd have them like a
28 Mercedes-Benz logo, 120 degrees. But they don't have
29 to be configured that way and usually the service is

1 wider anyway. But there's usually more service in the
2 direction it's pointed than behind it, for example. So
3 it's an initial indication.

4 486 Q. Let's go to the next site because we're going to, I
5 think, try to route this in the physical world. You 14:24
6 have included some examples of some cell sites here as
7 people might have seen them as they go about their
8 daily lives. Is each of these a transceiver?

9 A. Yes.

10 487 Q. And so, when in range with it and when the 14:24
11 circumstances lead - and we'll come to what those
12 circumstances might be - to the mobile telephone
13 choosing to connect to that, is that the route by which
14 the mobile phone will enter the network?

15 A. Yes, that's where the aerial is based, so your mobile 14:24
16 phone is mobile. It doesn't have to be next to the
17 cell site, so you talk to that over a radio network and
18 that will be the point at which that data gets
19 transferred into the network.

20 488 Q. Now, if we go to the next slide please. You've already 14:25
21 touched on this with your Mercedes-Benz logo,
22 sectorisation, in other words the fact that there may
23 be three transceivers angled in different directions
24 covering a total of 360 degrees?

25 A. Yes, it's common, they don't have and you don't have to 14:25
26 have sectorisation and in fact in the evidence that
27 I've considered later some of them weren't sectorised,
28 think. In which case they're called an omniceil and
29 they're pointed in all directions. So if you think of

1 these like light sources, each of those sectors could
2 be a different floodlight pointed in a different
3 direction, but some of the, the omniceils would be like
4 a lamppost where it's just shining equally in all
5 directions.

14:25

6 489 Q. There's an important limitation that we perhaps need to
7 talk about bearing in mind how you have represented
8 this here. We commonly see things like circles, and
9 sectors which are 120 degrees, in reality is it ever
10 that precise?

14:26

11 A. No. So, there's no hard limit to cells propagation
12 except there is a hard limit at 35 kilometres but they
13 will run until they can't run any further. Very often,
14 many cells are -- many cell sites are configured with
15 three sectors, they don't have to have three, they
16 could have one, they could have two, they could have
17 six.

14:26

18
19 Also, even though they're pointed in different
20 directions there'll be a large amount of overlap
21 between them.

14:26

22 490 Q. Now, your next slide relates to cell site density. And
23 just to introduce the concept that you're representing
24 here, over time the number of cell sites that there are
25 here in the southern part of Great Britain, has
26 changed, hasn't it?

14:27

27 A. Yes.

28 491 Q. And we can see that the green colour, which is, I
29 think, the position in 2003 --

1 A. Yes.

2 492 Q. -- that there was a very strong concentration around
3 the Greater London area?

4 A. Yes.

5 493 Q. But that the distribution of the green cells otherwise, 14:27
6 tends to come out in lines and then form other clusters
7 as it meets other major conurbations?

8 A. Yes. So each of the cells, they're trying to service
9 people, customers so they tend to have highest density
10 where the population densities are. And so what we 14:27
11 have in 2003 in green is the locations where there are
12 high densities of people, i.e. customers, people that
13 will pay for the service and also the commute routes.

14 494 Q. By contrast, in 2019, which is the red markers, we can
15 see that the network is much more spread and diffuse, 14:28
16 is that right?

17 A. Yes, so the network has developed, so they want to make
18 sure they've got total coverage, they're not losing any
19 customers. At the very beginning you have to start
20 somewhere so they've been gradually expanding in their 14:28
21 ability to provide service basically nationwide. They
22 don't want to lose any customer's service.

23 495 Q. The next page we're going to just deal with the sort of
24 factors which might affect the service that a
25 particular cell site provides and the area that it 14:28
26 serves. So, just talk to us, please, this slide is
27 azimuth mast height versus terrain, what is it that you
28 are illustrating here, please?

29 A. Before I do, the previous slide, I should have

1 mentioned, one of the primary limitations for service
2 areas is the presence or absence of cells. So my point
3 on the previous slide would be that when you've got
4 fewer cell sites there's bigger gap between them and
5 the cell sizes tend to be bigger, which means that the 14:29
6 precision and our estimations of where a phone might be
7 will be less precise. And so as we've gone through
8 time, the cell service areas have reduced and reduced
9 and reduced so they're much smaller now than they would
10 have been in 2003 in that slide, and that would have 14:29
11 been smaller service areas than in 1998 and the data
12 considered.

13 496 Q. On that subject, you've already mentioned 35 kilometres
14 which is the theoretical and sometimes actual maximum
15 range of a cell site. When there are fewer cell sites 14:29
16 are we more likely to see, subject to the terrain,
17 those maximum areas actually being used by mobile
18 telephones?

19 A. Yes. There's hard limit of 35 kilometres on GSM, and
20 that's because there's a time limit for how far the 14:29
21 signal can get and the network to be able to decode it.
22 It's called timing advance. And so, once you're
23 outside of 35 kilometres it can't actually talk to that
24 specific cell anymore and it must hand over to
25 something else. So we've a hard limit there. 14:30
26

27 The fewer the cell sites there are, the more chance
28 you've got of seeing something like that. In my
29 career, I've only seen 35-kilometre cell sites a few

1 times, but I know that some of them are within the
2 dates that we consider for this Inquiry, they were of
3 that size.

4 497 Q. Now, returning to the slide that we can see on screen,
5 just because it has theoretical maximum limit of 14:30
6 35 kilometres does that mean, assuming there are no
7 other cells in the area, that you will always achieve
8 that?

9 A. No. There's other factors that can take place, that
10 can affect it. Terrain is one of the big ones. So 14:30
11 what we're showing here is the location of a mast
12 that's below the size of the terrain that's around it.
13 So in the top map we've got the location in a 2D map
14 and we're illustrating that in the bottom image in
15 three dimensions. The mast is lower than the hills 14:31
16 that are around it and that will have an affect to
17 block it. So radio signals, they don't go through
18 stuff, matter, hills, very well at all, as you've
19 probably realised by trying to make a phone call when
20 going into elevator, for example, you get cut off, and 14:31
21 so terrain can have that affect as well.

22 498 Q. So if turn please to the next slide.

23 A. Yeah. So, what we are illustrating here is the same
24 information on a 2D map zoomed in a little. So on the
25 top image we've got the mast location, I've got a 14:31
26 dotted line which is the azimuth, this is pointed at
27 270. I've illustrated the area served by that cell.
28 It's got a red outline in light blue and it's
29 constrained by the terrain that's around it. So, once

1 we get into the lee side of those hills we're going to
2 connect to another cell, potentially. So that's the
3 top image.

4 499 Q. So, you've, perhaps, most clearly illustrated this,
5 that even though that cell is pointing due west and so 14:32
6 in theory the strongest signal will be right there, in
7 fact because of the terrain one only travels what is,
8 effectively on the scale of the map, two squares before
9 the terrain immediately due west has prevented that
10 signal from going further? 14:32

11 A. Yes. And if it wasn't constrained it would run and run
12 and run until another cell was better and that could be
13 tens of kilometres, if there are very few other cells.
14 Contemporaneously, it doesn't tend to be that big, they
15 tend to be 10 kilometres in rural areas. They might be 14:32
16 sometimes a little more than that but very rarely
17 above 50.

18 500 Q. Having looked at how the direction that it's pointing,
19 in other words the azimuth, and the terrain might
20 affect things, let's move on to how, using techniques 14:33
21 available to you and to your colleagues who are cell
22 site analysts, the investigation can be conducted. Our
23 next slide, please, deals with surveys and so we'll
24 just take a moment or two, please, to introduce the
25 concept of surveys and to decode what looked like 14:33
26 potentially quite complex representations on the
27 screen.

28 A. Certainly. You or me?

29 501 Q. First of all, what is a cell site survey?

1 A. Okay. So, your phone is constantly making a decision
2 as to which cell is the most appropriate to use for the
3 next call event, whether that be a phone call or a text
4 message or data. It does this very quickly, routinely
5 every few seconds and then it loses that information,
6 it doesn't need to know what the best cell site was or
7 best cell ID was 10 minutes ago, it needs to know
8 what's it doing now. It's only there to try and make
9 your experience better and easier.

14:33

10
11 We can go out and we can use survey equipment, which is
12 either a mobile phone with special software loaded on
13 to it, or things which emulate what a mobile phone
14 does, and we can take lots and lots of measurements and
15 we can keep that information and attach it to a
16 coordinate, a GPS coordinate so that we plot it up.
17 And this way we can perform, essentially, an
18 experiment. We can go out and we can drive around
19 roads. It's usually vehicle-based but it doesn't have
20 to be, and we just get more data that way. And we can
21 see where we would have connected to a given cell if
22 that's of interest to us, and so we can plot that up on
23 maps.

14:34

14:34

14:34

24
25 On the left-hand side you can see a lot of coloured
26 lines. The grey lines, they're actually a lot of dots
27 and those are where we've got measurements - and we
28 haven't got measurements everywhere, we've only got
29 them down the roads as you can see here - and that's

14:34

1 where a cell other than those that we're interested in
2 has been selected for service. If we look at the
3 bottom left mast you can see a yellow triangle, that's
4 a mast for one cell ID that we're interested in. We've
5 labelled it 15157. And the brown dots, so where we've 14:35
6 detected service from 15157, we've also highlighted the
7 direction in which that cell was pointed. And, as you
8 can see, it's predominantly in the direction that it
9 was pointed, obviously, fanning out to either side.

10
11 On the right-hand side at the same level you can see
12 while we've taken away the grey lines you can see where
13 we've got survey results indicating service. And so we
14 can see a pool of service and the odd bit of
15 disconnected. There's some limitations of this method. 14:35
16 It's at the time of the survey not at the time of the
17 call, there can be network changes. It's at ground
18 level in a vehicle usually. So we use this to inform
19 opinion of service by our experiment rather than define
20 it. 14:36

21
22 That's in an urban to suburban area. If you look you
23 can see that it's serving out to about a kilometre, a
24 kilometre and a half, which is quite normal, it's a
25 British standard cell. 14:36

26
27 If we look above that on the left-hand side you can see
28 another mast, 16837 I think it says, and we've got a
29 mast there and it's pointing to the east, so an azimuth

1 of 90 degrees. And the purple pots are detected up to
2 five, six, seven, eight, may be even beyond, eight or
3 nine kilometres in those directions. And this is a
4 bigger cell site in a less populated area, so there's
5 fewer cell sites, lower cell site density. And it's 14:36
6 quite normal for cells to be of different shapes,
7 you're going to have areas of disconnected service, in
8 fact cells normally overlap. We have an expectation
9 that multiple cells will usually serve at a given
10 location. We don't have a standard expectation for any 14:36
11 given cell is the point.

12 502 Q. Now, you have mentioned in the course of that answer
13 the fact that the mobile telephone is constantly
14 assessing which is the best connection point to the
15 network? 14:37

16 A. Yes.

17 503 Q. Is the best connection point always the cell that is
18 closest by distance?

19 A. No, it would be predominantly on service strength but
20 it can be actually affected by other factors. But if 14:37
21 you've got a close cell site that's on the other side
22 of a hill and you can actually see a much more distant
23 cell site, you may have less attenuation.

24 504 Q. Does the network also keep an eye on the maximum
25 capacity of any particular cell? 14:37

26 A. It does. So when you're in call, it will start trying
27 to manage call loading and it may hand you over, even
28 though you're on the best cell. It doesn't normally
29 affect our work particularly because usually there's

1 more than one cell that provides service at a location
2 anyway and our methods are designed to detect all of
3 them.

4 505 Q. We're going to turn away from surveys for the time
5 being and just look at toll tickets and we'll bring up 14:38
6 the next slide, please. Perhaps you can just introduce
7 us to what might be an unfamiliar term to some people,
8 we talk about call data records in 2026 and have done
9 for many years, what are toll tickets?

10 A. It is precursor. We call call data records because 14:38
11 that's what has been provided to us from the network
12 operators after they've enriched it with all that
13 location information. A toll ticket is straight from
14 the switch, so you may recall a previous slide with the
15 mobile switching centre. It will record the calls that 14:38
16 are taking place, for billing purposes, but there'll be
17 other parts of the network, there'll be other
18 information that's useful to cell site analysis,
19 including the location database, which is where the
20 cell is based that it's being connected to, the azimuth 14:39
21 of that cell. You might have other information such as
22 the height. And so with the toll tickets we only get
23 the information of the connections, we don't get all
24 the other enriched data. So we call that element no a
25 call detail record as opposed to call data record which 14:39
26 has been enriched.

27 506 Q. So let's go to the next slide, please, where we're
28 going to see how that information look when put in a
29 spreadsheet or table. Explain to us, we can see here

1 date, time, the caller, the duration, the base station,
2 location of caller. We don't have a lot of the other
3 information that we saw on that earlier slide about
4 start and end and so on.

5 A. Yes, in fact, we haven't got any information about the 14:39
6 cells in the actual document that I've received. I
7 think it's No.16. Also, it says "location of caller,"
8 just to be clear, that's a cell site. They didn't know
9 where the phone was anymore than we do now. So don't
10 misinterpret "caller" to mean the location, the exact 14:40
11 location the phone was known.

12 507 Q. If we just look at the table at the bottom, we don't
13 need to linger on it too long, but we can see there are
14 headings, "site, cell, cell name, X and Y," are those
15 eastings and northings?" 14:40

16 A. Yeah, they are and the British National Grid as well.

17 508 Q. In terms of the cell, we can see the first row has a
18 zero in it, whereas the third row has one in it?

19 A. Yes.

20 509 Q. Does that tell you anything as an expert? 14:40

21 A. Well, it's a sector. The site is the site ID of the
22 cell cite, that's where the equipment is. And it's
23 giving us a cell as to which one of the sectors is
24 being used. And nought could be an omnice ll. It could
25 be that there are no sectors. One is direction one, 14:40
26 whatever, it would be associated with an azimuth but,
27 rather unhelpfully, that azimuth hasn't been provided.
28 And so if you look at the cell name it's basically the
29 site plus the cell.

1 510 Q. Go to the next slide, please. Here we have something
2 of a compare and contrast, because that is not the
3 nature of the information that we're going to be
4 focusing on, this is more really more to illustrate the
5 fact that there is so much more that can be done with 14:41
6 the data these days because there is so much more data?
7 A. Yes. And not just in the types of information that is
8 provided in the CDR, but we've usually got far more
9 call events, in particular because of data connections,
10 we just get hundreds of them. 14:41
11 511 Q. The next slide relates to other party data, and this is
12 a significant feature of the information that you've
13 received that needs to be borne in mind at all times,
14 is that right?
15 A. Yes. 14:41
16 512 Q. We'll perhaps illustrate this best by looking through
17 the example that you've given. We can see that we are
18 dealing, if we look at the last three digits of the
19 mobile telephone which is listed just above the table
20 at the bottom towards the top left, we are dealing with 14:42
21 the 430 telephone?
22 A. Yes.
23 513 Q. The telephone that in the working hypothesis has been
24 attributed to Liam Campbell on 15th August, given the
25 colour red for the Inquiry Legal Team's presentation. 14:42
26 So this is the data for 430, and it includes data, the
27 first two rows, where we can see that the cell sites
28 that are being used are in or near Omagh, is that
29 right?

1 A. Yes.

2 514 Q. And we heard about those calls yesterday when
3 Mr. Greaney gave his opening remarks. But we can see
4 that within a matter of minutes, when one looks at the
5 call times, that later calls that are recorded here are 14:43
6 recorded as using a cell base in Holyhead?

7 A. Yes.

8 515 Q. And the obvious and common sense inference is that that
9 cannot be accurate in relation to the cell that 430 is
10 using for two related reasons; firstly, there's only 14:43
11 35 kilometre maximum range on the Holyhead range and,
12 secondly, there just isn't enough time to get in range
13 of that, not least because the Irish Sea is in the way?

14 A. Yes. This is on the Vodafone network, it's a known
15 feature of that network that in the raw data incoming 14:43
16 calls, if the other phone was on the same network, i.e.
17 it was also using Vodafone, it can include the calling
18 number's cell site and cell ID.

19 516 Q. So if we just unpack this in terms of what we're seeing
20 here. The first two calls which register on masts in 14:44
21 or near Omagh are outgoing calls, so in other words
22 calls that 430 made?

23 A. No, they're all incoming.

24 517 Q. They're all incoming?

25 A. Yes. 14:44

26 518 Q. Okay.

27 A. It's the other party, we're illustrating we can't trust
28 any of the incoming calls.

29 519 Q. We can't trust any of them. So although 430 - and we

1 know that that was not a phone that went to Omagh - 430
2 is registered as using the Omagh sites?

3 A. Yes.

4 520 Q. In fact we know from our other information that at that
5 time it was in contact with phones that were in Omagh? 14:44

6 A. Yes. And, so, in contemporaneous records we still get
7 this sort of information but we also get the incoming
8 cell site and so we can sift that out automatically.
9 we didn't have the bits that we'd normally get now
10 though in the data that was considered for 1998, so we 14:44
11 just don't know where the 430 cell site was.

12 521 Q. would one reach the conclusion that whoever it is that
13 is calling 430, firstly, must also be on the Vodafone
14 network; is that a safe conclusion?

15 A. Yes. 14:45

16 522 Q. And, secondly, because they can't be in two places in
17 that short period of time that we've got other numbers
18 calling?

19 A. Yes.

20 523 Q. So more than one other number calling. So that's the 14:45
21 other party data and that is something that you have
22 applied very close attention to when you have looked at
23 the records?

24 A. Yes, and in fact that latter point you made about
25 another number is calling, you can see that in the data 14:45
26 at the bottom of the screen.

27 524 Q. The data, in fact, on this occasion, provides us with
28 the telephone number that is calling?

29 A. Yes.

1 525 Q. We're going to turn now to look at a cell site that's
2 been referred to a number of times and is an important
3 one in Chapter 3, page 17, Pigeon Top. Now this is a
4 photograph of masts which have cells on them, is that
5 right? 14:46

6 A. Yes.

7 526 Q. Now, you're not able to say, are you Dr. Tart, whether
8 that is the exact infrastructure that was in place in
9 1998?

10 A. No, I'm not, I took that from this year. 14:46

11 527 Q. But does it illustrate a point that you wished to make
12 about the fact that it is commonly the case, in
13 relation to high points, that networks will try and get
14 the site even higher so that it has an even greater
15 line of sight? 14:46

16 A. Yes, and so I think there's two points really for this
17 slide. I don't know are these the same masts that were
18 there the best part of 30 years ago, but they might be
19 and it wouldn't be uncommon for them to be. We can see
20 (a) there's a big site. But, secondly, you can see the 14:46
21 horizon here within the image and it's a long way away.
22 So you can see that you're already putting a large
23 structure on top of a local high terrain feature, so it
24 may well go a very long way.

25 528 Q. We'll see that illustrated in the next slide, please, 14:47
26 for Pigeon Top. And here you have just taken a
27 particular line of sight from Pigeon Top which is on
28 the map at the point to the left and then shown that as
29 effectively a cross-section of the terrain to show that

1 in the lower image the line of sight succeeds in
2 avoiding a lot of the surrounding terrain meaning that
3 the end point of that line of sight is quite a long way
4 away?

5 A. Yes, and that's -- the bottom graph is at ground level, 14:47
6 so that's if you are sitting on the ground or lying
7 down, even. If you put it on top of a mast it would
8 even see higher. I've deliberately not put in an extra
9 bit, because I didn't know what it was. But you can
10 see there's no real terrain features between the Pigeon 14:47
11 Top cell site and Omagh.

12 529 Q. If we look at the next slide, you have conducted a
13 similar piece of work here, and we can see that, I
14 think you have slightly changed the angle here?

15 A. It's approximately the same but it doesn't really 14:48
16 matter. The point is here, that there are a lot of
17 places where, in particular, if there was a cell that
18 was based on a 50-metre mast it can see a long way and
19 so it can see right up to 35, 36, 37 kilometres away.

20 530 Q. And in fact on the graph at the bottom Omagh will sit 14:48
21 in that first dip?

22 A. Yes.

23 531 Q. So, that will give everybody an idea of the scale that
24 we can take from that.

25 14:48

26 And the final slide that we're going to look at, you've
27 conducted the same exercise in relation to the location
28 of the Omagh Technical College, and here, you've
29 selected, I think essentially at random, a direction

1 intended to illustrate this, so looking to the east,
2 slightly to the north and what do we see here from the
3 graph in terms of the line of sight?

4 A. It's an approximately similar angle to that of the
5 Pigeon Top cell we just looked at, and again this is at 14:49
6 ground level, so we haven't added on the actual cell
7 mast height which might be 10, 20 metres perhaps, but
8 that would still place it below a promontory at about
9 three kilometres away. So you can see there's a green
10 hill. And then on the lee side of that hill will be in 14:49
11 shadow and so you might lose service, there might be
12 other cells that are more likely the signal strengths
13 will more rapidly reduce.

14 532 Q. Thank you very much. We can take your slides down now,
15 and we're going to move on to section 7 of your report, 14:49
16 which starts at page 17. And we're just going to
17 headline between us please, Dr. Tart, what you've
18 described as changes in context and if we just move
19 through them.

20 14:50

21 I think you use the phrase that cell site analysis was
22 in its infancy in 2001?

23 A. It was a developing field, yes.

24 533 Q. And there are various ways we can look at that in terms
25 of moments in time. It wasn't until 2016 that there 14:50
26 was a national standard, is that right?

27 A. Yes, that was Forensic Science Regulator Appendix for
28 Cell Site Analysis FSRC1, yes.

29 534 Q. In fact, the Forensic Science Regulation in England and

1 wales started in 2008?

2 A. Yes, but the Code wasn't delivered until 2010. So

3 that's when the Regulator was appointed.

4 535 Q. So far as the position in 1998 as contrasting with now,

5 there was no academic work available to inform good 14:51

6 practice?

7 A. My understanding is that the first paper that was in a

8 peer-review scientific publication was in 2012 because

9 I submitted it, there wasn't anything before then.

10 536 Q. Obviously, there have been a number of legal changes in 14:51

11 terms of the regulation of this area of activity since

12 1998?

13 A. Yes.

14 537 Q. OFCOM was not introduced until 2003?

15 A. Yes, it had a precursor, the Radio Communications 14:51

16 Agency.

17 538 Q. The Radio Communications Agency which was covering the

18 period that we are concerned. With, one of the last

19 acts of that agency was in 2000, the creation of the

20 site finder resource, is that right? 14:51

21 A. Yes, and that used to show where the cell sites were,

22 it wasn't 100% accurate but it was a useful resource,

23 certainly, at the beginning of my career in this area.

24 539 Q. But the point, for our purposes, is that that, having

25 been introduced in 2000, would not have been available 14:52

26 to anyone in 1997 or 1998?

27 A. No, I was hoping to find a copy when I was asked

28 specific questions and it doesn't exist.

29 540 Q. So, we're going to turn now to section 12 of your

1 report, which you have identified as cell site
2 capacity. And it's important that we acknowledge, at
3 this stage, that there are going to be two parts to how
4 we deal with this element of your evidence. The first
5 part, which we are going to deal with solely as an 14:52
6 introduction, is the question of how widespread cell
7 site analysis was in 1997 and 1998?

8 A. Yes.

9 541 Q. And the second part will be in relation to the process
10 in 1998 in terms that if anybody wanted to do cell site 14:53
11 analysis what they would need to do?

12 A. Yes.

13 542 Q. And the reason that we are taking the first of those
14 topics in headline only is because you've been kind
15 enough to agree to help us in Chapter 4 with that and a 14:53
16 number of other matters in much greater detail?

17 A. Yes.

18 543 Q. Let's deal briefly, and I'm taking you here from page
19 40 of your report, to just a number of key events that
20 you have identified in the evolution of cell site 14:53
21 analysis. And here can we just make one thing
22 absolutely clear: Your involvement, Dr. Tart, is at
23 what is often described as the evidential stage; is
24 that right?

25 A. Yes. 14:53

26 544 Q. In other words, an investigation has taken place by an
27 authorised agency, that has moved to the point where it
28 has been decided that a prosecution is either in
29 contemplation or is in effect, and you come in to

1 provide expert evidence at that stage for the purpose
2 of court proceedings?

3 A. Yes, and evaluation, where I would inspect the data
4 given the positions taken by prosecution and defence,
5 if known. 14:54

6 545 Q. So one important rider to your evidence is that you are
7 not involved in terms of the work of the UK
8 intelligence community?

9 A. No, and I never have been.

10 546 Q. And you are not in any position whatsoever to speak 14:54
11 about whatever capability there may have been at any
12 time, is that right?

13 A. No, they don't advertise and so I have no knowledge.

14 547 Q. And so all of your answers are focused upon how you
15 come into the picture, in other words at a relatively 14:54
16 late stage and for the purpose of court proceedings?

17 A. Yes, my role. Yes.

18 548 Q. And so with those caveats in mind, you've looked back
19 through the public records, no doubt some of them will
20 have been on your radar in any event as part of your 14:55
21 training and experience, and you have identified in
22 1992, in connection with a bomb in Manchester, that
23 there appears to have been an experimental use of cell
24 site?

25 A. Yes, that was pretty much the year that GSM was 14:55
26 actually implemented, so it was very early doors.

27 549 Q. Next, you have seen records in 1995 and 1996 of it
28 being discussed by the Association of Chief Police
29 Officers, one of their committees?

1 A. Yes. 14:56

2 550 Q. At about the same time, the infamous Steele case -

3 Steele being a surname and not a metal in this context

4 - often referred to as the Rettendon murders or the

5 Range Rover murders, a crime which occurred in Essex,

6 investigated by Essex Police, and which came to

7 prosecution, you have seen information in 1997, that a

8 defence expert in that case was considering prosecution

9 evidence based on cell site analysis?

10 A. Yes. 14:56

11 551 Q. Concurrent to the development of the Steele case, there

12 was the attack in Manchester in 1996 where, again,

13 you've seen information to suggest GMP were using this

14 technique?

15 A. Yes. 14:56

16 552 Q. In 1997, you have seen discussion, again, at the

17 committee level of the Association of Chief Police

18 Officers?

19 A. Yes.

20 553 Q. And I think in early 1998, which is where we will stop 14:56

21 our review, perhaps a significant discussion that was

22 occurring at the Association of Chief Police Officers

23 level about the need to limit the use of cell site

24 analysis. Just tell us a little bit more about that?

25 A. Certainly. At 12.16 in my report. 14:57

26 554 Q. Yes.

27 A. So, these were minutes and they were talking about

28 restricting requests for call data for:

29

1 "Terrorism, safety of life, kidnap, attempted murder,
2 hostage and extortion, paedophile, dangerous escaped
3 prisoners, drugs manufacture, importation, distribution
4 and sensitive investigations - Security, Government or
5 Royalty."

14:57

6
7 The need to restrict implies that it was in widespread
8 use investigatively.

9 555 Q. So that's obviously at the investigative level. ACPO
10 there, perhaps, not necessarily dealing with the
11 evidential level where you come in, but clearly there
12 was an ongoing dialogue, at that stage, between various
13 police forces and the telecommunications provider
14 requesting cell site data?

14:57

15 A. Yes.

14:58

16 556 Q. Now, as I say, that's the extent to which we're going
17 to just provide a context to what comes next now. And
18 I stress you will come back and we have no doubt there
19 will be other witnesses who will be able to speak to
20 this topic in Chapter 4, but we are not here
21 investigating what could have been done before the
22 Omagh bombing, that is for a later stage. Here, let us
23 just consider what the Omagh bombing investigation to
24 do and here I am picking up at page 45 as that will
25 illustrate the various steps that were required. And
26 plainly, bearing in mind that it's a third party,
27 namely the telecommunication companies that hold the
28 data, it all needs to start with a request?

14:58

14:58

29 A. Yes.

1 557 Q. So, the investigating force would need to ask the
2 telecommunication company for particular data?
3 A. Yes.
4 558 Q. That will involve a process, which we don't need to go
5 into the detail of now, where the investigators tell 14:59
6 the telecommunication the sort of data that they want?
7 A. Yes.
8 559 Q. And so, obviously, a precursor to that request is an
9 internal discussion within the investigation about what
10 data points they are seeking? 14:59
11 A. Yes.
12 560 Q. And we've heard from Prof. Gallop the use of this
13 phrase before, but it applies equally to your
14 speciality, is there a need for a forensic strategy?
15 A. Yes, it's always good to define what the questions are. 14:59
16 561 Q. And so, whether it's formal or informal, the
17 investigating force identify what they want, they make
18 the request, and the expectation then is that they will
19 be provided with the data that they've asked for?
20 A. Yes. 15:00
21 562 Q. Now, to use a word that's not commonly used, although
22 I'm sure everybody knows what it means, there is then a
23 process of normalisation?
24 A. Yes.
25 563 Q. What do you mean by "normalisation"? 15:00
26 A. So, "normalisation," we touched on this in some of the
27 previous slides. Normalisation is turning all the
28 technical information into useable information. So we
29 would need to look at what the calls were, if we've got

1 a cell ID where the cell site is, if we know the
2 azimuth to bring that together. So we're trying to get
3 information from disparate networks, potentially, so
4 that they're all in the same format, all aligned and we
5 can then start comparing or making observations from 15:00
6 that data that may assist us in answering the core
7 questions.

8 564 Q. Is your understanding that in 1998 that would have been
9 a manual process?

10 A. Yes. And automated tools now exist, they have done for 15:00
11 a few years now. I used Excel to do this, and I did it
12 manually, which is pretty much how I started as well.

13 565 Q. Not to put too fine a point on it, but that's a
14 painstaking process which does require considerable
15 care and concentration? 15:01

16 A. Yes.

17 566 Q. Now, I'm just going to read a sentence from 12.22, it's
18 something that you said on this point and I'd just like
19 to highlight it for you. Your last sentence reads:

20 15:01
21 "Thus, even getting the data used for Cell Site
22 Analysis was far more time consuming and complex (while
23 it's later use is also far less precise). In my view
24 this is a significant barrier for use of the method; it
25 could not easily be used to conduct analyses involving
26 trends, potential meetings or undertake attribution
27 analysis using data from a long period as is routinely
28 conducted today."
29

1 A. Yes. I have cases where I've got a quarter of a
2 million records, we throw it into a normalisation tool
3 and we can see large trends. If you've got to look at
4 every line individually and normalise it, that becomes
5 more difficult. There were fewer amounts of data then 15:02
6 though.

7 567 Q. That was really the point I was going to make. As you
8 have already observed, the amount of data that is being
9 generated by the current cellar network is vast, isn't
10 it? 15:02

11 A. Yes.

12 568 Q. Because of the proliferation of mobile phones and the
13 extent of their capacity to influence everyday life?

14 A. Yes, and data connections as well. The fact that they
15 do more things there are routinely recorded. 15:02

16 569 Q. So on the one hand we have much more data but we have
17 more sophisticated tools which are time saving and take
18 out a lot of the human element to producing something
19 that is useful; the flip side is in 1998 less data but
20 none of those tools which no doubt make your life much 15:03
21 easier?

22 A. Yes.

23 570 Q. So once the data has been normalised does it then need
24 to be mapped?

25 A. Yes, we move into analysis phase. Yes. 15:03

26 571 Q. And that involves identifying where cell sites are,
27 which numbers are using them, and no doubt at that
28 stage also, making proper allowance for other data and
29 the like?

1 A. Yes. So we've got the data in a format that we can
2 use, we're interested in where the phone was, in the
3 area that the phone was in, so this is the first stage
4 of that: where is the mast? It needs to have been in
5 range of the cell that was based on it. 15:03

6 572 Q. The next step that you've identified is not always
7 taken but is, you've spoken about available to
8 investigators, namely the use of a survey to try and
9 gather further data so greater precision can be
10 achieved? 15:04

11 A. Yes, it's a routine method. Not only do we do surveys,
12 we maintain a database so we can see changes over the
13 time. Within the group that I operate with, we've a
14 billion measurements that are available to us that have
15 been generated over more than a decade. So that's 15:04
16 closer to 15 years now. And so that's really useful
17 because you can see experimental data, but that's
18 contemporaneous.

19 573 Q. Well, let's turn our attention, please, to 1998 and
20 following. We know that a Vodafone engineer by the 15:04
21 name Scott Southall --

22 A. Yes.

23 574 Q. -- did, in fact, conduct a form of survey, he did so in
24 May of 1999, is that right?

25 A. Yes. 15:04

26 575 Q. Now, he used a technique that you haven't used, is that
27 right?

28 A. Yes.

29 576 Q. And that just gives rise to a very short diversion

1 within this review just to pick up on something that I
2 have been asked to ask you. And this is in relation to
3 IMSI trace and IMSI capture. They're two different
4 things, that's the first thing to acknowledge, isn't
5 that right? 15:05

6 A. Yes, yes.

7 577 Q. What do you understand "IMSI trace" to be?

8 A. First of all I have never done either of them, so I've
9 no direct firsthand use, it's never been part of my
10 role. My understanding of the IMSI trace is that it's 15:05
11 directly linked to the phone into the network's view of
12 what's taking place. But, as I say, I've never used it
13 so I'm very reticent to go into more detail.

14 578 Q. Given that reticence is your position that you can't
15 help in terms of what that might actually look like in 15:05
16 practice?

17 A. Yes, I'm concerned that any answer I gave wouldn't be
18 robust.

19 579 Q. How does that differ from the IMSI capture?

20 A. Again, I've never done that. My understanding is 15:05
21 that's recording the IMSI of phones that operating in
22 an area but this is -- I've not got direct experience
23 of it.

24 580 Q. We'll return just to our narrative. We'll put
25 ourselves in the position of the analyst, forensic 15:06
26 strategy has been developed, request has been made,
27 data has come back, that's all had to be normalised, it
28 then has to be analysed, it needs to be mapped. A
29 survey, if one is to take place, needs to be arranged.

1 And once one has taken all of those steps, might one
2 begin to have an end product?

3 A. Yes, yes.

4 581 Q. And that end product will be subject to many of the
5 caveats that you have given us along the way? 15:06

6 A. Yes. So you'll have generated a number of
7 observations, these will be meaningful things that
8 you've noted within the data you've considered, and
9 from that you'll start forming opinions.

10 582 Q. You have, helpfully if I may say so, drawn together all 15:07
11 of your conclusions on this point from paragraph 12.60
12 which is to be found on your page 60, where you have
13 reviewed the work that was done by the analysts
14 following the route that you have described, including
15 producing end product. And you have asked yourself, I 15:07
16 think, a simple question of, has this produced a
17 reliable output?

18 A. Yes.

19 583 Q. And you will recall that we headlined at the beginning
20 the 2026 standard? 15:08

21 A. Yes.

22 584 Q. Those four elements beginning with balance. And what
23 is your conclusion about balance?

24 A. Well, there were no stated propositions available is my
25 understanding, so that's always a tricky position for a 15:08
26 forensic scientist.

27 585 Q. Just pause there. You are expected, in adversarial
28 proceedings, particularly adversarial proceedings which
29 are criminal law in nature, to test propositions,

1 aren't you?

2 A. We are, yes. So we should be looking to see whether
3 the data that we're considering is likely or of a type
4 that is likely, given the positions taken by not just
5 one side but the prosecution or defence. So, we're 15:08
6 essentially test to go see whether it's reasonable.
7 And if it's expected to be given both, then we know
8 their evidence has got no probative value and if it's
9 more likely given one than the other then it may have
10 probative value. So we would normally be looking to 15:09
11 see an alternative proposition, but there was none
12 available here. That still happens today, so that's a
13 normal thing. What I found within the evidence, the
14 way it was presented was a series of estimations, of
15 service areas I think that the manner in which they'd 15:09
16 done those estimations were legitimate, and I don't
17 think there's any actual risk in the fact that we
18 aren't in a position to have an alternative. The
19 manner in which it was presented, in my view, was
20 appropriate. 15:09

21 586 Q. So that's balance?

22 A. Yes.

23 587 Q. Obviously, as everybody knows, you're going to come
24 back to tell us what the conclusions we can draw about
25 the data is, but we're here just providing the 15:09
26 overview. Logic is your next standard?

27 A. Yes.

28 588 Q. What do you have to say about this and the process that
29 was gone through?

1 A. So, logic is whether the data is expected given the
2 proposition rather than whether the proposition itself
3 is expected. If you get those mixed up it becomes a
4 prosecutor's fallacy, it's called a transposed
5 conditional, there was no evidence about that in the 15:10
6 evidence that I reviewed, so I don't think there has
7 been a failure of logic.

8 589 Q. You give us an example at your 12.60.2 about the
9 prosecutor's fallacy?

10 A. Yes. 15:10

11 590 Q. And it's easy to get lost in this, but it's simple
12 illustration, if I may say, based on the facts of this
13 case. Just give us an example of the prosecutor's
14 fallacy as you've given it there?

15 A. Okay, as given here: 15:10

16

17 "For example, the analyses do not claim that a phone
18 was in Omagh because a given cell was believed to serve
19 there..."

20

21 So, the cell served beyond Omagh, for example. And so
22 to say that I expect that you could connect to this
23 cell if I were in Omagh, is not the same as I expect
24 that the phone was in Omagh because I would expect that
25 I could connect to the cell in Omagh. I know that 15:10
26 sounds tortuous. You can tie yourself up in knots with
27 it. The danger is that you end up with a false
28 precision.

29 591 Q. So where a mobile phone uses a cell site that is in

1 Omagh --

2 A. Yes.

3 592 Q. -- one can reach the conclusion safely, can one, that
4 the phone is in range of that cell, in other words,
5 it's in the area served by the cell? 15:11

6 A. Yeah. And so that data might be likely if it were in
7 Omagh, but not only Omagh.

8 593 Q. Absolutely. But the fact that it is using a cell that
9 serves Omagh doesn't mean that it is in Omagh because
10 that cell serves other places too? 15:11

11 A. Yes.

12 594 Q. So, that is logic and you found no such flaw in the
13 analysis that was conducted that you've reviewed?

14 A. Yes.

15 595 Q. Transparency, you use the word "exceptional" here? 15:11

16 A. Yes.

17 596 Q. And I think it's appropriate that that is noted. What
18 do you have to say about the transparency of the
19 methodology?

20 A. So, all of the methods were defined, and the 15:11
21 limitations of them, they went into serious detail, the
22 practitioners, in what the limitations were, both
23 within the source data and the later analyses that were
24 conducted on them. It was a joy to read, if I'm
25 honest, from a technical level, it was done very well 15:12
26 in my view.

27 597 Q. We're not just talking about the in-house police
28 investigation, we're also, you've used the plural,
29 we're talking about the analysts who subsequently

1 looked at the data and prepared reports?

2 A. Yes. There were a number of reports that were
3 specifically based and focused on the limitations of
4 the methods, and they were very well written, in my
5 view. 15:12

6 598 Q. And then, finally, robustness?

7 A. Yes.

8 599 Q. What do you have to say about the robustness of the
9 approach that's been taken?

10 A. So, robustness we could split up into three main 15:12
11 pieces; that would be competence of the examiner,
12 validity of the methods and quality assurance, and
13 those are the three bases. We can see split competence
14 into skills, knowledge and understanding and, again, in
15 my view, it was quite apparent from the limitations 15:13
16 discussions there was a deep level of competence. And
17 you wouldn't be able to generate the data without the
18 skills in place. The knowledge was obvious. And I
19 think the approach to managing risk of the reports
20 being misunderstood, the fact they had a separate 15:13
21 document purely about that, I think was very good
22 practice.

23 600 Q. So you conclude at 12.60.5 saying this:

24

25 "I find no indication that the findings and opinions 15:13
26 given are unreliable. None of the technical issues
27 identified during my career are evident in the material
28 I have reviewed. In my view the estimates of service
29 areas are based on sound principles and are of

1 justifiably low precision, for example, the
2 35 kilometres for Pigeon Top."

3
4 A. Yes.

5 601 Q. And so, that's your opinion having conducted a review 15:13
6 of the cell site analysis that was generated as a
7 result of the Omagh Bombing investigation by the police
8 and subsequently looked at and reviewed by people
9 independent of the police in various reports. There
10 are two short further topics to deal with, but before I 15:14
11 get to those, as we know in the Breslin litigation (as
12 we are calling it), two of those experts who were
13 independent of the police as well as a police analyst
14 and a number of others, gave evidence before
15 Mr. Justice Morgan, and their evidence was the subject 15:14
16 of very considerable scrutiny and analysis in a long
17 and detailed judgment. That judgment was delivered
18 sometime ago now. By 2026 standards, based on all of
19 your experience and expertise, do you see anything in
20 that judgment which causes you to doubt the validity of 15:15
21 the analysis from a cell site point of view?

22 A. No.

23 CHAIRMAN: Mr. De la Poer should we think about a short
24 break around about this time.

25 MR. DE LA POER: I am entirely in your hands, Sir. I 15:15
26 can indicate just for everybody's time management
27 purpose I anticipate that I have less than 10 minutes
28 left but I know that there are some Core Participant
29 questions, I don't know whether I have covered those,

1 but there is certainly permission given for those
2 questions, it would be a maximum of 20 minutes but I am
3 quite content to take a break now, Sir, if you think
4 that is appropriate.

5 CHAIRMAN: Yes, we will take a break at this stage. 15:15
6 Shall we sit again around 3.30?

7 MR. DE LA POER: Thank you, Sir.
8

9 AFTER A BRIEF ADJOURNMENT, THE HEARING RESUMED AS
10 FOLLOWS: 15:20
11

12 CHAIRMAN: Mr. De la Poer.

13 MR. DE LA POER: Sir, thank you. Dr. Tart, we are just
14 going to go back to one answer you gave earlier so we
15 can have absolute clarity, as I may have led you into 15:30
16 error or misspoken. Can I ask you to turn to 12.1.6,
17 which is for your reference, Sir, page 44. You gave
18 evidence about minutes that you had seen dated February
19 of 1998, and people may have found your evidence
20 memorable because what you told us is that there was a 15:31
21 restriction that was applied in relation to particular
22 very serious categories of criminal behaviour?

23 A. Yes.

24 602 Q. You listed them, they included terrorism, safety of
25 life, kidnap, attempted murder, hostage and extortion 15:31
26 and so on, we don't need to go over that again, you
27 have given your evidence. I would just like to be
28 clear about what implication you think there is from
29 what is said, I will read to you what you said in your

1 report. The last sentence: '
2
3 "There is an obvious implication that by this point
4 telecommunications data is in widespread use, at least
5 during the investigation and that this restriction was 15:31
6 viewed as an issue."
7
8 A. Yes.
9 603 Q. So that we're absolutely clear, you are there talking
10 about telecommunications data? 15:31
11 A. Yes.
12 604 Q. Thank you very much indeed. Two short topics as I
13 indicated Dr. Tart, and I am extremely grateful to the
14 PA Duffy team who have indicated that notwithstanding
15 their permission everything has been covered, so these 15:32
16 will be the last two topics from me. Identification of
17 users of mobile phones, this is your part 13, page 63?
18 A. Yes.
19 605 Q. Here we are giving an overview. The starting point
20 that we need to acknowledge is that cell site analysis 15:32
21 will never conclusively tell us who is using a mobile
22 phone?
23 A. That is true, we never know exactly where it was and we
24 never know who was using it.
25 606 Q. It is capable of providing some data points which can 15:32
26 contribute to an assessment of who might be using it,
27 do you agree?
28 A. Yes. And we can test an allegation, yes.
29 607 Q. Yes. Obviously before we get to cell sites, law

1 enforcement, as you know, and will have experience of,
2 will carry out subscriber checks, whether it is
3 contracted phone and who the contract is with. You
4 will also be familiar with call data analysis, namely,
5 the looking at who is phoning which number? 15:33

6 A. Yes.

7 608 Q. To see if patterns emerge from that assessment. None
8 of these things are cell site analysis but they all
9 form part of a wider attribution picture?

10 A. And they are all from the telecommunications data. 15:33

11 609 Q. Yes, but when we come to cell sites, the sort of
12 considerations that can be applied when seeking to
13 understand who a user is, could be which cell sites
14 they are commonly using or which are commonly being
15 used by the mobile telephone? 15:34

16 A. Yes.

17 610 Q. In 2026, there is the form of analysis sometimes
18 described as 'sleep wake analysis', and you can just
19 help us with that. That's when the mast that is last
20 used and first used by a user where there is a period 15:34
21 of apparent inactivity is looked at and the proposition
22 being tested is has that person taken it home, left it
23 by their bedside table, fallen asleep and then woken up
24 and the phone has operated in that way against a cell
25 which serves that person's house? 15:34

26 A. Yes, it would be a home cell we are looking for or a
27 number of them.

28 611 Q. And it can go wider, looking at places of work, other
29 places where people frequent, and again the proposition

1 being tested is are those cells that serve that area
2 being used by the handset that we are considering?

3 A. Yes.

4 612 Q. You have covered all of those in your report which is
5 why I have adduced them, but having set it up it is 15:34
6 important for us to knock it down. When we look at
7 1998 and the level of data that was available, none of
8 that kind of detailed work that requires tens, if not
9 hundreds, of data point entries to begin to look at a
10 pattern is available bearing in mind the large 15:35
11 distances and infrequency of the calls?

12 A. Yes, we are routinely using thousands of records now
13 and we would also look to see if there was a known
14 location of a suspect and whether the cell used close
15 in time was there, all of that sort of stuff. You can 15:35
16 only do it if it is available.

17 613 Q. To take an example, we see commonly in the data, a
18 particular handset is using a cell that is based in the
19 Dundalk area, all that tells us is that mobile phone is
20 in range of a cell that is in the Dundalk area? 15:35

21 A. Yes.

22 614 Q. So that is the identification of users of mobile
23 telephones. The second short topic is about access to
24 text messages and voicemail. And again we need to
25 remind everybody of the limits of your knowledge. 15:36
26 Firstly, you didn't practice in 1998?

27 A. Yes.

28 615 Q. Secondly, your expertise is in cell site analysis, not
29 the accessing of text message and voicemails that may

1 be stored on database?

2 A. Yes.

3 616 Q. Thirdly, while there may be a lawful route for police
4 to obtain that, there are other agencies who may also
5 have lawful routes to obtain whatever data that is 15:36
6 available?

7 A. Yes.

8 617 Q. You can't speak to any of that?

9 A. I can't.

10 618 Q. We know that in 1998 we are dealing with the second 15:36
11 generation of the mobile telephone network, GSM?

12 A. Yes.

13 619 Q. Is it your understanding, and an understanding gained
14 through your experience and expertise, that text
15 messages, firstly, were only able to be sent on the 15:37
16 same network under that operation?

17 A. At the beginning, yes, that was a requirement, that is
18 my understanding and that was removed later.

19 620 Q. would that have been the requirement in 1998 as far as
20 you are aware? 15:37

21 A. As far as I am aware.

22 621 Q. Is it your understanding that the content of those text
23 messages would have been stored for a period of time?

24 A. Well the content of all text messages are stored, it is
25 a store and forward system. It assumes that when a 15:37
26 person goes out of coverage whatever it will hold until
27 they come back in and then you will get them, that is
28 the way the system normally operates.

29 622 Q. Are you able to help us with any knowledge as to how

1 long a text message would have been held in 1998?

2 A. I don't know in 1998, it can change according to

3 network settings.

4 623 Q. So it will have been down to the network provider to

5 set the period of time, because plainly there is data 15:38

6 storage issue that they have to manage in terms of how

7 long they keep particular messages?

8 A. Yes, and it might be network dependent as well.

9 624 Q. Secondly, in relation to voicemails. Those are plainly

10 stored for a period of time because they get accessed 15:38

11 once they have been left?

12 A. Yes.

13 625 Q. Again, do you have any knowledge of what the position

14 was in 1998 in terms of how long voicemails were stored

15 and whether there was a cut-off period? 15:38

16 A. No.

17 626 Q. Again, is it your expectation that that would have been

18 down to each network operator?

19 A. Yes.

20 MR. DE LA POER: Thank you very much indeed, Dr. Tart. 15:38

21 As I have said before, you will be returning, we

22 anticipate, on 1st October. Sir, do you have any

23 questions for Dr. Tart?

24 CHAIRMAN: No, thank you.

25 MR. DE LA POER: In those circumstances I wonder if he 15:38

26 might be released until that return date. And Sir, I

27 can say before Dr. Tart gets up from the witness box,

28 that that concludes the live evidence for today.

29

1 If I can give this indication about tomorrow. Tomorrow
2 we will hear from Mr. Safranauskas, who will take us
3 through his presentation in terms of the key
4 individuals and their links. And in terms of
5 attribution, and as Mr. Greaney said earlier today, 15:39
6 subject to time allowance and the situation when we
7 reach it, there is a possibility that the evidence from
8 the AGS, Superintendent Casserly, that that will be
9 played tomorrow afternoon too.

10 CHAIRMAN: Thank you very much Dr. Tart, I look forward 15:39
11 to hearing from you again.

12 DR. TART: Thank you, Sir.

13
14 THE INQUIRY ADJOURNED UNTIL WEDNESDAY, 23RD SEPTEMBER
15 2026 AT 10:00 A.M. 15:40
16
17
18
19
20
21
22
23
24
25
26
27
28
29

INDEX

WITNESS	PAGE
DR. JOHN MORRISON	
QUESTIONED BY MR. GREANEY	2
 <u>PROF. ANGELA GALLOP</u>	
QUESTIONED BY MR. GREANEY	39
QUESTIONED BY THE CHAIRMAN	103
QUESTIONED BY MR. MCGUCKIN	103
 <u>DR. MATTHEW TART</u>	
QUESTIONED BY MR. DE LA POER	106

	59:9, 61:12, 80:4, 102:17, 124:15, 125:7, 135:7, 151:27 10.20 [1] - 36:18 100% [1] - 136:22 103 [2] - 159:8, 159:9 106 [1] - 159:12 10:00 [1] - 158:15 11.14 [1] - 38:17 110 [1] - 82:13 112 [1] - 84:28 11:15 [1] - 39:7 12 [2] - 61:17, 136:29 12.1.6 [1] - 152:16 12.16 [1] - 139:25 12.22 [1] - 142:17 12.60 [1] - 146:11 12.60.2 [1] - 148:8 12.60.5 [1] - 150:23 120 [2] - 118:28, 120:9 128 [2] - 84:29, 89:15 12TH [1] - 107:7 13 [3] - 52:12, 62:9, 153:17 131 [1] - 94:20 134 [1] - 98:6 135 [1] - 108:25 136 [1] - 99:12 14 [3] - 52:12, 52:17, 64:21 14-POINT [1] - 22:1 15 [3] - 52:17, 66:28, 144:16 15157 [2] - 126:5, 126:6 15TH [3] - 33:24, 107:7, 130:24 16 [1] - 67:27 168 [1] - 41:5 16837 [1] - 126:28 17 [5] - 59:6, 69:27, 108:1, 133:3, 135:16 170 [1] - 94:12 17025 [3] -	96:22, 97:2, 98:1 180 [1] - 118:16 19 [2] - 59:7, 72:11 1960S [1] - 17:28 1969 [4] - 3:4, 12:1, 12:22, 13:7 1970 [4] - 13:10, 13:12, 13:25, 16:25 1970S [4] - 18:14, 56:15, 64:4, 64:6 1974 [3] - 14:15, 14:19, 16:27 1980S [4] - 22:7, 56:16, 63:20, 95:14 1985 [2] - 95:28, 95:29 1986 [15] - 15:10, 16:19, 17:1, 17:10, 17:19, 18:1, 18:8, 18:10, 18:22, 18:27, 19:13, 19:22, 22:3, 37:17, 43:5 1987 [2] - 20:2, 96:2 1990S [13] - 22:7, 22:10, 37:20, 46:2, 49:1, 56:21, 57:25, 64:15, 65:9, 65:24, 75:28, 91:29, 95:2 1992 [1] - 138:22 1993 [1] - 107:27 1994 [7] - 21:22, 21:25, 21:26, 22:2, 22:14, 23:9, 25:6 1995 [2] - 96:17, 138:27 1996 [5] - 25:9, 25:27, 25:28, 138:27, 139:12 1997 [30] - 3:5, 15:17, 16:20, 17:2, 17:11, 20:27, 23:10, 23:11, 26:18, 26:26, 27:18, 28:29, 37:18, 41:4, 43:10, 46:10, 72:5, 74:1, 82:27, 85:18, 86:5, 87:7, 89:16,	99:9, 100:14, 103:7, 136:26, 137:7, 139:7, 139:16 1997/1998 [10] - 41:24, 53:20, 64:23, 69:23, 74:19, 75:15, 80:8, 83:21, 89:9, 101:12 1997/98 [7] - 56:11, 58:19, 60:15, 61:6, 67:10, 79:20, 90:7 1998 [44] - 33:25, 40:17, 41:4, 61:10, 61:12, 72:5, 74:1, 82:27, 85:18, 87:8, 89:16, 89:18, 99:9, 103:7, 104:2, 105:1, 107:7, 110:20, 111:11, 111:15, 111:19, 112:1, 112:23, 116:27, 122:11, 132:10, 133:9, 136:4, 136:12, 136:26, 137:7, 137:10, 139:20, 142:8, 143:19, 144:19, 152:19, 155:7, 155:26, 156:10, 156:19, 157:1, 157:2, 157:14 1999 [2] - 96:22, 144:24 1999/EARLY [1] - 79:17 19TH [1] - 27:18 1:30 [2] - 40:4, 73:18 1G [4] - 112:3, 112:5, 113:3, 113:11 1ST [2] - 107:15, 157:22	SOMETHING [1] - 117:1 2000 [3] - 97:17, 136:19, 136:25 2000S [4] - 63:20, 75:28, 79:18, 97:1 2001 [1] - 135:22 2003 [4] - 120:29, 121:11, 122:10, 136:14 2007 [1] - 97:27 2008 [1] - 136:1 2009 [1] - 97:23 2010 [4] - 3:2, 43:16, 108:10, 136:2 2012 [2] - 42:25, 136:8 2015 [1] - 43:23 2016 [2] - 108:25, 135:25 2017 [1] - 71:9 2019 [1] - 121:14 2021 [1] - 97:28 2024 [1] - 4:26 2025 [1] - 5:5 2026 [14] - 53:17, 56:11, 61:4, 83:23, 109:19, 110:19, 111:10, 111:18, 111:24, 128:8, 146:20, 151:18, 154:17, 158:15 21 [1] - 76:11 21043 [1] - 109:1 22 [2] - 64:29, 77:14 23 [2] - 4:5, 79:6 23RD [1] - 158:14 23RD [1] - 4:26 24 [2] - 70:27, 79:22 25 [1] - 80:29 26 [1] - 36:19 27 [2] - 38:14, 84:8 270 [2] - 118:16, 123:27 28 [1] - 11:24 29 [2] - 16:11, 86:11 2:05 [2] - 106:3 2D [2] - 123:13, 123:24 2G [7] - 112:1, 112:8, 112:14, 112:21, 112:29,	113:1, 113:9 3 3 [5] - 45:10, 76:6, 114:19, 116:22, 133:3 3.30 [1] - 152:6 3.5 [1] - 4:7 30 [4] - 38:15, 89:14, 103:3, 133:18 31 [1] - 90:26 32 [14] - 15:24, 15:27, 16:1, 16:7, 17:2, 17:3, 34:6, 34:7, 34:18, 34:28, 35:8, 35:12, 35:15, 91:22 33 [1] - 94:27 34 [1] - 98:6 35 [9] - 99:11, 120:12, 122:13, 122:19, 122:23, 123:6, 131:11, 134:19, 151:2 35- KILOMETRE [1] - 122:29 36 [2] - 99:11, 134:19 360 [1] - 119:24 37 [2] - 70:27, 134:19 38 [1] - 77:11 39 [2] - 17:12, 159:7 4 4 [3] - 45:17, 137:15, 140:20 4% [1] - 34:20 40 [1] - 137:19 43 [1] - 17:13 430 [8] - 130:21, 130:26, 131:9, 131:22, 131:29, 132:1, 132:11, 132:13 44 [2] - 21:16, 152:17 45 [1] - 140:24 48 [1] - 77:11 49 [1] - 77:12
0	0 [1] - 118:17 0.2 [3] - 60:15, 79:12 048914 [1] - 113:17 0489371 [1] - 41:22				
1	1 [4] - 16:13, 41:25, 66:29, 108:28 10 [9] - 59:4,		2 2 [3] - 16:24, 41:29, 159:4 2,000 [1] - 45:22 20 [5] - 59:9, 73:17, 108:15, 135:7, 152:2 20-		

5	121:21 ABLE [26] - 16:10, 19:16, 19:27, 26:24, 27:23, 36:19, 37:12, 48:15, 60:1, 61:24, 63:3, 66:20, 78:27, 81:12, 81:13, 84:1, 86:6, 91:15, 113:8, 122:21, 133:7, 140:19, 150:17, 156:15, 156:29 ABSENCE [1] - 122:2 ABSOLUTE [1] - 152:15 ABSOLUTELY [27] - 11:13, 46:27, 48:21, 50:3, 51:6, 51:21, 53:24, 55:17, 57:18, 57:23, 59:10, 59:25, 64:28, 66:16, 66:27, 78:3, 79:1, 79:2, 82:8, 89:2, 91:3, 93:9, 94:7, 94:15, 137:22, 149:8, 153:9 ABSORBANCE [1] - 68:28 ABSTENTIONI SM [5] - 17:17, 17:25, 18:2, 18:19, 19:2 ABSTENTIONI ST [2] - 12:14, 13:16 ACADEMIC [5] - 4:4, 11:17, 76:1, 107:23, 136:5 ACCEPT [1] - 33:10 ACCEPTS [1] - 81:26 ACCESS [7] - 19:26, 25:1, 31:6, 37:11, 112:24, 112:28, 155:23 ACCESSED [1] - 157:10 ACCESSING [1] - 155:29 ACCIDENT [1] - 47:6 ACCIDENTS [1] - 89:28 ACCOMPLICE	S [1] - 104:9 ACCORDING [1] - 157:2 ACCOUNTS [1] - 47:26 ACCREDITATI ON [3] - 97:1, 97:6, 108:12 ACCREDITATI ON [1] - 96:1 ACCREDITED [2] - 86:22, 97:2 ACCURATE [5] - 36:10, 36:11, 36:22, 131:9, 136:22 ACCUSED [1] - 43:7 ACHIEVE [3] - 8:14, 31:18, 123:7 ACHIEVED [2] - 91:29, 144:10 ACHIEVING [1] - 8:8 ACKNOWLED GE [3] - 137:2, 145:4, 153:20 ACKNOWLED GED [1] - 68:1 ACPO [1] - 140:9 ACRONYM [1] - 112:20 ACRONYMS [1] - 112:13 ACT [1] - 96:28 ACTIVE [9] - 21:10, 35:27, 37:7, 38:10, 55:22, 71:6, 74:16, 77:4, 77:6 ACTIVELY [1] - 59:21 ACTIVITIES [6] - 3:18, 3:19, 3:26, 4:9, 10:10, 10:23 ACTIVITY [9] - 7:24, 11:9, 11:11, 11:14, 12:11, 19:17, 56:18, 116:7, 136:11 ACTS [1] - 136:19 ACTUAL [7] - 67:13, 112:20, 114:15, 122:14, 129:6, 135:6, 147:17 ADAMS [4] -	18:17, 22:5, 24:22 ADDED [2] - 24:5, 135:6 ADDITION [1] - 101:4 ADDITIONAL [4] - 72:19, 100:9, 108:17, 116:16 ADDRESS [4] - 46:17, 57:28, 80:29, 91:21 ADDRESSED [1] - 67:28 ADDRESSES [3] - 54:17, 77:10, 77:11 ADDUCED [1] - 155:5 ADHERE [2] - 97:10, 110:1 ADHESIVE [1] - 83:2 ADJOURNED [3] - 39:11, 106:11, 158:14 ADJOURNMEN T [1] - 152:9 ADOPT [1] - 30:4 ADOPTED [1] - 93:18 ADVANCE [1] - 122:22 ADVANCED [1] - 81:9 ADVANCES [2] - 46:5, 58:3 ADVERSARIAL [2] - 146:27, 146:28 ADVERTISE [1] - 138:13 ADVICE [2] - 91:8, 95:10 ADVISE [1] - 91:3 ADVISED [1] - 100:2 ADVISER [1] - 34:26 ADVISING [1] - 108:28 ADVISORY [2] - 92:23, 95:12 ADVISORY [2] - 80:5, 92:21 AERIAL [4] - 116:9, 117:26, 118:14, 119:15	AFFAIRS [1] - 10:21 AFFECT [6] - 121:24, 123:10, 123:16, 123:21, 124:20, 127:29 AFFECTED [4] - 43:20, 68:6, 74:25, 127:20 AFTER [1] - 152:9 AFTERNOON [5] - 106:15, 106:19, 106:20, 107:10, 158:9 AFTERWARDS [3] - 14:10, 70:17, 96:26 AGENCIES [1] - 156:4 AGENCY [2] - 136:16, 136:17 AGENCY [3] - 91:29, 136:19, 137:27 AGENDAS [1] - 28:18 AGO [5] - 19:8, 117:2, 125:7, 133:18, 151:18 AGREE [5] - 111:11, 111:14, 112:19, 137:15, 153:27 AGREED [1] - 57:14 AGS [1] - 158:8 AHEAD [3] - 20:26, 55:9, 64:7 AHERN [1] - 34:26 AIM [5] - 31:16, 32:3, 33:13, 41:16 AIMS [2] - 8:8, 8:14 ALBERT [1] - 22:1 ALDERMASTO N [1] - 89:19 ALERT [1] - 88:20 ALIAS [3] - 23:21, 24:9, 24:10 ALIGN [1] - 97:29 ALIGNED [2] - 118:21, 142:4 ALLEGATION	[1] - 153:28 ALLIANCE [2] - 90:14, 96:10 ALLOWANCE [2] - 143:28, 158:6 ALLOWED [1] - 117:5 ALMOST [2] - 19:26, 75:21 ALONGSIDE [3] - 6:9, 15:21, 33:19 ALTERNATIVE [2] - 147:11, 147:18 ALTOGETHER [1] - 51:20 AMERICA [1] - 10:29 AMMONIUM [1] - 70:9 AMOUNT [6] - 49:1, 92:1, 103:10, 106:28, 120:20, 143:8 AMOUNTS [3] - 61:19, 72:22, 143:5 ANALOGUE [1] - 112:6 ANALYSE [5] - 59:17, 61:18, 65:5, 78:11, 113:8 ANALYSED [5] - 3:17, 65:26, 85:21, 113:4, 145:28 ANALYSES [6] - 54:29, 56:29, 91:5, 142:25, 148:17, 149:23 ANALYSING [3] - 50:24, 69:18, 78:11 ANALYSIS [3] - 61:17, 135:28, 142:22 ANALYSIS [41] - 4:8, 34:18, 49:20, 58:27, 68:2, 68:13, 68:24, 74:23, 77:20, 82:1, 94:17, 95:18, 95:19, 104:6, 106:5, 107:23, 108:4, 108:13, 108:15, 108:23, 109:22, 110:22, 111:6,
6	6 [1] - 113:18 60 [1] - 146:12 63 [2] - 77:12, 153:17 64 [1] - 77:14				
7	7 [3] - 51:6, 116:23, 135:15 75 [1] - 77:14 76 [1] - 79:23 7TH [1] - 5:5				
8	8 [2] - 52:16, 52:17 89 [1] - 79:24				
9	90 [5] - 37:3, 37:5, 82:13, 118:15, 127:1 9001 [2] - 96:3, 96:4 9TH [1] - 25:9				
A	A.M [1] - 158:15 ABANDONED [1] - 31:27 ABERDEEN [1] - 90:23 ABIDE [1] - 95:26 ABILITY [3] - 87:17, 105:7,				

128:18, 135:21, 137:7, 137:11, 137:21, 139:9, 139:24, 142:27, 143:25, 149:13, 151:6, 151:16, 151:21, 153:20, 154:4, 154:8, 154:17, 155:28 ANALYSIS ^[2] - 105:15, 154:18 ANALYST ^[2] - 145:25, 151:13 ANALYSTS ^[3] - 124:22, 146:13, 149:29 ANALYTICAL ^[1] - 89:29 ANALYTICAL ^[6] - 70:1, 70:3, 78:8, 81:7, 84:21, 102:9 AND ^[2] - 39:11, 106:11 ANECDOTAL ^[1] - 89:9 ANGELA ^[3] - 39:6, 39:15, 39:26 ANGELA ^[2] - 39:21, 159:6 ANGLE ^[2] - 134:14, 135:4 ANGLED ^[1] - 119:23 ANNEX ^[1] - 67:7 ANNUAL ^[1] - 13:13 ANSWER ^[10] - 8:26, 19:28, 76:6, 76:7, 89:8, 112:27, 113:15, 127:12, 145:17, 152:14 ANSWERED ^[1] - 103:24 ANSWERING ^[3] - 38:27, 46:8, 142:6 ANSWERS ^[1] - 138:14 ANTICIPATE ^[3] - 104:29, 151:27, 157:22 ANYWAY ^[9] - 21:2, 75:4, 75:8, 76:10, 81:10, 84:17, 97:24, 119:1, 128:2	APART ^[1] - 105:24 APPARATUS ^[1] - 65:24 APPARENT ^[2] - 150:15, 154:21 APPEAL ^[1] - 42:15 APPEAR ^[6] - 37:20, 84:15, 101:11, 101:23, 116:24, 117:4 APPEARANCE ^[1] - 50:1 APPEARED ^[1] - 81:16 APPEARING ^[1] - 85:9 APPENDIX ^[1] - 135:27 APPENDIX ^[1] - 108:23 APPLIED ^[11] - 55:18, 63:23, 63:25, 67:12, 67:14, 96:3, 97:11, 107:20, 132:22, 152:21, 154:12 APPLIES ^[2] - 100:21, 141:13 APPLY ^[8] - 9:23, 57:21, 63:8, 63:21, 65:19, 87:13, 99:6, 105:18 APPLYING ^[1] - 11:5 APPOINTED ^[5] - 27:2, 29:8, 32:10, 44:19, 136:3 APPOINTMENT ^[2] - 97:27, 101:5 APPRECIATE ^[1] - 40:23 APPROACH ^[13] - 12:20, 14:25, 21:12, 21:14, 33:9, 48:27, 81:18, 91:18, 91:21, 101:10, 109:10, 150:9, 150:19 APPROACHED ^[1] - 84:15 APPROACHES ^[2] - 9:11, 100:14 APPROPRIATE ^[7] - 55:21, 58:15,	116:20, 125:2, 147:20, 149:17, 152:4 APPROVAL ^[1] - 13:20 APPROVED ^[1] - 13:20 APRIL ^[1] - 41:27 ARC ^[2] - 64:17, 118:21 ARCHIVES ^[1] - 6:5 ARD ^[3] - 13:12, 13:14, 25:17 AREA ^[20] - 36:2, 58:18, 103:25, 117:27, 117:29, 118:1, 121:3, 121:25, 123:7, 123:27, 126:22, 127:4, 136:11, 136:23, 144:3, 145:22, 149:5, 155:1, 155:19, 155:20 AREAS ^[21] - 10:29, 44:22, 46:8, 47:18, 53:11, 58:5, 58:6, 65:6, 73:28, 75:22, 76:8, 118:23, 122:2, 122:8, 122:11, 122:17, 124:15, 127:7, 147:15, 150:29 ARENA ^[1] - 71:9 ARGUED ^[2] - 33:27, 38:1 ARMED ^[7] - 7:24, 7:29, 9:10, 28:27, 31:23, 31:24 ARMY ^[33] - 13:20, 16:17, 20:16, 20:21, 20:22, 20:23, 21:27, 22:11, 22:23, 22:24, 22:28, 23:15, 23:16, 23:17, 23:19, 23:24, 24:13, 24:17, 24:22, 24:25, 24:27, 25:3, 25:4, 25:24, 26:11, 26:13, 27:22, 27:23, 28:22,	29:14, 29:17 ARRANGED ^[1] - 145:29 ARRIVED ^[1] - 100:24 ARTICLES ^[2] - 4:4, 34:20 ARTILLERY ^[1] - 19:26 AS ^[7] - 39:11, 39:22, 103:1, 103:20, 106:11, 106:23, 152:9 ASLEEP ^[1] - 154:23 ASPECT ^[3] - 12:19, 47:14, 101:21 ASPECTS ^[4] - 3:10, 3:25, 77:29, 109:17 ASSESS ^[1] - 91:6 ASSESSING ^[2] - 71:5, 127:14 ASSESSMENT ^[11] - 63:13, 64:24, 71:20, 74:8, 74:9, 99:23, 103:27, 104:5, 110:6, 153:26, 154:7 ASSESSOR ^[1] - 85:13 ASSIST ^[2] - 91:2, 142:6 ASSOCIATE ^[1] - 88:28 ASSOCIATED ^[6] - 14:3, 54:16, 54:18, 83:5, 117:24, 129:26 ASSOCIATION ^[2] - 34:11, 34:13 ASSOCIATION ^[3] - 138:28, 139:17, 139:22 ASSUME ^[1] - 52:7 ASSUMED ^[1] - 48:6 ASSUMES ^[2] - 50:14, 156:25 ASSUMING ^[1] - 123:6 ASSURANCE ^[2] - 108:6, 150:12 AT ^[1] - 158:15 ATTACH ^[1] - 125:15	ATTACK ^[4] - 11:17, 38:23, 71:9, 139:12 ATTACKING ^[2] - 33:6, 51:1 ATTACKS ^[8] - 10:19, 10:20, 33:27, 53:26, 71:22, 71:28, 72:2 ATTEMPTED ^[3] - 53:26, 140:1, 152:25 ATTENDED ^[1] - 93:27 ATTENTION ^[2] - 132:22, 144:19 ATTENUATION ^[1] - 127:23 ATTRIBUTED ^[2] - 18:16, 130:24 ATTRIBUTION ^[3] - 142:26, 154:9, 158:5 AUGUST ^[4] - 22:2, 33:25, 107:7, 130:24 AUSTRALIA ^[1] - 68:5 AUTHORISED ^[1] - 137:27 AUTHORITY ^[1] - 116:20 AUTOMATED ^[2] - 60:29, 142:10 AUTOMATICAL LY ^[1] - 132:8 AUTOMATION ^[1] - 62:6 AVAILABLE ^[32] - 6:22, 36:14, 41:3, 41:24, 46:9, 64:23, 64:27, 65:24, 65:26, 67:9, 67:23, 68:17, 70:12, 71:12, 74:1, 76:16, 80:8, 82:26, 85:18, 86:14, 109:6, 124:21, 136:5, 136:25, 144:7, 144:14, 146:24, 147:12, 155:7, 155:10, 155:16, 156:6 AVENELL ^[2] - 45:2, 77:16 AVENUES ^[1] - 53:4	AVOID ^[2] - 51:29, 62:15 AVOIDING ^[1] - 134:2 AWARDED ^[1] - 43:24 AWARE ^[7] - 15:1, 54:11, 62:15, 62:26, 76:4, 156:20, 156:21 AWARENESS ^[4] - 56:22, 62:11, 75:25, 89:10 AWFUL ^[2] - 48:7, 93:17 AZIMUTH ^[12] - 118:10, 118:12, 118:17, 118:24, 121:27, 123:26, 124:19, 126:29, 128:20, 129:26, 129:27, 142:2
					B
					BACKGROUN D ^[4] - 42:1, 67:6, 72:16, 107:19 BACKGROUN D/OVERVIEW ^[1] - 41:23 BAGS ^[3] - 66:6, 66:7, 66:9 BALANCE ^[5] - 109:23, 109:27, 146:22, 146:23, 147:21 BANBRIDGE ^[1] - 38:3 BANK ^[1] - 90:1 BARRIER ^[1] - 142:24 BASE ^[4] - 36:7, 115:18, 129:1, 131:6 BASED ^[20] - 36:3, 36:23, 41:24, 68:4, 89:29, 90:8, 90:9, 103:12, 117:27, 119:15, 125:19, 128:20, 134:18, 139:9, 144:5, 148:12, 150:3, 150:29, 151:18, 155:18 BASES ^[1] - 150:13

BASIC ^[1] - 113:24 BASIS ^[7] - 5:26, 23:16, 24:29, 41:15, 64:26, 89:8, 114:23 BEAR ^[5] - 4:13, 53:13, 73:6, 102:14, 104:21 BEARING ^[6] - 17:20, 50:28, 59:4, 120:7, 140:26, 155:10 BECAME ^[5] - 13:4, 13:5, 13:23, 15:2, 30:2 BECOME ^[10] - 12:5, 14:5, 14:19, 22:6, 29:28, 31:13, 59:8, 59:14, 78:28, 94:9 BECOMES ^[7] - 12:27, 12:29, 16:6, 16:7, 17:26, 143:4, 148:3 BECOMING ^[1] - 76:4 BEDSIDE ^[1] - 154:23 BEEN ^[2] - 39:21, 106:22 BEFOREHAND ^[1] - 23:5 BEGAN ^[1] - 31:8 BEGIN ^[8] - 39:24, 92:28, 100:23, 106:17, 107:17, 113:24, 146:2, 155:9 BEGINNING ^[10] - 11:27, 25:24, 54:28, 79:11, 117:1, 121:19, 136:23, 146:19, 146:22, 156:17 BEHALF ^[3] - 68:7, 86:28, 102:22 BEHAVED ^[1] - 105:21 BEHAVIOUR ^[1] - 152:22 BEHIND ^[2] - 19:8, 119:2 BELFAST ^[4] - 24:1, 90:24, 94:4, 94:16 BELIEF ^[1] -	28:21 BELOW ^[3] - 66:1, 123:12, 135:8 BENZ ^[2] - 118:28, 119:21 BEREAVED ^[1] - 102:22 BERNADETTE ^[1] - 35:11 BERTIE ^[1] - 34:26 BEST ^[13] - 9:21, 54:12, 63:12, 73:13, 87:29, 92:24, 125:6, 125:7, 127:14, 127:17, 127:28, 130:16, 133:18 BETTER ^[5] - 56:18, 60:17, 64:13, 124:12, 125:9 BETWEEN ^[50] - 3:4, 7:9, 7:18, 14:8, 20:27, 20:28, 22:5, 22:11, 22:17, 22:23, 25:2, 26:3, 26:14, 28:7, 28:13, 34:11, 37:16, 38:14, 38:16, 38:20, 42:9, 51:11, 52:28, 53:8, 61:3, 61:21, 61:22, 63:3, 63:9, 70:14, 70:27, 72:15, 77:2, 79:23, 80:11, 84:1, 84:24, 85:24, 86:27, 92:16, 98:18, 100:28, 101:16, 108:2, 116:4, 120:21, 122:4, 134:10, 135:17, 140:12 BEYOND ^[2] - 127:2, 148:21 BIAS ^[8] - 62:16, 74:21, 75:1, 75:4, 75:14, 75:16, 75:26, 111:17 BIG ^[4] - 58:25, 123:10, 124:14, 133:20 BIGGER ^[4] - 78:26, 122:4, 122:5, 127:4 BILL ^[2] -	115:11, 116:5 BILLING ^[3] - 116:14, 116:18, 128:16 BILLION ^[2] - 60:11, 144:14 BINDS ^[1] - 51:20 BIOLOGICAL ^[2] - 48:10, 48:22 BIOLOGIST ^[3] - 42:6, 42:29, 77:18 BIRMINGHAM ^[4] - 90:10, 90:12, 92:13, 95:17 BIRTH ^[1] - 13:3 BIRTHDAY ^[1] - 43:23 BIT ^[11] - 51:9, 60:10, 60:29, 62:24, 66:6, 92:14, 98:1, 118:3, 126:14, 134:9, 139:24 BITS ^[2] - 29:6, 132:9 BLAIR ^[1] - 26:26 BLAST ^[2] - 68:4, 71:8 BLIND ^[1] - 118:11 BLOCK ^[1] - 123:17 BLOOD ^[12] - 47:5, 48:13, 49:20, 49:22, 49:24, 49:27, 50:3, 88:8, 88:26, 88:27, 89:1 BLOOD-SOAKED ^[1] - 47:5 BLOODSTAIN ^[1] - 88:23 BLOW ^[1] - 50:1 BLUE ^[3] - 49:9, 49:12, 123:28 BLUEPRINT ^[1] - 73:23 BODY ^[4] - 49:22, 66:23, 78:26, 79:15 BOLD ^[1] - 95:28 BOMB ^[11] - 33:27, 37:2, 71:8, 71:14, 72:20, 72:22, 73:5, 81:29, 82:2,	100:8, 138:22 BOMBING ^[12] - 11:11, 25:10, 32:4, 33:8, 36:17, 36:20, 38:3, 38:20, 40:19, 53:23, 140:22, 140:23 BOMBING ^[1] - 151:7 BOMBS ^[5] - 33:17, 33:21, 33:29, 38:1, 72:27 BOOK ^[4] - 4:1, 32:28, 38:13 BOOKS ^[1] - 6:2 BOOSTER ^[1] - 68:18 BORDER ^[1] - 102:8 BORDER ^[2] - 12:8, 36:4 BORDERS ^[1] - 90:21 BORNE ^[2] - 100:11, 130:13 BOTTOM ^[13] - 44:3, 66:6, 66:17, 76:25, 115:10, 115:27, 123:14, 126:3, 129:12, 130:20, 132:26, 134:5, 134:20 BOUND ^[1] - 75:21 BOX ^[2] - 39:15, 157:27 BREAK ^[5] - 39:5, 106:2, 151:24, 152:3, 152:5 BRESLIN ^[1] - 151:11 BRIAN ^[3] - 24:1, 26:7, 29:6 BRIEF ^[1] - 152:9 BRIEF ^[3] - 67:5, 67:18, 67:21 BRIEFING ^[1] - 54:6 BRIEFLY ^[1] - 137:18 BRIEFLY ^[1] - 39:11 BRIGADE ^[1] - 24:1 BRING ^[7] - 4:13, 38:10,	53:13, 62:12, 77:9, 128:5, 142:2 BRISTOL ^[1] - 89:29 BRITAIN ^[3] - 32:5, 71:4, 120:25 BRITISH ^[2] - 126:25, 129:16 BROAD ^[1] - 96:4 BROADER ^[2] - 10:25, 93:23 BROADLY ^[2] - 86:17, 100:15 BROKEN ^[1] - 115:17 BROUGHT ^[4] - 28:12, 104:21, 105:3, 105:14 BROWN ^[1] - 126:5 BRÁDAIGH ^[1] - 19:4 BSI ^[1] - 108:27 BUDGET ^[1] - 56:20 BUDGETS ^[1] - 56:2 BUILD ^[1] - 23:12 BUILDING ^[3] - 25:6, 25:7, 115:13 BUILDS ^[1] - 23:11 BUILT ^[2] - 61:26, 72:27 BURDEN ^[1] - 73:10 BUREAU ^[1] - 99:25 BURKE ^[3] - 29:27, 32:16, 32:26 BURN ^[1] - 68:21 BY ^[9] - 39:21, 103:1, 103:20, 106:22, 159:4, 159:7, 159:8, 159:9, 159:12	C CAI ^[2] - 63:14, 64:13 CAIN ^[1] - 6:5	CALIBRATION ^[1] - 96:20 CALLER ^[4] - 129:1, 129:2, 129:7, 129:10 CAMPAIGN ^[12] - 7:29, 12:8, 14:20, 19:17, 19:27, 31:24, 32:5, 33:2, 33:8, 35:1, 37:26, 38:12 CAMPBELL ^[8] - 29:26, 32:14, 32:22, 33:7, 33:27, 37:29, 38:6, 130:24 CAMPBELL'S ^[1] - 33:9 CANARY ^[1] - 25:10 CANNOT ^[1] - 131:9 CAPABILITIES ^[3] - 19:19, 19:21, 81:17 CAPABILITY ^[4] - 33:14, 37:21, 37:22, 138:11 CAPABLE ^[3] - 10:25, 110:13, 153:25 CAPACITY ^[4] - 14:23, 127:25, 137:2, 143:13 CAPTURE ^[2] - 145:3, 145:19 CAPTURED ^[2] - 76:20, 78:9 CAR ^[5] - 33:8, 33:17, 33:21, 33:27, 38:1 CARD ^[3] - 113:27, 114:6, 114:13 CARDIFF ^[1] - 44:9 CARE ^[1] - 142:15 CAREER ^[10] - 3:12, 42:9, 42:26, 43:3, 47:9, 62:21, 64:4, 122:29, 136:23, 150:27 CAREFUL ^[4] - 51:21, 52:9, 76:23, 88:3 CARRIED ^[2] - 87:20, 99:24 CARRIERS ^[1] -
--	---	--	---	--	---	--

69:14 CARRY [6] - 57:10, 57:13, 87:17, 102:25, 104:17, 154:2 CARRYING [2] - 85:6, 87:16 CASE [25] - 43:29, 44:4, 47:4, 51:12, 51:26, 52:5, 57:7, 63:1, 63:13, 75:2, 75:10, 87:15, 87:22, 88:6, 88:22, 99:2, 105:1, 105:6, 119:28, 133:12, 139:2, 139:8, 139:11, 148:13 CASELOADS [2] - 102:9, 102:10 CASES [15] - 43:27, 44:6, 44:7, 48:8, 53:22, 77:4, 80:1, 82:17, 91:16, 92:9, 95:11, 99:20, 101:20, 102:8, 143:1 CASEWORK [1] - 77:23 CASSERLY [1] - 158:8 CASTING [1] - 83:3 CATCH [1] - 40:4 CATEGORIES [2] - 117:3, 152:22 CATEGORISE D [1] - 96:21 CATEGORY [1] - 110:3 CATHAL [1] - 12:4 CAUSED [1] - 49:27 CAUSES [1] - 151:20 CAVEAT [1] - 59:5 CAVEATS [3] - 109:11, 138:18, 146:5 CBE [1] - 43:24 CCL [1] - 108:11 CCTV [1] - 59:14 CDR [2] - 116:1, 130:8 CEASEFIRE [14]	- 21:22, 22:2, 22:9, 22:10, 22:14, 23:4, 25:8, 27:6, 27:15, 27:17, 27:18, 27:21, 27:29 CECILIA [1] - 39:26 CELL [119] - 56:17, 106:5, 107:6, 107:23, 108:4, 108:12, 108:14, 108:23, 109:22, 111:6, 116:8, 116:9, 116:11, 116:12, 116:21, 116:24, 117:16, 117:26, 117:27, 117:28, 117:29, 118:1, 118:9, 119:6, 119:17, 120:14, 120:22, 120:24, 121:25, 122:4, 122:5, 122:8, 122:15, 122:24, 122:27, 122:29, 123:27, 124:2, 124:5, 124:12, 124:21, 124:29, 125:2, 125:6, 125:21, 126:1, 126:4, 126:7, 126:25, 127:4, 127:5, 127:11, 127:17, 127:21, 127:23, 127:25, 127:28, 128:1, 128:18, 128:20, 128:21, 129:8, 129:14, 129:17, 129:22, 129:23, 129:28, 129:29, 130:27, 131:6, 131:9, 131:18, 132:8, 132:11, 133:1, 134:11, 134:17, 135:5, 135:6, 135:21, 136:21, 137:1, 137:6, 137:10, 137:20, 138:23, 139:9, 139:23, 140:14, 142:1, 143:26, 144:5, 148:18, 148:23, 148:25, 148:29, 149:4, 149:5, 149:8, 149:10, 151:6, 151:21, 153:20, 153:29,	154:8, 154:11, 154:13, 154:24, 154:26, 155:14, 155:18, 155:20, 155:28 CELL [2] - 135:28, 142:21 CELLAR [1] - 143:9 CELLS [18] - 21:9, 35:27, 36:1, 118:23, 120:11, 120:14, 121:5, 121:8, 122:2, 123:7, 124:13, 127:6, 127:8, 127:9, 129:6, 133:4, 135:12, 155:1 CENTRAL [3] - 93:12, 93:16, 107:29 CENTRE [2] - 94:17, 128:15 CERTAIN [8] - 6:29, 46:4, 48:12, 48:27, 54:13, 70:18, 109:3, 114:16 CERTAINLY [20] - 11:8, 41:5, 56:21, 57:13, 63:20, 64:16, 74:27, 75:8, 75:23, 75:28, 77:6, 88:19, 95:8, 105:22, 105:23, 107:20, 124:28, 136:23, 139:25, 152:1 CERTIFY [1] - 97:19 CHAIN [2] - 78:10, 97:13 CHAINS [1] - 50:11 CHAIR [2] - 23:28, 39:9 CHAired [1] - 108:22 CHAIRMAN [18] - 39:4, 39:8, 39:13, 39:17, 39:19, 102:27, 103:1, 103:3, 106:1, 106:6, 106:14, 106:19, 151:23, 152:5, 152:12, 157:24, 158:10, 159:8	CHAIRPERSON N [1] - 35:8 CHALLENGE [1] - 51:2 CHALLENGED [1] - 24:20 CHALLENGES [3] - 60:4, 72:19, 100:10 CHANCE [2] - 60:17, 122:27 CHANGE [20] - 12:9, 13:17, 18:1, 18:5, 18:11, 18:13, 18:20, 18:22, 18:26, 19:1, 19:6, 19:10, 26:6, 27:10, 57:24, 58:2, 58:5, 58:7, 70:16, 157:2 CHANGED [14] - 9:6, 9:8, 15:27, 17:28, 18:5, 24:4, 26:8, 26:10, 29:7, 46:2, 48:28, 75:8, 120:26, 134:14 CHANGES [8] - 58:25, 58:29, 59:5, 74:27, 126:17, 135:18, 136:10, 144:12 CHANGES [3] - 59:28, 61:17, 62:9 CHANGING [1] - 86:9 CHAPTER [6] - 45:10, 76:6, 116:22, 133:3, 137:15, 140:20 CHAPTER [3] - 5:20, 40:28, 82:21 CHARACTERIS TIC [1] - 50:1 CHARACTERIS TICS [1] - 74:11 CHARGE [2] - 68:18, 109:27 CHARGEABLE [1] - 116:6 CHARTERED [1] - 107:24 CHEAP [1] - 33:29 CHECK [3] - 39:2, 73:7, 94:25 CHECKING [1] - 73:11	CHECKS [1] - 154:2 CHEMICAL [1] - 61:17 CHEMICAL [13] - 49:6, 58:27, 68:2, 68:21, 68:23, 69:11, 70:16, 76:14, 78:6, 81:8, 82:16, 95:17, 95:18 CHEMICALS [1] - 74:6 CHEMIST [1] - 90:6 CHEMIST [1] - 82:15 CHEMISTRY [1] - 82:22 CHIEF [5] - 32:12, 32:18, 138:28, 139:17, 139:22 CHOOSING [1] - 119:13 CHRIS [4] - 44:24, 45:12, 71:1, 72:14 CHROMATOGRAPHY [9] - 66:1, 69:3, 69:4, 69:6, 69:7, 69:18, 78:11, 80:14, 83:14 CHRONOLOG Y [1] - 6:7 CIRA [1] - 38:21 CIRCLE [1] - 118:27 CIRCLES [1] - 120:8 CIRCUMSTANCES [6] - 15:29, 21:20, 70:19, 119:11, 119:12, 157:25 CITE [1] - 129:22 CIVIL [1] - 85:9 CIVILIANS [1] - 33:22 CLAIM [1] - 148:17 CLANDESTINE [1] - 36:21 CLARITY [1] - 152:15 CLASSIFIED [2] - 7:17, 7:27 CLEAN [1] - 110:20	CLEAR [11] - 11:11, 15:2, 24:21, 37:1, 86:19, 101:27, 112:23, 129:8, 137:22, 152:28, 153:9 CLEARLY [5] - 34:24, 79:14, 79:15, 124:4, 140:11 CLOSE [3] - 127:21, 132:22, 155:14 CLOSED [1] - 89:19 CLOSER [1] - 144:16 CLOSEST [1] - 127:18 CLOTHING [1] - 49:12 CLUSTERS [1] - 121:6 CO [2] - 38:16, 38:20 CO- OPERATION [2] - 38:16, 38:20 COALITION [1] - 38:7 COASTAL [1] - 44:14 CODE [2] - 108:24, 136:2 CODES [2] - 85:28, 97:29 COGNITIVE [2] - 74:21, 75:4 COIL [1] - 69:9 COIN [1] - 49:21 COLD [1] - 48:8 COLLABORATION [3] - 56:8, 92:15, 104:1 COLLABORATIONS [1] - 93:11 COLLABORATIVE [6] - 53:1, 53:8, 86:25, 98:18, 101:18, 104:12 COLLEAGUES [2] - 43:12, 124:21 COLLECT [2] - 54:10, 54:12 COLLECTIONS [1] - 74:16 COLLEGE [1] - 134:28
--	--	---	---	---	---

COLLEGE ^[1] - 6:9 COLOUR ^[5] - 58:11, 58:12, 80:14, 120:28, 130:25 COLOURED ^[1] - 125:25 COLOURS ^[1] - 49:15 COMBINED ^[1] - 59:13 COMBINING ^[1] - 77:21 COMING ^[5] - 12:6, 28:10, 69:16, 70:5, 115:10 COMMENT ^[1] - 105:19 COMMENTS ^[2] - 41:26, 51:18 COMMISSION ^[1] - 10:6 COMMITTED ^[2] - 11:12, 47:3 COMMITTEE ^[1] - 139:17 COMMITTEE ^[9] - 10:22, 15:25, 16:2, 16:6, 17:3, 34:7, 35:9, 35:12, 108:22 COMMITTEES ^[1] - 92:21 COMMITTEES ^[4] - 80:3, 92:20, 92:24, 138:29 COMMON ^[13] - 46:21, 47:18, 47:29, 49:8, 49:9, 69:6, 69:8, 69:17, 73:28, 87:28, 91:20, 119:25, 131:8 COMMONLY ^[8] - 65:6, 116:1, 120:8, 133:12, 141:21, 154:14, 155:17 COMMUNICAT ES ^[1] - 115:20 COMMUNICATI ONS ^[2] - 136:15, 136:17 COMMUNICATI ONS ^[1] - 112:18 COMMUNITY ^[7] - 69:24, 72:8, 80:25, 83:19,	83:20, 83:24, 138:8 COMMUTE ^[1] - 121:13 COMPANIES ^[1] - 140:27 COMPANY ^[5] - 43:18, 90:12, 90:14, 108:11, 141:2 COMPARABLE ^[1] - 86:17 COMPARE ^[6] - 61:23, 65:5, 66:8, 69:11, 81:13, 130:2 COMPARED ^[3] - 46:11, 58:19, 85:21 COMPARING ^[2] - 81:19, 142:5 COMPARISON ^[10] - 74:8, 74:14, 74:23, 80:12, 83:4, 83:13, 89:4, 89:11, 99:24, 101:9 COMPARISON S ^[4] - 71:16, 78:13, 80:11, 85:24 COMPETENCE ^[3] - 150:11, 150:13, 150:16 COMPETENCY ^[1] - 108:6 COMPETENT ^[1] - 97:20 COMPETITION ^[1] - 43:14 COMPLETED ^[1] - 3:13 COMPLETELY ^[4] - 52:8, 56:14, 61:7, 75:18 COMPLETING ^[1] - 3:2 COMPLEX ^[8] - 43:27, 65:3, 77:20, 79:29, 82:17, 100:8, 124:26, 142:22 COMPLICATE D ^[2] - 53:21, 62:18 COMPLY ^[1] - 96:11 COMPLYING ^[2] - 96:29, 111:1 COMPONENT	^[1] - 78:12 COMPONENTS ^[11] - 31:1, 61:19, 61:22, 69:5, 69:16, 70:11, 71:14, 71:23, 72:26, 81:29, 113:27 COMPOSITION ^[1] - 70:16 COMPOUNDS ^[4] - 61:26, 70:4, 70:7, 70:18 COMPROMISE ^[1] - 52:2 COMPROMISE D ^[1] - 104:27 CONAILL ^[1] - 19:5 CONCEIVABLE ^[1] - 87:18 CONCEIVABLY ^[1] - 76:29 CONCENTRATI ON ^[2] - 121:2, 142:15 CONCEPT ^[10] - 6:17, 17:16, 17:23, 17:25, 18:8, 18:12, 19:2, 46:22, 120:23, 124:25 CONCERN ^[7] - 13:5, 69:25, 74:21, 74:26, 75:1, 75:15, 75:22 CONCERNED ^[10] - 23:15, 50:7, 50:23, 65:11, 96:23, 96:25, 105:15, 115:15, 136:18, 145:17 CONCERNS ^[2] - 75:13, 83:24 CONCLUDE ^[1] - 150:23 CONCLUDED ^[2] - 40:4, 84:27 CONCLUDES ^[1] - 157:28 CONCLUSION ^[7] - 80:25, 83:28, 101:22, 132:12, 132:14, 146:23, 149:3 CONCLUSION S ^[12] - 45:14, 67:24, 69:28, 76:11, 80:29,	84:8, 86:11, 87:4, 98:4, 99:12, 146:11, 147:24 CONCLUSIVEL Y ^[1] - 153:21 CONCURRENT ^[1] - 139:11 CONDITIONAL ^[1] - 148:5 CONDUCT ^[5] - 87:23, 91:4, 91:10, 142:25, 144:23 CONDUCT ^[1] - 108:24 CONDUCTED ^[11] - 53:25, 75:9, 81:3, 99:20, 124:22, 134:12, 134:27, 142:28, 149:13, 149:24, 151:5 CONDUCTING ^[1] - 109:21 CONFIDENCE ^[2] - 81:14, 97:12 CONFIDENT ^[1] - 61:20 CONFIGURED ^[2] - 118:29, 120:14 CONFIRM ^[2] - 47:2, 47:20 CONFIRMATIO N ^[5] - 62:16, 75:1, 75:14, 75:16, 75:26 CONFLICT ^[4] - 13:2, 13:3, 43:20, 68:6 CONFLICTING ^[1] - 47:26 CONNECT ^[6] - 104:9, 115:4, 119:13, 124:2, 148:22, 148:25 CONNECTED ^[7] - 36:15, 92:19, 100:24, 114:22, 114:29, 125:21, 128:20 CONNECTION ^[8] - 14:8, 14:9, 34:25, 61:24, 117:13, 127:14, 127:17, 138:22 CONNECTION S ^[3] - 128:23, 130:9, 143:14 CONSEQUENC	E ^[1] - 6:16 CONSIDER ^[4] - 67:5, 73:25, 123:2, 140:23 CONSIDERAB LE ^[4] - 20:28, 39:27, 142:14, 151:16 CONSIDERAB LY ^[1] - 81:5 CONSIDERATI ONS ^[3] - 46:21, 47:29, 154:12 CONSIDERED ^[10] - 22:27, 22:28, 23:17, 38:19, 62:21, 105:3, 119:27, 122:12, 132:10, 146:8 CONSIDERING ^[1] - 37:1 CONSIDERING ^[5] - 33:2, 100:12, 139:8, 147:3, 155:2 CONSISTENT ^[1] - 82:10 CONSTANT ^[1] - 98:25 CONSTANTLY ^[3] - 57:29, 125:1, 127:13 CONSTITUTIO NALLY ^[1] - 13:18 CONSTRAINE D ^[4] - 103:25, 105:10, 123:29, 124:11 CONSTRUCTI ON ^[1] - 71:28 CONSULTED ^[1] - 24:18 CONSUMING ^[1] - 142:22 CONTACT ^[5] - 76:22, 93:20, 115:19, 117:28, 132:5 CONTAIN ^[4] - 88:8, 88:9, 116:13 CONTAINED ^[3] - 16:11, 91:26, 95:10 CONTAINING ^[1] - 34:22 CONTAINS ^[2] - 6:6, 116:15 CONTAMINAN	T ^[1] - 50:25 CONTAMINAT ED ^[1] - 50:20 CONTAMINATI ON ^[4] - 51:29, 65:17, 78:25, 100:20 CONTEMPLATI ON ^[1] - 137:29 CONTEMPORA NEOUS ^[2] - 132:6, 144:18 CONTEMPORA NEOUSLY ^[1] - 124:14 CONTEMPORA RY ^[1] - 109:18 CONTENT ^[5] - 102:25, 107:10, 152:3, 156:22, 156:24 CONTESTED ^[1] - 7:12 CONTEXT ^[9] - 10:28, 11:2, 42:12, 50:29, 52:5, 52:6, 135:18, 139:3, 140:17 CONTINUATIO N ^[3] - 7:28, 9:10, 9:11 CONTINUE ^[4] - 31:23, 73:12, 73:13, 104:8 CONTINUED ^[1] - 106:11 CONTINUED ^[3] - 3:22, 9:4, 9:9 CONTINUING ^[1] - 65:19 CONTINUITY ^[2] - 50:12, 51:3 CONTINUITY ^[18] - 8:21, 11:22, 15:13, 15:14, 16:19, 17:10, 17:16, 19:9, 19:11, 19:16, 19:25, 21:5, 21:12, 35:23, 37:17, 37:19, 38:7, 38:11 CONTRACT ^[1] - 154:3 CONTRACTED ^[1] - 154:3 CONTRAST ^[4] - 20:1, 20:3, 121:14, 130:2
---	---	---	---	---	--

CONTRASTIN G [1] - 136:4 CONTRIBUTE [2] - 101:6, 153:26 CONTRIBUTED [3] - 79:24, 82:14, 82:21 CONTRIBUTIO N [1] - 54:2 CONTROL [2] - 32:6, 53:5 CONURBATIO NS [1] - 121:7 CONVENTION [12] - 13:13, 25:13, 25:14, 25:15, 25:18, 25:26, 26:2, 28:29, 29:4, 29:5, 29:14, 118:8 CONVENTION [4] - 13:21, 20:16, 20:24, 25:24 CONVENTION AL [3] - 9:14, 51:1, 72:15 CONVICTED [2] - 44:9, 57:8 CONVOLUTED [1] - 77:19 COORDINATE [2] - 125:16 COPE [1] - 60:21 COPY [1] - 136:27 COPYING [1] - 78:9 CORE [10] - 17:18, 17:29, 19:5, 23:22, 29:6, 109:14, 114:29, 115:10, 115:17, 142:6 CORE [7] - 5:1, 20:5, 35:21, 41:26, 57:3, 102:18, 151:28 CORK [1] - 36:5 CORNER [2] - 114:22, 115:4 CORRECT [96] - 3:1, 3:6, 4:12, 4:27, 5:4, 5:6, 5:16, 5:19, 5:22, 5:23, 6:18, 6:21, 8:6, 8:9, 8:12, 8:15, 8:20, 8:22, 9:3, 9:17, 10:27, 12:24, 12:26, 13:8, 13:28, 14:2,	14:4, 14:7, 14:14, 15:5, 15:7, 15:16, 16:3, 16:5, 16:8, 16:21, 17:5, 19:14, 20:3, 21:1, 22:25, 23:27, 23:29, 24:2, 24:8, 24:16, 25:5, 25:29, 26:12, 27:4, 27:9, 27:11, 28:9, 29:16, 29:19, 29:29, 30:10, 30:24, 30:26, 30:29, 31:5, 31:12, 32:19, 32:23, 32:25, 33:26, 34:2, 34:9, 35:4, 35:7, 36:26, 37:5, 37:15, 38:2, 38:9, 38:25, 41:13, 41:28, 44:19, 45:21, 61:16, 64:19, 71:18, 72:3, 74:18, 82:28, 85:16, 107:1, 107:4, 109:23, 110:8, 111:26, 112:3, 112:6, 112:9, 116:29 CORRECTLY [4] - 10:24, 32:18, 64:16, 110:6 COST [1] - 62:7 COSTELLO [2] - 13:19, 14:19 COSTLY [2] - 61:2, 97:24 COTTON [1] - 49:13 COUNCIL [18] - 20:23, 20:29, 21:27, 22:12, 22:24, 23:16, 24:17, 24:23, 24:25, 24:27, 25:4, 26:11, 26:13, 27:22, 29:14, 80:5, 97:18 COUNSEL [1] - 102:20 COUNTERTHR EAT [1] - 71:7 COUNTIES [1] - 36:4 COUNTRY [1] - 108:14 COUNTY [1] -	35:8 COUNTY [12] - 15:24, 15:27, 16:1, 16:7, 17:3, 34:6, 34:7, 34:18, 34:28, 35:12, 35:15 COUPLE [4] - 23:5, 43:12, 70:26, 116:3 COURSE [21] - 7:3, 7:6, 8:24, 9:24, 19:15, 21:2, 26:2, 29:14, 31:13, 33:24, 40:24, 40:28, 41:18, 45:10, 76:21, 80:18, 91:9, 103:24, 109:13, 111:3, 127:12 COURSES [1] - 82:18 COURT [2] - 42:15, 82:23 COURT [9] - 55:2, 56:25, 56:26, 57:1, 87:1, 91:9, 108:7, 138:2, 138:16 COURTS [1] - 85:9 COVER [1] - 118:22 COVERAGE [2] - 121:18, 156:26 COVERED [3] - 151:29, 153:15, 155:4 COVERING [2] - 119:24, 136:17 CRACK [2] - 55:28, 56:1 CREATE [7] - 16:17, 16:19, 16:20, 16:25, 16:27, 17:1, 17:2 CREATED [4] - 6:8, 63:16, 63:17, 73:22 CREATES [1] - 23:10 CREATING [1] - 31:17 CREATION [7] - 15:4, 15:19, 15:21, 16:15, 17:9, 17:11, 136:19 CRFP [1] - 97:17	CRIME [1] - 82:23 CRIME [14] - 47:1, 47:3, 47:6, 47:8, 47:26, 50:12, 54:6, 54:7, 57:28, 91:3, 97:11, 97:14, 100:8, 139:5 CRIMES [1] - 43:7 CRIMINAL [13] - 42:12, 43:18, 43:21, 45:28, 50:29, 51:12, 52:16, 79:29, 85:9, 91:1, 109:29, 146:29, 152:22 CRIMINALITY [1] - 10:20 CRITICAL [2] - 51:21, 71:4 CROSS [3] - 41:18, 102:8, 133:29 CROSS- BORDER [1] - 102:8 CROSS- REFERENCE [1] - 41:18 CROSS- SECTION [1] - 133:29 CRUCIALLY [1] - 115:26 CURRENT [2] - 78:21, 143:9 CUSTODY [1] - 50:11 CUSTOMER [2] - 115:9, 116:14 CUSTOMER'S [1] - 121:22 CUSTOMERS [3] - 121:9, 121:12, 121:19 CUT [2] - 123:20, 157:15 CUT-OFF [1] - 157:15 CV [2] - 67:8, 109:5	D	DAILY [1] - 119:8	DAMAGE [1] - 51:24 DAMILOLA [2] - 44:14, 88:22 DAMILOLA'S [1] - 88:24 DANGER [1] - 148:27 DANGEROUS [1] - 140:2 DATA [78] - 3:17, 5:28, 80:17, 83:7, 83:16, 107:6, 110:9, 112:23, 112:28, 113:4, 113:13, 113:15, 115:28, 116:4, 116:6, 116:16, 116:25, 117:4, 117:12, 119:18, 122:11, 125:4, 125:20, 128:8, 128:10, 128:24, 128:25, 130:6, 130:9, 130:11, 130:26, 131:15, 132:10, 132:21, 132:25, 132:27, 138:3, 139:28, 140:14, 140:28, 141:2, 141:6, 141:10, 141:19, 142:6, 142:21, 142:27, 143:5, 143:8, 143:14, 143:16, 143:19, 143:23, 143:28, 144:1, 144:9, 144:17, 145:27, 146:8, 147:3, 147:25, 148:1, 149:6, 149:23, 150:1, 150:17, 153:4, 153:10, 153:25, 154:4, 154:10, 155:7, 155:9, 155:17, 156:5, 157:5 DATABASE [7] - 60:14, 78:14, 96:9, 96:12, 128:19, 144:12, 156:1 DATABASE [1] - 6:8 DATABASES [8] - 74:15, 76:15, 79:10, 79:13, 80:16, 83:6,	83:15, 86:19 DATE [5] - 77:9, 101:10, 117:6, 129:1, 157:26 DATED [4] - 4:26, 5:5, 41:25, 152:18 DATES [3] - 12:18, 93:3, 123:2 DATING [2] - 12:7, 18:13 DAYS [17] - 9:14, 23:5, 37:25, 50:23, 56:1, 60:18, 61:25, 78:27, 79:4, 81:10, 81:15, 84:2, 84:4, 84:22, 85:25, 130:6 DE [4] - 106:3, 106:14, 151:23, 152:12 DE [9] - 106:15, 106:23, 106:25, 151:25, 152:7, 152:13, 157:20, 157:25, 159:12 DEAL [17] - 5:20, 11:19, 15:8, 36:14, 38:5, 41:29, 56:25, 57:26, 73:16, 79:21, 107:10, 107:15, 121:23, 137:4, 137:5, 137:18, 151:10 DEALING [12] - 3:3, 17:20, 38:15, 41:1, 41:7, 59:26, 110:5, 117:20, 130:18, 130:20, 140:10, 156:10 DEALS [3] - 80:7, 109:10, 124:23 DEALT [2] - 79:23, 98:5 DEBATE [1] - 63:21 DEBRIS [2] - 71:15, 72:22 DECADE [1] - 144:15 DECADES [1] - 80:24 DECAMPED [1] - 90:11 DECEMBER [1] - 4:26
---	---	---	--	----------	--------------------------	---	--

DECIDE [2] - 53:4, 104:6 DECIDED [2] - 95:19, 137:28 DECIDING [5] - 51:25, 80:9, 88:4, 92:24, 100:29 DECISION [5] - 18:20, 18:22, 27:21, 87:20, 125:1 DECLARATION [1] - 21:27 DECLARATION [1] - 28:17 DECLARING [1] - 34:21 DECODE [2] - 122:21, 124:25 DECOMMISSIO NING [2] - 27:8, 27:11 DEDUCED [1] - 58:23 DEEMED [3] - 20:17, 28:27, 38:21 DEEP [1] - 150:16 DEFENCE [1] - 103:11 DEFENCE [11] - 14:23, 42:10, 43:8, 63:2, 63:10, 85:7, 86:28, 101:19, 138:4, 139:8, 147:5 DEFINE [2] - 126:19, 141:15 DEFINED [1] - 149:20 DEFINITELY [4] - 49:17, 76:3, 92:19, 93:21 DEFINITIONS [2] - 11:16, 11:18 DEFINITIVE [1] - 70:23 DEGRADED [1] - 60:20 DEGREE [1] - 107:20 DEGREED [1] - 118:15 DEGREES [6] - 118:15, 118:16, 118:28, 119:24, 120:9, 127:1 DELAYED [1] - 39:28	DELEGITIMISI NG [1] - 31:21 DELIBERATEL Y [1] - 134:8 DELIVERED [4] - 82:18, 82:19, 136:2, 151:17 DELIVERING [1] - 98:21 DELVE [2] - 15:9, 26:1 DEMONSTRAT E [1] - 96:13 DENIAL [1] - 14:8 DENIED [3] - 24:23, 24:28, 34:13 DENIM [2] - 49:9, 49:12 DENIS [1] - 94:9 DENSITIES [2] - 121:10, 121:12 DENSITY [3] - 120:22, 121:9, 127:5 DEPARTMENT [2] - 30:16, 30:17 DEPARTMENT S [1] - 85:7 DEPENDENT [2] - 59:10, 157:8 DEPOSITED [2] - 88:18, 88:27 DEPOSITION [1] - 66:22 DERIVED [2] - 102:11, 113:9 DERIVES [1] - 112:25 DESCENDING [1] - 41:6 DESCRIBE [9] - 8:10, 9:14, 9:22, 11:5, 12:22, 17:22, 29:3, 68:1, 107:3 DESCRIBED [22] - 16:23, 22:20, 22:21, 36:6, 68:1, 68:24, 71:1, 77:17, 79:27, 80:21, 83:18, 86:5, 98:17, 99:18, 100:15, 112:6, 112:14, 115:25, 135:18, 137:23, 146:14, 154:18 DESCRIBES [4]	- 72:14, 72:19, 72:27, 83:12 DESCRIBING [3] - 56:7, 56:11, 104:12 DESCRIPTION [1] - 117:25 DESCRIPTION S [1] - 9:25 DESIGNED [1] - 128:2 DESTABILISAT ION [1] - 31:19 DETAIL [25] - 5:10, 5:21, 15:9, 17:9, 19:16, 26:1, 29:2, 41:6, 58:10, 58:16, 59:4, 72:14, 74:9, 75:6, 91:23, 107:6, 109:7, 109:15, 115:15, 118:3, 128:25, 137:16, 141:5, 145:13, 149:21 DETAILED [6] - 76:19, 80:12, 83:29, 101:9, 151:17, 155:8 DETAILS [3] - 20:11, 20:13, 67:7 DETECT [1] - 128:2 DETECTED [3] - 84:22, 126:6, 127:1 DETECTOR [1] - 69:17 DETERMINATI VE [1] - 82:9 DETONATOR [1] - 68:18 DEVELOP [2] - 31:8, 38:10 DEVELOPED [9] - 38:6, 55:6, 61:9, 81:4, 83:24, 97:29, 108:5, 121:17, 145:26 DEVELOPING [1] - 135:23 DEVELOPMEN T [9] - 30:19, 77:24, 78:5, 91:11, 94:22, 96:17, 108:3, 117:5, 139:11 DEVELOPMEN TS [3] - 26:19,	26:20, 91:14 DEVICE [4] - 59:13, 71:25, 72:26, 94:13 DEVICES [16] - 44:25, 58:22, 59:10, 59:11, 59:14, 71:6, 71:16, 71:19, 71:21, 71:27, 72:12, 72:15, 72:24, 77:10, 82:6, 92:7 DEVICES [1] - 70:29 DEVEISED [1] - 98:12 DIAGRAMMATI C [1] - 114:20 DIALOGUE [1] - 140:12 DIFFER [2] - 35:24, 145:19 DIFFERENCE [2] - 37:16, 72:14 DIFFERENCES [5] - 70:13, 84:16, 86:27, 91:21, 101:14 DIFFERENT [46] - 9:29, 11:1, 14:24, 21:6, 22:17, 25:20, 35:28, 38:16, 44:22, 46:28, 48:23, 49:15, 58:11, 58:12, 58:19, 61:10, 65:4, 66:3, 68:17, 71:28, 72:2, 72:28, 76:7, 80:25, 81:20, 82:2, 83:12, 83:13, 84:24, 85:21, 86:16, 87:2, 87:13, 87:19, 88:7, 101:7, 104:9, 104:17, 117:3, 119:23, 120:2, 120:19, 127:6, 145:3 DIFFERENTIAL [1] - 116:4 DIFFERENTIAT ION [2] - 7:18, 7:21 DIFFERENTLY [1] - 21:13 DIFFICULT [5] -	36:22, 60:21, 66:11, 93:18, 143:5 DIFFUSE [1] - 121:15 DIGITAL [11] - 58:10, 58:20, 59:5, 59:8, 59:10, 59:12, 59:14, 108:11, 112:7, 112:8 DIGITS [1] - 130:18 DILIGENTLY [1] - 72:23 DIMENSIONS [1] - 123:15 DIP [1] - 134:21 DIRECT [5] - 78:13, 78:29, 113:13, 145:9, 145:22 DIRECTION [11] - 8:4, 95:13, 118:14, 118:25, 119:2, 120:3, 124:18, 126:7, 126:8, 129:25, 134:29 DIRECTIONS [5] - 119:23, 119:29, 120:5, 120:20, 127:3 DIRECTLY [4] - 92:17, 101:3, 118:18, 145:11 DIRECTOR [9] - 24:5, 30:27, 32:14, 32:15, 32:16, 32:22, 32:24, 32:26, 33:7 DIRECTOR [1] - 92:18 DIRECTORS' [1] - 92:17 DISAGREE [3] - 7:14, 7:22, 8:4 DISAGREEME NT [1] - 33:5 DISAPPEARED [2] - 75:14, 75:18 DISCHARGE [1] - 45:18 DISCIPLINE [1] - 92:22 DISCIPLINES [2] - 40:17, 87:25 DISCONNECTE D [2] - 126:15,	127:7 DISCONTENT [3] - 23:23, 23:24, 24:14 DISCOVER [1] - 44:11 DISCOVERED [3] - 47:9, 81:28, 82:1 DISCOVERY [1] - 99:21 DISCREPANC ES [1] - 101:16 DISCRETION [1] - 102:21 DISCRIMINATI NG [3] - 60:5, 61:21, 83:29 DISCRIMINATI ON [2] - 81:7, 100:27 DISCUSS [1] - 34:28 DISCUSSED [2] - 57:14, 138:28 DISCUSSING [1] - 95:29 DISCUSSION [4] - 63:18, 139:16, 139:21, 141:9 DISCUSSIONS [2] - 18:14, 150:16 DISILLUSIONE D [1] - 14:20 DISPARATE [1] - 142:3 DISPUTE [2] - 26:14, 28:13 DISPUTED [1] - 85:4 DISRUPTION [1] - 31:28 DISSIDENT [27] - 3:11, 3:13, 3:18, 3:26, 4:5, 4:8, 5:14, 5:18, 6:1, 6:13, 7:4, 7:5, 7:10, 7:11, 7:17, 7:18, 7:19, 7:27, 8:10, 8:16, 8:18, 8:27, 9:15, 9:20, 9:21, 26:8 DISSIDENT [3] - 3:16, 4:2, 6:8 DISSIDENTS [4] - 9:1, 9:9, 9:14, 30:22 DISSOLVED [1] - 97:23 DISTANCE [1] -
---	--	--	--	---	--

127:18 DISTANCES [1] - 155:11 DISTANT [1] - 127:22 DISTINCTION [1] - 7:9 DISTINGUISH [4] - 63:3, 63:9, 73:2, 84:1 DISTRIBUTION [3] - 80:16, 121:5, 140:3 DISTRIBUTOR [1] - 83:6 DIVERSION [1] - 144:29 DIVISION [1] - 90:10 DNA [44] - 45:2, 47:17, 47:21, 49:1, 49:21, 58:25, 59:28, 60:1, 60:2, 60:20, 60:22, 60:25, 60:27, 60:28, 61:7, 61:12, 61:18, 62:6, 76:2, 77:13, 77:14, 77:16, 77:20, 77:26, 77:27, 77:29, 78:5, 78:9, 78:10, 78:11, 78:16, 79:6, 79:8, 79:19, 88:23, 88:24, 96:8, 96:11, 100:21, 102:10 DOCTOR [2] - 5:9, 17:13 DOCTORATE [1] - 107:21 DOCUMENT [4] - 90:9, 90:10, 129:6, 150:21 DOCUMENTED [1] - 105:12 DOCUMENTS [1] - 84:28 DOCUMENTS [7] - 45:8, 45:20, 85:1, 85:4, 85:14, 86:14, 92:12 DOMINANT [1] - 13:4 DONE [15] - 43:4, 64:10, 64:24, 64:25, 104:25, 108:22, 128:8, 130:5,	140:21, 142:10, 145:8, 145:20, 146:13, 147:16, 149:25 DOORS [1] - 138:26 DOTS [2] - 125:26, 126:5 DOTTED [1] - 123:26 DOUBT [9] - 6:16, 11:13, 72:8, 78:22, 138:19, 140:18, 143:20, 143:27, 151:20 DOWN [10] - 42:25, 54:3, 105:24, 115:17, 125:29, 134:7, 135:14, 155:6, 157:4, 157:18 DOWNING [1] - 21:26 DR [4] - 106:22, 158:12, 159:3, 159:11 DR [19] - 6:9, 11:19, 11:24, 38:26, 39:3, 39:8, 106:3, 106:17, 106:25, 113:17, 133:7, 135:17, 137:22, 152:13, 153:13, 157:20, 157:23, 157:27, 158:10 DRAFTED [1] - 108:23 DRAW [1] - 147:24 DRAWN [1] - 146:10 DRILL [1] - 17:9 DRIPPING [1] - 50:4 DRIVE [1] - 125:18 DRIVEN [1] - 56:20 DROPPING [5] - 12:13, 12:14, 12:16, 13:15 DROR [1] - 75:29 DRUGS [3] - 68:2, 90:1, 140:3 DUBLIN [4] - 12:15, 36:5, 101:29, 102:7 DUE [10] - 19:15,	21:2, 31:13, 35:29, 41:18, 80:17, 109:13, 111:3, 124:5, 124:9 DUFFY [1] - 153:14 DUNDALK [3] - 36:7, 155:19, 155:20 DUNDEE [1] - 90:22 DURATION [2] - 117:6, 129:1 DURING [15] - 6:10, 7:3, 7:6, 12:10, 14:10, 26:2, 26:18, 29:14, 40:10, 40:28, 45:10, 95:1, 108:1, 150:27, 153:5 DYE [1] - 49:15 DÁIL [4] - 12:15, 17:26, 18:2, 18:19 DÁITHÍ [1] - 19:4	[7] - 13:26, 85:6, 114:2, 115:16, 116:13, 124:8, 133:29 EFFICIENTLY [1] - 41:12 EFFORT [1] - 56:5 EIGHT [2] - 127:2 EITHER [5] - 111:22, 125:12, 126:9, 137:28, 145:8 ELECT [2] - 20:21, 20:22 ELECTED [3] - 17:26, 18:3, 26:27 ELECTION [1] - 26:21 ELECTROSTA TIC [1] - 83:2 ELEMENT [4] - 75:4, 128:24, 137:4, 143:18 ELEMENTS [1] - 146:22 ELEVATOR [1] - 123:20 ELIMINATE [1] - 47:20 ELSEWHERE [1] - 91:6 EMBEDDED [2] - 88:23, 88:26 EMBRACED [1] - 81:18 EMBRYONIC [2] - 79:14, 95:22 EMERGE [1] - 154:7 EMERGED [3] - 21:17, 21:20, 98:26 EMERGENCE [5] - 5:14, 17:15, 19:8, 19:11, 20:1 EMERGING [2] - 13:29, 34:6 EMPHASIS [1] - 42:17 EMULATE [1] - 125:13 ENABLE [1] - 79:18 ENABLING [1] - 62:29 ENCOMPASS [1] - 66:11	ENCOMPASSE [2] - 46:27, 99:15 END [16] - 25:9, 25:10, 66:9, 67:18, 69:10, 69:12, 69:15, 69:17, 106:4, 129:4, 134:3, 146:2, 146:4, 146:15, 148:27 ENDED [1] - 42:24 ENFORCEMEN T [2] - 61:15, 154:1 ENFSI [1] - 93:25 ENGAGE [2] - 28:26, 37:12 ENGAGED [2] - 11:9, 11:14 ENGAGEMENT [1] - 102:6 ENGINEER [1] - 144:20 ENGINEERING [2] - 30:17, 116:18 ENGINEERING [2] - 24:5, 30:28 ENGLAND [2] - 42:21, 135:29 ENHANCE [1] - 48:24 ENHANCED [1] - 100:27 ENHANCEMEN T [2] - 83:2, 99:22 ENHANCEMEN TS [1] - 71:15 ENHANCING [1] - 74:4 ENORMOUS [2] - 72:21, 84:11 ENRICHED [3] - 128:12, 128:24, 128:26 ENSURE [2] - 50:27, 106:4 ENSURING [1] - 110:5 ENTER [1] - 119:14 ENTIRELY [1] - 151:25 ENTRIES [1] - 155:9 ENVIRONMEN T [1] - 63:22 EP [1] - 78:11	EQUALLY [4] - 42:9, 58:29, 120:4, 141:13 EQUIPMENT [5] - 91:27, 91:28, 92:1, 125:11, 129:22 EQUIVALENT [4] - 16:22, 25:17, 81:16, 92:3 ERROR [1] - 152:16 ESCAPED [1] - 140:2 ESPECIALLY [4] - 65:18, 67:3, 68:2 ESPOUSE [2] - 7:28, 8:7 ESSENTIAL [1] - 72:26 ESSENTIALLY [6] - 33:12, 62:20, 110:9, 125:17, 134:29, 147:6 ESSENTIALS [1] - 82:23 ESSEX [2] - 139:5, 139:6 ESTABLISHED [6] - 12:21, 15:25, 16:14, 18:8, 19:13, 79:11 ESTABLISHIN G [1] - 9:28 ESTABLISHME NT [4] - 93:12, 93:16, 103:12, 107:29 ESTIMATES [1] - 150:28 ESTIMATIONS [3] - 122:6, 147:14, 147:16 EUROPE [2] - 81:27, 108:11 EUROPEAN [2] - 93:25, 97:8 EVALUATE [1] - 52:4 EVALUATING [1] - 81:4 EVALUATION [1] - 62:9 EVALUATION [4] - 59:1, 83:6, 83:15, 138:3 EVENT [5] - 50:22, 110:22, 117:7, 125:3,
--	---	---	--	--	---

138:20 EVENTS [7] - 6:7, 47:8, 47:11, 47:26, 54:9, 130:9, 137:19 EVENTUALLY [1] - 62:27 EVERYDAY [1] - 143:13 EVERYWHERE [1] - 125:28 EVIDENCE [64] - 5:13, 9:24, 17:22, 25:12, 36:13, 39:6, 39:29, 40:3, 40:24, 40:25, 40:27, 41:12, 41:16, 51:24, 52:3, 54:10, 54:13, 56:27, 57:6, 59:1, 61:24, 62:24, 77:22, 81:4, 82:21, 84:3, 84:5, 84:23, 86:23, 86:29, 87:14, 88:9, 88:29, 90:9, 95:12, 100:18, 100:29, 101:3, 101:7, 103:24, 104:4, 105:26, 106:7, 107:18, 108:7, 110:19, 111:22, 119:26, 137:4, 138:1, 138:6, 139:9, 147:8, 147:13, 148:5, 148:6, 151:14, 151:15, 152:18, 152:19, 152:27, 157:28, 158:7 EVIDENCE [1] - 62:10 EVIDENT [1] - 150:27 EVIDENTIAL [3] - 109:24, 137:23, 140:11 EVOLUTION [1] - 137:20 EVOLVING [5] - 51:20, 52:20, 53:28, 57:29, 103:29 EXACT [2] - 129:10, 133:8 EXACTLY [6] - 4:22, 43:11, 53:14, 75:27,	88:5, 153:23 EXAMINATION [7] - 68:4, 79:28, 83:3, 83:13, 84:19, 85:3, 105:10 EXAMINATION S [4] - 54:29, 56:29, 81:2, 91:5 EXAMINED [3] - 54:26, 56:19, 85:21 EXAMINER [1] - 150:11 EXAMPLE [31] - 11:11, 34:17, 47:17, 48:9, 48:17, 49:9, 49:13, 49:27, 50:29, 68:20, 68:26, 70:9, 72:21, 81:28, 82:29, 88:8, 88:21, 92:5, 102:10, 104:8, 116:24, 118:17, 119:2, 123:20, 130:17, 148:8, 148:13, 148:17, 148:21, 151:1, 155:17 EXAMPLES [5] - 8:18, 48:21, 66:2, 89:24, 119:6 EXCEL [1] - 142:11 EXCELLENT [1] - 6:6 EXCEPT [3] - 81:3, 97:23, 120:12 EXCEPTIONAL [1] - 149:15 EXCHANGE [1] - 115:25 EXECUTIVE [23] - 20:21, 20:22, 20:28, 22:11, 22:23, 22:28, 23:15, 23:17, 23:19, 23:24, 23:28, 24:13, 25:3, 25:23, 26:8, 27:23, 27:27, 28:22, 29:8, 29:9, 29:11, 29:17, 29:21 EXERCISE [2] - 84:26, 134:27 EXERCISES [2]	- 86:26, 101:19 EXHIBIT [5] - 51:3, 55:23, 87:12, 88:6, 88:17 EXHIBITED [1] - 110:28 EXHIBITS [1] - 57:18 EXIST [4] - 111:19, 113:4, 136:28, 142:10 EXISTED [4] - 26:14, 87:7, 112:3, 112:22 EXISTENCE [6] - 11:29, 15:1, 15:2, 15:29, 37:25, 96:24 EXISTS [2] - 88:11, 89:4 EXPANDING [1] - 121:20 EXPECT [16] - 52:27, 53:2, 53:8, 55:26, 57:9, 63:23, 68:12, 68:14, 84:17, 91:15, 99:6, 105:1, 112:27, 148:22, 148:23, 148:24 EXPECTATION [4] - 127:8, 127:10, 141:18, 157:17 EXPECTATION S [2] - 109:18, 111:18 EXPECTED [8] - 53:19, 65:25, 93:8, 110:9, 146:27, 147:7, 148:1, 148:3 EXPECTING [1] - 118:24 EXPELLED [3] - 14:27, 15:26, 16:4 EXPERIENCE [12] - 37:11, 42:1, 61:12, 69:24, 71:3, 107:19, 125:9, 138:21, 145:22, 151:19, 154:1, 156:14 EXPERIENCED [3] - 66:25, 77:18, 92:7 EXPERIENCIN	G [1] - 24:14 EXPERIMENT [2] - 125:18, 126:19 EXPERIMENTA L [2] - 138:23, 144:17 EXPERT [21] - 59:26, 67:7, 67:26, 67:27, 68:2, 69:28, 71:1, 73:18, 76:1, 76:12, 77:16, 79:24, 79:27, 82:13, 84:29, 91:8, 110:18, 129:20, 138:1, 139:8 EXPERTISE [14] - 4:10, 4:13, 30:18, 37:11, 58:13, 73:28, 76:9, 92:5, 94:1, 94:4, 102:8, 151:19, 155:28, 156:14 EXPERTS [8] - 45:11, 65:7, 84:27, 87:3, 89:4, 100:3, 101:19, 151:12 EXPLAIN [11] - 46:2, 46:22, 62:19, 64:6, 67:1, 75:5, 90:26, 105:5, 118:12, 128:29 EXPLAINING [1] - 53:12 EXPLANATION [1] - 113:3 EXPLODED [1] - 71:26 EXPLORE [3] - 46:8, 46:29, 76:5 EXPLOSION [1] - 70:15 EXPLOSIVE [14] - 44:25, 44:27, 67:26, 68:3, 68:13, 69:28, 70:2, 70:4, 71:6, 72:12, 72:26, 77:10, 92:8, 94:13 EXPLOSIVE [1] - 70:29 EXPLOSIVES [6] - 68:17, 69:19, 87:14, 92:6, 94:4,	103:10 EXPLOSIVES [2] - 70:22, 89:25 EXPRESS [1] - 36:19 EXPRESSED [2] - 38:17, 110:19 EXTENDED [2] - 68:5, 116:8 EXTENSIVE [1] - 71:2 EXTENSIVELY [3] - 3:28, 73:21, 80:1 EXTENT [6] - 62:21, 76:7, 77:7, 101:27, 140:16, 143:13 EXTERNAL [1] - 26:20 EXTORTION [2] - 140:2, 152:25 EXTRA [1] - 134:8 EXTRACTING [1] - 78:8 EXTREME [1] - 37:13 EXTREMELY [2] - 65:28, 153:13 EYE [1] - 127:24	FAIR [2] - 64:25, 95:1 FAIRLY [3] - 79:13, 81:19, 90:16 FALL [2] - 110:7, 111:17 FALLACY [4] - 110:7, 148:4, 148:9, 148:14 FALLEN [1] - 154:23 FALSE [1] - 148:27 FAMILIAR [2] - 94:9, 154:4 FANNING [1] - 126:9 FAR [13] - 21:7, 27:25, 40:16, 48:7, 88:10, 105:14, 122:20, 130:8, 136:4, 142:22, 142:23, 156:19, 156:21 FASHIONED [1] - 74:13 FASTER [2] - 61:1, 62:7 FAVOUR [1] - 33:27 FEATHER [1] - 66:4 FEATURE [4] - 93:21, 130:12, 131:15, 133:23 FEATURES [3] - 75:9, 111:2, 134:10 FEBRUARY [2] - 25:9, 152:18 FEL [1] - 89:25 FELLOW [1] - 107:24 FELT [4] - 6:25, 6:28, 36:19, 104:26 FEMALE [2] - 60:27, 75:10 FEW [10] - 5:25, 15:10, 52:12, 60:9, 66:11, 97:25, 122:29, 124:13, 125:5, 142:11 FEWER [6] - 36:1, 122:4, 122:15, 122:27, 127:5, 143:5 FHEIS [3] -
---	---	--	---	---	--

13:12, 13:14, 25:17 FIBRE [8] - 49:14, 80:15, 81:2, 81:29, 82:1, 88:22, 88:26, 94:17 FIBRES [13] - 45:4, 49:10, 79:22, 79:28, 80:2, 80:8, 80:10, 80:12, 81:13, 81:18, 81:19, 81:24, 87:15 FIBRIC [1] - 49:14 FIELD [1] - 135:23 FIFTH [2] - 44:16, 111:25 FIGURE [2] - 16:13, 16:24 FIGURE [4] - 16:22, 35:5, 35:15, 40:12 FIGUREHEADS [1] - 35:16 FIGURES [5] - 16:10, 23:18, 23:19, 24:19, 36:8 FILES [3] - 74:17, 77:4, 77:6 FINAL [3] - 38:4, 98:3, 134:26 FINALLY [4] - 28:12, 36:12, 84:25, 150:6 FINANCE [2] - 32:16, 32:26 FINDER [1] - 136:20 FINDINGS [3] - 40:18, 98:25, 150:25 FINE [2] - 73:11, 142:13 FINGER [1] - 76:25 FINGERPRINT [2] - 73:23, 99:25 FINGERPRINT [10] - 74:8, 74:14, 74:15, 74:17, 75:16, 76:12, 89:1, 99:20, 99:21, 99:23 FINGERPRINT S [15] - 44:29, 47:17, 48:19,	73:16, 74:4, 74:16, 75:21, 76:3, 76:21, 76:24, 76:27, 77:3, 77:12, 87:15, 99:22 FINISH [2] - 36:12, 73:17 FINISHED [4] - 38:28, 73:13, 99:14, 102:25 FIREARMS [1] - 92:12 FIRM [2] - 6:26, 96:10 FIRMS [1] - 96:4 FIRST [60] - 4:23, 10:13, 11:25, 12:1, 13:7, 13:11, 15:25, 16:13, 16:18, 17:2, 17:13, 21:16, 23:14, 29:29, 32:12, 35:8, 36:16, 38:5, 41:5, 42:15, 46:23, 47:3, 48:4, 50:8, 51:4, 52:4, 52:11, 52:24, 58:9, 58:10, 59:6, 67:5, 67:26, 73:22, 79:23, 87:9, 87:27, 87:29, 88:5, 107:3, 107:11, 107:27, 108:7, 109:22, 111:8, 112:22, 116:25, 124:29, 129:17, 130:27, 131:20, 134:21, 136:7, 137:4, 137:13, 144:3, 145:4, 145:8, 154:20 FIRST [1] - 10:6 FIRSTHAND [1] - 145:9 FIRSTLY [5] - 110:23, 131:10, 132:13, 155:26, 156:15 FIT [5] - 13:9, 53:6, 70:2, 71:23, 71:24 FITS [1] - 83:1 FIVE [2] - 72:26, 127:2 FLAVOUR [2] - 84:13, 84:14 FLAW [1] -	149:12 FLIGHT [1] - 40:5 FLIP [1] - 143:19 FLOODLIGHT [1] - 120:2 FLUID [3] - 49:22, 78:26, 79:15 FOCUS [4] - 4:10, 8:23, 53:12, 65:8 FOCUSED [7] - 3:12, 10:9, 10:10, 40:18, 70:3, 138:14, 150:3 FOCUSING [3] - 11:21, 109:13, 130:4 FOLLOW [2] - 113:11, 113:23 FOLLOWED [1] - 68:23 FOLLOWING [7] - 11:23, 17:12, 20:1, 36:18, 113:18, 144:20, 146:14 FOLLOWS [1] - 118:2 FOLLOWS [7] - 39:11, 39:22, 103:1, 103:20, 106:12, 106:23, 152:10 FOOTWEAR [2] - 66:3, 82:29 FOR [1] - 106:11 FORCE [4] - 31:9, 31:11, 141:1, 141:17 FORCES [1] - 140:13 FOREFRONT [1] - 97:6 FORENSIC [38] - 42:7, 42:17, 42:19, 42:23, 42:26, 43:5, 43:15, 62:9, 62:27, 70:22, 80:4, 82:23, 85:14, 89:18, 89:20, 89:25, 90:11, 90:14, 91:11, 92:28, 93:2, 93:11, 93:25, 95:9, 95:19, 96:10, 97:5, 97:18,	97:28, 101:5, 101:28, 107:24, 107:28, 108:21, 108:24, 108:28, 135:27, 135:29 FORENSIC [120] - 40:13, 40:14, 40:16, 41:2, 42:4, 42:6, 42:21, 42:29, 43:8, 43:24, 44:22, 45:28, 46:11, 46:14, 46:17, 46:21, 46:22, 46:27, 47:14, 49:25, 50:6, 51:7, 51:10, 51:11, 51:16, 52:16, 52:29, 53:6, 53:12, 54:2, 54:4, 54:7, 54:19, 54:22, 55:12, 55:27, 55:29, 56:26, 57:5, 57:9, 57:21, 57:24, 58:7, 59:1, 62:13, 62:20, 63:22, 63:25, 63:27, 64:2, 65:28, 66:13, 66:26, 68:2, 72:20, 73:19, 73:24, 77:18, 77:19, 77:22, 77:23, 79:27, 81:2, 81:25, 82:15, 86:15, 86:22, 87:7, 89:4, 89:9, 89:10, 89:15, 90:3, 90:5, 90:16, 90:17, 90:29, 91:3, 91:12, 91:14, 92:7, 92:22, 93:19, 93:27, 94:10, 94:14, 95:2, 95:16, 96:5, 96:19, 96:20, 97:6, 97:13, 97:20, 97:22, 98:5, 98:10, 98:12, 98:22, 98:24, 99:15, 100:1, 100:2, 100:14, 101:11, 101:23, 103:26, 103:29, 104:1, 104:5, 104:11, 105:15, 107:22, 107:27, 109:1, 116:20, 141:14,	145:25, 146:26 FORENSICS [5] - 58:10, 58:20, 59:5, 59:8, 108:11 FORENSICS [1] - 108:12 FORGET [1] - 65:17 FORM [21] - 14:28, 16:12, 19:25, 25:13, 29:4, 29:11, 29:21, 30:22, 31:4, 33:4, 36:23, 38:19, 52:3, 57:22, 64:9, 69:17, 112:5, 121:6, 144:23, 154:9, 154:17 FORMAL [2] - 94:22, 141:16 FORMALLY [1] - 73:19 FORMAT [3] - 116:19, 142:4, 144:1 FORMATION [2] - 14:18, 15:12 FORMED [3] - 13:24, 14:29, 15:24 FORMING [4] - 5:26, 12:4, 25:2, 146:9 FORMS [4] - 69:4, 69:8, 81:8, 86:1 FORT [1] - 103:12 FORWARD [13] - 9:18, 10:12, 13:15, 13:19, 21:29, 27:12, 61:3, 93:15, 106:7, 115:13, 115:22, 156:25, 158:10 FORWARDS [1] - 91:10 FOUR [7] - 58:5, 58:6, 78:8, 90:20, 108:13, 111:2, 146:22 FOUR-STAGE [1] - 78:8 FOURTH [2] - 44:16, 110:15 FRAGILE [1] - 68:6	FRAMED [1] - 28:15 FRANCIE [1] - 35:10 FRANK [11] - 23:21, 24:7, 29:7, 29:24, 29:27, 30:27, 32:11, 32:18, 33:5, 33:10, 33:12 FRANKLY [1] - 116:29 FRENCH [1] - 89:5 FREQUENCY [1] - 60:13 FREQUENT [1] - 154:29 FRESH [1] - 98:25 FRICTION [8] - 22:17, 22:20, 22:22, 22:23, 23:8, 25:1, 25:6, 26:3 FSANI [15] - 46:11, 70:1, 79:10, 81:16, 86:17, 87:2, 91:28, 92:5, 94:16, 99:21, 100:12, 101:11, 101:23, 101:28, 105:21 FSI [1] - 102:7 FSRC1 [1] - 135:28 FSS [4] - 81:17, 89:22, 91:29, 92:11 FTIR [1] - 80:15 FULL [10] - 39:25, 60:3, 60:8, 60:11, 67:8, 76:26, 90:16, 90:17, 106:26, 109:5 FULLY [1] - 36:22 FUNDAMENTA LLY [1] - 84:19 FUNDING [1] - 58:2 FUTURE [1] - 22:9 FEIN [36] - 7:15, 7:22, 8:5, 9:5, 13:9, 13:13, 13:14, 13:23, 13:24, 13:27,
---	---	--	--	--	---

13:29, 14:5, 14:6, 14:11, 15:13, 15:15, 15:23, 15:26, 16:2, 16:25, 16:26, 16:27, 16:29, 17:2, 17:26, 18:3, 18:17, 19:12, 25:17, 25:18, 26:24, 27:7, 27:13, 31:25, 31:26	AL ^[1] - 36:2 GERRY ^[3] - 18:16, 22:5, 24:22 GILLEN ^[2] - 24:1, 29:7 GIVEN ^[26] - 45:24, 57:6, 76:8, 84:12, 89:24, 110:9, 118:1, 125:21, 127:9, 127:11, 130:17, 130:24, 138:4, 145:14, 146:5, 147:4, 147:7, 147:9, 148:1, 148:14, 148:15, 148:18, 150:26, 152:1, 152:27 GLASGOW ^[1] - 90:21 GLASS ^[1] - 83:9 GLOBAL ^[1] - 112:17 GLOBALLY ^[1] - 94:14 GLOSS ^[1] - 108:17 GLUE ^[1] - 83:9 GMP ^[1] - 139:13 GOODS ^[1] - 96:3 GOULDING ^[2] - 12:4, 17:29 GOVERNMENT ^[6] - 26:22, 34:24, 43:22, 85:7, 90:6, 140:4 GPS ^[1] - 125:16 GRADUALLY ^[1] - 121:20 GRAINS ^[1] - 66:4 GRAMPIAN ^[1] - 90:22 GRAPH ^[5] - 68:29, 69:1, 134:5, 134:20, 135:3 GRAPHICAL ^[1] - 16:12 GRATEFUL ^[3] - 73:14, 105:26, 153:13 GREANEY ^[12] - 38:26, 39:2, 39:5, 39:14, 39:22, 39:24, 102:13, 103:17, 105:28,	106:2, 159:4, 159:7 GREANEY ^[4] - 39:13, 106:16, 131:3, 158:5 GREAT ^[2] - 71:4, 120:25 GREATER ^[2] - 73:20, 121:3 GREATER ^[5] - 100:19, 109:6, 133:14, 137:16, 144:9 GREEN ^[4] - 120:28, 121:5, 121:11, 135:9 GREY ^[2] - 125:26, 126:12 GRID ^[1] - 129:16 GROUND ^[4] - 126:17, 134:5, 134:6, 135:6 GROUND ^[1] - 8:5 GROUP ^[2] - 85:15, 108:26 GROUP ^[9] - 8:3, 8:13, 11:12, 12:4, 13:12, 14:26, 31:18, 37:2, 144:13 GROUPE ^[1] - 112:19 GROUPING ^[2] - 29:27, 48:14 GROUPS ^[19] - 5:17, 7:16, 7:25, 7:27, 8:18, 8:29, 9:22, 10:5, 10:10, 10:15, 25:2, 26:3, 28:7, 28:13, 30:1, 77:5, 80:3, 93:24, 93:28 GROWING ^[5] - 22:4, 22:11, 22:15, 74:21, 74:26 GSM ^[4] - 112:14, 122:19, 138:25, 156:11 GUEST ^[1] - 82:19 GUIDANCE ^[2] - 95:10, 108:26 GUIDED ^[1] - 110:23 GUIDING ^[1] - 109:20 GUILTY ^[2] -	57:9, 62:23 GUNSHOT ^[1] - 88:10	H	HAIR ^[1] - 88:9 HALF ^[1] - 126:24 HALSTED ^[1] - 103:12 HALT ^[1] - 105:3 HAND ^[13] - 61:28, 65:22, 70:8, 76:20, 84:3, 114:22, 115:4, 122:24, 125:25, 126:11, 126:27, 127:27, 143:16 HANDS ^[1] - 151:25 HANDSET ^[4] - 113:27, 114:5, 155:2, 155:18 HANDWRITING ^[2] - 85:3, 85:20 HAPPY ^[2] - 20:11, 56:3 HARD ^[4] - 120:11, 120:12, 122:19, 122:25 HARDWARE ^[1] - 114:3 HARVEST ^[1] - 12:9 HAVING ^[2] - 39:21, 106:22 HEAD ^[4] - 5:3, 28:10, 28:13, 73:19 HEADED ^[1] - 66:28 HEADING ^[1] - 68:9 HEADINGS ^[2] - 91:2, 129:14 HEADLINE ^[4] - 29:4, 109:19, 135:17, 137:14 HEADLINED ^[1] - 146:19 HEADLINES ^[1] - 91:24 HEAR ^[6] - 39:6, 45:10, 45:12, 46:4, 57:2, 158:2 HEARD ^[3] - 32:18, 131:2, 141:12	HEARING ^[1] - 152:9 HEARING ^[1] - 158:11 HEARINGS ^[2] - 9:24, 40:25 HEIGHT ^[3] - 121:27, 128:22, 135:7 HELD ^[4] - 77:22, 92:18, 116:17, 157:1 HELP ^[30] - 3:8, 6:29, 7:7, 9:26, 20:4, 41:11, 43:6, 45:13, 45:18, 46:20, 47:15, 47:27, 52:15, 54:8, 54:10, 57:4, 57:24, 63:8, 63:9, 67:20, 73:2, 76:16, 77:16, 87:8, 101:2, 102:9, 137:15, 145:15, 154:19, 156:29 HELPED ^[3] - 75:23, 77:17, 93:10 HELPFUL ^[8] - 9:24, 21:21, 21:23, 35:21, 62:29, 70:8, 70:18, 98:2 HELPPFULLY ^[2] - 73:12, 146:10 HELPS ^[1] - 108:16 HESTER ^[4] - 44:24, 45:12, 71:1, 72:14 HIGH ^[12] - 5:13, 17:21, 20:13, 20:15, 41:7, 57:26, 67:23, 71:3, 71:7, 121:12, 133:13, 133:23 HIGHER ^[2] - 133:14, 134:8 HIGHEST ^[1] - 121:9 HIGHLIGHT ^[3] - 109:11, 109:17, 142:19 HIGHLIGHTED ^[1] - 126:6 HIGHLIGHTIN G ^[1] - 65:17 HIGHLY ^[3] -	66:20, 77:18, 82:15 HILL ^[3] - 127:22, 135:10 HILLS ^[3] - 123:15, 123:18, 124:1 HINDSIGHT ^[1] - 111:17 HISTORICAL ^[2] - 21:20, 43:29 HISTORICALL Y ^[1] - 89:21 HISTORY ^[2] - 78:5, 92:15 HMM ^[6] - 5:2, 5:16, 8:28, 21:19, 27:1, 32:19 HOLD ^[3] - 108:12, 140:27, 156:26 HOLIDAY ^[1] - 39:28 HOLLOWAY ^[1] - 3:23 HOLYHEAD ^[2] - 131:6, 131:11 HOME ^[3] - 36:7, 154:22, 154:26 HOME ^[5] - 42:7, 42:20, 73:24, 97:19, 107:28 HONEST ^[1] - 149:25 HONOUR'S ^[1] - 107:20 HONOURS ^[1] - 43:23 HOPE ^[1] - 88:10 HOPING ^[1] - 136:27 HORGAN ^[1] - 6:9 HORIZON ^[2] - 55:19, 133:21 HOSTAGE ^[2] - 140:2, 152:25 HOSTED ^[1] - 6:5 HOURLY ^[2] - 36:13, 38:28 HOUSE ^[2] - 149:27, 154:25 HPLC ^[1] - 80:14 HUMAN ^[1] - 143:18 HUME ^[2] - 22:5, 22:6 HUME-ADAMS ^[1] - 22:5
--	---	---	---	----------	--	---	--

HUNDREDS [3] - 51:25, 130:10, 155:9 HUNTINGDON [2] - 92:11 HYPOTHESIS [1] - 130:23 HÉIREANN [1] - 30:1	[1] - 143:26 IDENTITY [1] - 114:10 IED [1] - 71:14 IEDS [2] - 70:9, 71:6 ILLUSTRATE [5] - 130:4, 130:16, 133:11, 135:1, 140:25 ILLUSTRATED [3] - 123:27, 124:4, 133:25 ILLUSTRATES [1] - 55:6 ILLUSTRATING [5] - 65:23, 121:28, 123:14, 123:23, 131:27 ILLUSTRATION [1] - 148:12 IMAGE [9] - 44:15, 44:16, 61:29, 123:14, 123:25, 124:3, 133:21, 134:1 IMAGES [1] - 66:12 IMAGINATION [1] - 66:14 IMAGINE [2] - 57:5, 105:20 IMEI [1] - 114:2 IMEIS [1] - 114:5 IMMEDIATELY [2] - 117:28, 124:9 IMPACT [1] - 113:13 IMPARTIAL [1] - 57:1 IMPLEMENTED [2] - 109:2, 138:26 IMPLICATION [2] - 152:28, 153:3 IMPLIES [1] - 140:7 IMPORTANCE [1] - 15:18 IMPORTANT [33] - 7:9, 10:27, 19:7, 19:10, 26:18, 47:10, 47:14, 48:9, 48:25, 49:19, 49:23, 49:26, 51:19, 51:24, 52:7, 54:23, 55:3, 56:27, 58:17, 59:15, 65:10, 65:13, 65:27,	65:28, 76:26, 97:15, 97:21, 120:6, 133:2, 137:2, 138:6, 155:6 IMPORTANTLY [2] - 54:24, 97:8 IMPORTATION [1] - 140:3 IMPRESSION [1] - 61:6 IMPROVE [1] - 43:13 IMPROVED [2] - 81:15, 100:16 IMPROVEMENT [1] - 98:2 IMPROVEMENTS [1] - 101:4 IMPROVING [1] - 73:25 IMPROVISED [3] - 71:5, 72:16, 94:12 IMSI [8] - 114:9, 114:18, 145:3, 145:7, 145:10, 145:19, 145:21 IN'97 [1] - 68:14 IN-HOUSE [1] - 149:27 INACTIVITY [1] - 154:21 INCIDENT [6] - 73:22, 100:25, 104:9, 105:8, 105:12 INCIDENTS [7] - 70:5, 71:4, 71:17, 94:13, 104:10, 105:13 INCLUDE [5] - 34:20, 98:10, 100:3, 116:6, 131:17 INCLUDED [7] - 33:15, 67:8, 76:2, 95:16, 95:23, 119:6, 152:24 INCLUDES [3] - 40:27, 116:7, 130:26 INCLUDING [14] - 10:26, 72:21, 74:4, 78:13, 79:10, 82:16, 83:14, 85:24, 96:5, 100:1, 101:11, 101:23, 128:19, 146:14	INCOMING [5] - 131:15, 131:23, 131:24, 131:28, 132:7 INCONVENIENCE [2] - 39:27, 40:1 INCORPORATION [1] - 31:11 INCREASE [2] - 26:4, 26:5 INCREASED [3] - 84:20, 84:22, 100:17 INCREASING [2] - 28:7, 62:11 INCREASINGLY [1] - 59:15 INCREDIBLY [3] - 47:10, 65:12, 76:23 INDEED [6] - 28:10, 38:26, 73:1, 94:8, 153:12, 157:20 INDEPENDENCE [1] - 55:7 INDEPENDENT [1] - 10:6 INDEPENDENT [6] - 43:13, 54:24, 55:3, 62:12, 151:9, 151:13 INDEX [1] - 159:1 INDICAT [1] - 24:18 INDICATE [14] - 20:13, 29:13, 29:25, 31:6, 32:9, 33:1, 33:4, 33:16, 33:20, 34:10, 34:17, 47:27, 102:19, 151:26 INDICATED [11] - 4:28, 17:8, 27:5, 32:8, 34:5, 42:29, 51:6, 67:21, 68:20, 153:13, 153:14 INDICATING [2] - 53:11, 126:13 INDICATION [3] - 119:3, 150:25, 158:1 INDIVIDUAL [5] - 57:8, 72:1, 78:2, 82:5, 97:20 INDIVIDUALLY [1] - 143:4	INDIVIDUALS [4] - 23:22, 24:20, 24:28, 158:4 INFAMOUS [1] - 139:2 INFANCY [2] - 60:14, 135:22 INFERENCE [2] - 107:22, 131:8 INFLUENCE [1] - 143:13 INFLUENTIAL [1] - 97:7 INFORM [2] - 126:18, 136:5 INFORMAL [1] - 141:16 INFORMATION [30] - 59:12, 60:6, 98:26, 102:3, 114:16, 116:8, 116:14, 116:17, 116:27, 117:21, 123:24, 125:5, 125:15, 128:13, 128:18, 128:21, 128:23, 128:28, 129:3, 129:5, 130:3, 130:7, 130:12, 132:4, 132:7, 139:7, 139:13, 141:28, 142:3 INFORMED [2] - 23:2, 106:5 INFRARED [2] - 68:28, 68:29 INFRASTRUCTURE [2] - 115:20, 133:8 INFREQUENCY [1] - 155:11 INHIBITED [2] - 6:25, 6:28 INITIAL [2] - 80:11, 119:3 INKS [1] - 85:20 INLA [8] - 14:18, 14:28, 15:1, 15:2, 15:4, 16:18, 38:8, 38:11 INNER [1] - 20:29 INNOCENT [1] - 33:21 INPUT [3] - 54:4, 54:5, 100:12 INQ [1] - 113:17 INQUIRIES [1] - 7:13	INQUIRY [3] - 39:11, 106:11, 158:14 INQUIRY [2] - 54:27, 55:11 INQUIRY [12] - 4:15, 4:18, 7:7, 7:26, 40:9, 40:14, 40:16, 91:17, 102:20, 106:29, 123:2, 130:25 INQUIRY'S [2] - 40:25, 107:12 INSERTING [1] - 69:9 INSPECT [1] - 138:3 INSTANCE [1] - 42:15 INSTANCES [1] - 23:3 INSTEAD [1] - 16:7 INSTIGATORS [1] - 38:23 INSTITUTES [1] - 93:26 INSTITUTES [1] - 81:25 INSTRUCTED [1] - 40:13 INSTRUCTION [1] - 106:29 INSTRUCTION [2] - 45:19, 45:24 INSTRUMENT [1] - 82:29 INSTRUMENTS [3] - 61:25, 101:13, 101:25 INTEGRATED [1] - 60:22 INTEGRITY [3] - 50:17, 50:28, 51:3 INTELLIGENCE [1] - 138:8 INTENDED [2] - 33:12, 135:1 INTENDING [2] - 86:29, 103:23 INTENSITY [1] - 14:22 INTERACTION [1] - 77:2 INTEREST [1] - 125:22 INTERESTED [6] - 49:18, 75:6,
--	--	--	--	--	--

77:8, 126:1, 126:4, 144:2 INTERESTING LY [1] - 81:17 INTERLABORATORY [4] - 86:25, 92:27, 93:6, 101:18 INTERLABORATORY [1] - 92:21 INTERNAL [1] - 141:9 INTERNALLY [3] - 15:23, 15:26, 24:10 INTERNATION AL [2] - 96:2, 108:29 INTERNATION AL [5] - 3:3, 79:28, 80:2, 85:12, 114:9 INTERNATION ALLY [1] - 108:19 INTERNET [1] - 117:13 INTERPRET [5] - 52:4, 54:8, 91:7, 101:1 INTERPRETATI ON [7] - 63:14, 77:21, 80:15, 92:24, 95:18, 108:27, 113:14 INTERPRETATI ON [2] - 85:14, 108:26 INTERPRETIN G [2] - 77:29, 78:13 INTRODUCE [4] - 67:2, 120:23, 124:24, 128:6 INTRODUCED [3] - 112:8, 136:14, 136:25 INTRODUCING [1] - 40:16 INTRODUCTIO N [7] - 5:14, 7:8, 41:2, 41:8, 67:6, 67:21, 137:6 INTRODUCTO RY [2] - 41:12, 106:7 INVESTIGATE [1] - 55:26 INVESTIGATE D [1] - 139:6 INVESTIGATIN	G [14] - 51:11, 52:25, 52:28, 53:2, 55:14, 71:5, 98:8, 99:3, 104:2, 104:22, 105:11, 140:21, 141:1, 141:17 INVESTIGATIO N [21] - 40:19, 52:17, 52:20, 52:26, 53:3, 53:5, 53:6, 53:23, 53:28, 55:13, 62:13, 94:12, 98:27, 105:15, 124:22, 137:26, 140:23, 141:9, 149:28, 151:7, 153:5 INVESTIGATIO NS [16] - 41:3, 45:29, 53:25, 57:11, 57:14, 59:16, 59:18, 64:25, 65:3, 67:9, 71:3, 73:22, 77:20, 86:28, 91:1, 140:4 INVESTIGATIV E [5] - 98:9, 98:24, 100:1, 109:25, 140:9 INVESTIGATIV ELY [1] - 140:8 INVESTIGATO R [4] - 54:25, 71:8, 71:9, 99:29 INVESTIGATO RS [7] - 56:9, 72:20, 97:11, 98:19, 100:10, 141:5, 144:8 INVITE [2] - 56:24, 90:27 INVOLVE [2] - 65:6, 141:4 INVOLVED [18] - 3:10, 3:20, 10:11, 10:18, 10:20, 19:5, 27:26, 43:26, 65:14, 70:24, 71:28, 72:2, 74:9, 93:13, 94:12, 100:4, 113:19, 138:7 INVOLVEMENT [3] - 12:13, 117:1, 137:22 INVOLVES [4] - 17:23, 64:26,	69:7, 143:26 INVOLVING [4] - 77:20, 78:8, 117:13, 142:25 IQ [1] - 41:22 IRA [122] - 6:14, 7:15, 7:23, 8:5, 8:19, 8:21, 8:29, 9:1, 9:5, 9:15, 11:4, 11:22, 11:23, 11:28, 12:2, 12:3, 12:6, 12:21, 12:23, 12:25, 12:29, 13:4, 13:6, 13:12, 13:21, 13:25, 14:3, 14:11, 14:17, 14:21, 14:22, 14:27, 15:3, 15:13, 15:14, 15:19, 15:29, 16:14, 16:15, 16:16, 16:18, 16:19, 16:20, 17:1, 17:10, 17:11, 17:16, 18:18, 19:9, 19:11, 19:16, 19:25, 20:2, 20:6, 20:8, 20:10, 20:18, 20:25, 21:3, 21:5, 21:9, 21:12, 21:15, 21:17, 21:22, 22:15, 23:10, 24:6, 25:3, 25:8, 25:13, 25:16, 27:6, 27:16, 27:20, 28:3, 28:5, 28:23, 29:12, 29:15, 29:22, 29:28, 30:3, 30:8, 30:9, 30:22, 30:23, 31:2, 31:4, 31:8, 31:14, 31:17, 31:25, 32:10, 33:1, 33:9, 34:11, 34:21, 34:22, 34:29, 35:6, 35:23, 35:24, 35:25, 35:26, 36:3, 36:9, 36:15, 36:16, 36:20, 37:8, 37:17, 37:18, 37:19, 37:22, 37:26, 38:7, 38:11 IRELAND [15] - 10:5, 10:21, 10:28, 18:4,	18:21, 21:29, 25:19, 26:23, 27:3, 32:5, 34:24, 37:27, 90:23, 91:20, 94:11 IRISH [9] - 4:2, 12:18, 16:17, 16:27, 28:25, 30:2, 34:16, 34:24, 131:13 IRSP [2] - 14:28, 16:28 ISLAND [1] - 25:19 ISO [1] - 109:1 ISOLATED [2] - 22:28, 23:2 ISSUE [10] - 8:27, 26:19, 55:26, 67:28, 78:28, 79:25, 91:22, 94:29, 153:6, 157:6 ISSUES [2] - 110:29, 150:26 ITEM [3] - 50:17, 87:27, 114:15 ITEMS [6] - 51:25, 54:26, 56:18, 80:9, 84:24, 91:5 ITERATIONS [1] - 61:9 ITIEL [1] - 75:29 ITSELF [7] - 52:1, 60:4, 81:24, 98:12, 103:11, 110:11, 148:2	151:17, 151:20 JUDGMENTS [1] - 75:19 JULY [1] - 27:18 JUMP [1] - 55:9 JUSTICE [3] - 43:19, 43:21, 95:15 JUSTICE [1] - 151:15 JUSTIFIABLY [1] - 151:1 JUSTIFIED [1] - 28:28	68:11, 69:11, 99:25, 137:14, 155:8 KINDS [2] - 54:4, 90:3 KINGDOM [6] - 26:22, 82:19, 85:10, 95:2, 102:2, 111:24 KNOCK [1] - 155:6 KNOTS [1] - 148:26 KNOWLEDGE [8] - 78:22, 89:9, 138:13, 150:14, 150:18, 155:25, 156:29, 157:13 KNOWN [18] - 12:5, 13:23, 14:5, 29:28, 30:2, 30:27, 31:13, 31:26, 32:12, 73:5, 89:12, 90:2, 114:17, 129:11, 131:14, 138:5, 155:13 KNOWS [5] - 4:22, 5:7, 107:9, 141:22, 147:23
				K	
				KEENAN [2] - 26:7, 29:6 KEEP [7] - 59:21, 77:5, 91:9, 111:15, 125:15, 127:24, 157:7 KEITH [4] - 44:27, 45:12, 67:28, 70:6 KEPT [1] - 98:25 KERSHAW [5] - 44:29, 73:18, 74:28, 76:6, 76:12 KEVIN [6] - 24:24, 44:29, 73:18, 74:28, 75:5, 99:26 KEY [7] - 5:17, 23:18, 23:19, 24:19, 86:24, 137:19, 158:3 KIDNAP [2] - 140:1, 152:25 KILL [1] - 33:21 KILLED [2] - 44:9, 44:11 KILLING [3] - 33:13, 33:15, 44:10 KILOMETRE [3] - 126:23, 126:24, 131:11 KILOMETRES [11] - 120:12, 122:13, 122:19, 122:23, 123:6, 124:13, 124:15, 127:3, 134:19, 135:9, 151:2 KIND [8] - 65:2, 65:23, 65:25,	
			J		L
			JACOB [2] - 45:6, 82:13 JANUARY [3] - 13:12, 25:27, 41:25 JOB [1] - 97:21 JOHN [3] - 6:3, 6:9, 22:6 JOHN [1] - 159:3 JOIN [2] - 27:13, 30:9 JOINED [4] - 14:29, 95:8, 107:28, 108:10 JOURNEY [2] - 63:28, 95:3 JOY [1] - 149:24 JUDGMENT [3] -		LA [9] - 106:15, 106:23, 106:25, 151:25, 152:7, 152:13, 157:20, 157:25, 159:12 LAB [2] - 52:1, 92:11 LABELLED [2] - 115:28, 126:5 LABORATORI ES [37] - 46:12, 46:14, 56:16, 63:26, 84:14, 86:15, 86:18, 86:22, 87:7, 89:3, 89:15, 89:19, 89:23, 90:3, 90:5, 90:20, 90:27, 91:19, 91:25, 92:16, 92:29, 93:2, 93:13, 93:19, 93:27, 94:1, 96:5, 96:20, 96:21, 96:27, 97:2, 97:10, 102:1, 103:6, 105:21, 105:23

LABORATORY ^[18] - 43:13, 50:13, 54:22, 56:13, 77:22, 87:24, 90:24, 91:4, 91:12, 93:7, 95:9, 97:14, 98:15, 98:22, 98:26, 100:6, 102:7, 103:13 LABORATORY ^[7] - 70:22, 89:22, 89:25, 89:27, 90:6, 90:23, 101:29 LABOUR ^[1] - 26:21 LABS ^[4] - 51:28, 92:7, 101:11, 101:23 LAID ^[1] - 113:23 LAMPPOST ^[1] - 120:4 LANDLINE ^[1] - 115:7 LANDS ^[1] - 50:2 LANGUAGE ^[1] - 74:13 LARGE ^[14] - 22:27, 45:19, 48:22, 49:1, 51:26, 53:21, 65:29, 70:11, 70:12, 77:19, 120:20, 133:22, 143:3, 155:10 LARGELY ^[4] - 30:15, 95:14, 98:5, 113:18 LARGER ^[2] - 60:14, 75:22 LARGEST ^[1] - 108:10 LAST ^[9] - 48:5, 48:19, 52:12, 130:18, 136:18, 142:19, 153:1, 153:16, 154:19 LATE ^[16] - 12:7, 22:7, 22:10, 56:15, 57:25, 60:8, 60:21, 61:8, 63:19, 64:15, 65:9, 65:24, 75:28, 95:1, 138:16 LATEST ^[1] - 82:21	LATTER ^[1] - 132:24 LAW ^[3] - 61:15, 146:29, 153:29 LAWFUL ^[2] - 156:3, 156:5 LAWRENCE ^[1] - 44:16 LAWYERS ^[1] - 43:6 LC ^[1] - 108:25 LEAD ^[14] - 18:10, 19:22, 23:9, 28:4, 38:3, 38:22, 40:14, 44:19, 47:16, 87:22, 98:13, 98:21, 100:5, 119:11 LEAD-UP ^[1] - 18:10 LEADERS ^[2] - 19:5, 20:24 LEADERSHIP ^[11] - 12:10, 17:29, 19:23, 20:8, 20:10, 20:15, 20:17, 20:25, 21:5, 35:23, 38:22 LEADING ^[8] - 14:25, 18:23, 22:3, 35:15, 40:12, 52:26, 58:14, 79:27 LEADS ^[2] - 23:11, 57:3 LEARN ^[2] - 42:3, 94:8 LEARNT ^[1] - 48:7 LEAST ^[3] - 114:18, 131:13, 153:4 LEAVE ^[3] - 29:11, 31:20, 76:23 LEAVING ^[2] - 30:9, 31:7 LECTURED ^[1] - 80:1 LECTURES ^[1] - 82:19 LED ^[11] - 12:3, 14:19, 18:23, 22:2, 23:25, 28:21, 29:17, 29:26, 77:19, 100:5, 152:15 LEE ^[2] - 124:1,	135:10 LEFT ^[18] - 12:12, 15:2, 30:12, 30:22, 43:4, 43:17, 44:8, 92:14, 114:22, 115:24, 125:25, 126:3, 126:27, 130:20, 133:28, 151:28, 154:22, 157:11 LEFT-HAND ^[3] - 114:22, 125:25, 126:27 LEFT-WING ^[1] - 12:12 LEGAL ^[1] - 130:25 LEGAL ^[3] - 11:17, 116:20, 136:10 LEGITIMATE ^[2] - 28:27, 147:16 LENGTH ^[1] - 48:12 LENGTHS ^[1] - 68:29 LENGTHY ^[1] - 11:21 LESS ^[9] - 60:1, 61:2, 93:7, 122:7, 127:4, 127:23, 142:23, 143:19, 151:27 LETTERS ^[1] - 18:15 LETTERS' ^[1] - 18:16 LEVEL ^[21] - 5:13, 17:21, 20:14, 20:15, 41:7, 57:26, 67:23, 71:7, 92:19, 113:24, 126:11, 126:18, 134:5, 135:6, 139:17, 139:23, 140:9, 140:11, 149:25, 150:16, 155:7 LEVELS ^[2] - 91:14, 109:7 LGC ^[1] - 90:5 LIABLE ^[1] - 33:21 LIAM ^[9] - 29:26, 32:14, 32:22, 33:7, 33:9, 33:27, 37:29, 38:6, 130:24	LIBERATION ^[1] - 16:17 LIBRARIES ^[1] - 61:26 LIFE ^[4] - 140:1, 143:13, 143:20, 152:25 LIFESTYLES ^[1] - 59:9 LIFTING ^[2] - 80:9, 83:3 LIGHT ^[8] - 66:8, 68:29, 74:4, 74:5, 75:2, 114:1, 120:1, 123:28 LIKELY ^[15] - 38:21, 48:5, 49:24, 54:11, 60:13, 63:5, 73:3, 100:18, 110:11, 122:16, 135:12, 147:3, 147:4, 147:9, 149:6 LIMIT ^[8] - 74:28, 120:11, 120:12, 122:19, 122:20, 122:25, 123:5, 139:23 LIMITATION ^[2] - 70:6, 120:6 LIMITATIONS ^[7] - 67:11, 122:1, 126:15, 149:21, 149:22, 150:3, 150:15 LIMITED ^[3] - 19:26, 102:6, 102:24 LIMITS ^[1] - 155:25 LINE ^[10] - 68:29, 104:21, 107:13, 123:26, 133:15, 133:27, 134:1, 134:3, 135:3, 143:4 LINED ^[1] - 69:10 LINES ^[7] - 54:27, 55:11, 91:26, 121:6, 125:26, 126:12 LINGER ^[1] - 129:13 LINK ^[4] - 46:29, 78:2, 105:8, 114:23 LINKED ^[2] - 114:11, 145:11 LINKING ^[1] -	81:18 LINKS ^[2] - 84:23, 158:4 LIQUID ^[2] - 69:6, 69:13 LIST ^[5] - 24:5, 38:15, 45:27, 58:9, 70:23 LISTED ^[10] - 36:25, 58:5, 71:11, 73:29, 83:9, 85:17, 103:6, 103:13, 130:19, 152:24 LITIGATION ^[1] - 151:11 LIVE ^[1] - 157:28 LIVES ^[1] - 119:8 LOADED ^[1] - 125:12 LOADING ^[1] - 127:27 LOADS ^[1] - 62:1 LOCAL ^[3] - 74:15, 78:14, 133:23 LOCATION ^[18] - 66:22, 116:10, 117:25, 118:5, 118:6, 123:11, 123:13, 123:25, 127:10, 128:1, 128:13, 128:19, 129:2, 129:7, 129:10, 129:11, 134:27, 155:14 LOCATIONS ^[3] - 54:16, 89:17, 121:11 LOGIC ^[5] - 110:3, 147:26, 148:1, 148:7, 149:12 LOGO ^[2] - 118:28, 119:21 LONDON ^[4] - 3:23, 59:23, 89:21, 121:3 LONG-ESTABLISHED ^[1] - 18:8 LONGEST ^[1] - 48:14 LOOK ^[45] - 11:16, 16:1, 22:14, 34:17, 34:23, 37:19, 37:24, 47:12,	49:20, 51:9, 55:5, 58:9, 59:3, 60:25, 62:24, 64:10, 70:18, 75:25, 80:10, 82:8, 84:12, 87:6, 100:18, 103:3, 106:7, 113:8, 126:2, 126:22, 126:27, 128:5, 128:28, 129:12, 129:28, 130:18, 133:1, 134:12, 134:26, 135:24, 141:29, 143:3, 145:15, 155:6, 155:9, 155:13, 158:10 LOOKED ^[16] - 3:25, 43:17, 71:25, 89:27, 90:1, 91:23, 99:27, 107:6, 124:18, 124:25, 132:22, 135:5, 138:18, 150:1, 151:8, 154:21 LOOKING ^[32] - 4:5, 7:16, 7:25, 7:26, 43:7, 48:2, 48:6, 49:10, 49:18, 50:9, 50:10, 51:27, 52:3, 52:12, 63:2, 66:10, 67:16, 71:19, 84:26, 85:27, 86:1, 88:20, 110:26, 116:26, 130:16, 135:1, 147:2, 147:10, 154:5, 154:26, 154:28 LOOKS ^[4] - 58:19, 62:18, 92:2, 131:4 LOSE ^[2] - 121:22, 135:11 LOSES ^[1] - 125:5 LOSING ^[1] - 121:18 LOST ^[1] - 148:11 LOTHIAN ^[1] - 90:21 LOUTH ^[1] - 36:5 LOW ^[1] - 151:1 LOWER ^[4] - 84:5, 123:15,
---	---	--	--	---	--

127:5, 134:1 LUNCH ^[1] - 106:2 LUNCH ^[1] - 106:11 LYING ^[1] - 134:6 LYNETTE ^[1] - 44:8	MANAGER ^[2] - 3:15, 108:3 MANAGING ^[3] - 71:14, 77:23, 150:19 MANCHESTER ^[4] - 71:9, 73:20, 138:22, 139:12 MANDATORY ^[1] - 95:25 MANNER ^[2] - 147:15, 147:19 MANSERGH ^[1] - 34:26 MANUAL ^[1] - 142:9 MANUALLY ^[1] - 142:12 MANUALS ^[1] - 95:9 MANUFACTUR E ^[3] - 33:29, 68:3, 140:3 MANUFACTUR ER ^[3] - 80:16, 83:6, 83:16 MANUFACTUR ING ^[1] - 83:1 MAP ^[6] - 113:23, 123:13, 123:24, 124:8, 133:28 MAPPED ^[2] - 143:24, 145:28 MAPS ^[1] - 125:23 MARISA ^[1] - 6:3 MARK ^[1] - 66:3 MARKER ^[1] - 105:24 MARKERS ^[1] - 121:14 MARKS ^[9] - 45:6, 66:7, 82:12, 82:16, 82:29, 83:4, 84:11, 85:28, 86:3 MARRIED ^[1] - 35:18 MARTIN ^[2] - 24:26, 34:26 MARY ^[1] - 39:26 MASS ^[1] - 89:28 MASS ^[1] - 83:14 MAST ^[13] - 121:27, 123:11, 123:15, 123:25,	126:3, 126:4, 126:28, 126:29, 134:7, 134:18, 135:7, 144:4, 154:19 MASTS ^[3] - 131:20, 133:4, 133:17 MATCH ^[3] - 47:22, 60:17, 100:19 MATCHED ^[1] - 88:24 MATCHES ^[3] - 62:2, 74:24, 81:14 MATCHING ^[1] - 81:23 MATERIAL ^[10] - 6:13, 6:20, 6:22, 22:26, 31:6, 67:13, 78:26, 83:24, 150:27 MATERIALS ^[10] - 23:16, 24:29, 25:1, 29:13, 33:1, 33:16, 33:20, 34:5, 34:10, 34:16 MATTER ^[6] - 31:7, 102:21, 102:28, 123:18, 131:4, 134:16 MATTERS ^[2] - 50:26, 137:16 MATTHEW ^[3] - 106:3, 106:17, 106:27 MATTHEW ^[2] - 106:22, 159:11 MAXIMUM ^[6] - 122:14, 122:17, 123:5, 127:24, 131:11, 152:2 MAYNOOTH ^[1] - 3:24 MCAULEY ^[1] - 94:9 MCGLINCHY ^[1] - 6:3 MCGRANE ^[6] - 23:28, 27:28, 29:24, 29:26, 32:15, 32:24 MCGUCKIN ^[6] - 102:21, 103:17, 103:20, 103:22, 105:26, 159:9 MCGUINNESS ^[12] - 23:21, 24:7,	24:26, 29:24, 29:27, 30:27, 32:11, 32:18, 33:5, 33:10, 33:12, 33:20 MCKENNA ^[1] - 24:24 MCKEVITT ^[13] - 23:20, 23:26, 27:28, 29:24, 29:26, 30:23, 31:8, 31:17, 32:13, 32:20, 35:5, 35:11, 35:18 MCKEVITT'S ^[1] - 32:3 MCKIE ^[2] - 75:2, 75:10 MEAN ^[21] - 44:6, 47:4, 47:22, 54:3, 58:6, 59:8, 63:11, 84:21, 88:21, 93:5, 95:8, 104:11, 104:13, 104:24, 105:6, 105:20, 118:20, 123:6, 129:10, 141:25, 149:9 MEANING ^[3] - 9:29, 11:1, 134:2 MEANINGFUL ^[1] - 146:7 MEANINGLES S ^[1] - 52:8 MEANS ^[12] - 7:13, 8:7, 28:18, 50:11, 61:1, 61:20, 65:4, 94:24, 100:17, 100:24, 122:5, 141:22 MEANTIME ^[1] - 39:8 MEASUREMEN T ^[1] - 83:4 MEASUREMEN T ^[1] - 96:1 MEASUREMEN TS ^[4] - 125:14, 125:27, 125:28, 144:14 MEASURES ^[1] - 75:23 MEASURING ^[1] - 68:27 MEET ^[5] - 11:17, 25:16, 25:20, 25:22, 40:7	MEETING ^[4] - 14:21, 14:22, 34:27, 106:8 MEETINGS ^[3] - 92:18, 93:28, 142:26 MEETS ^[1] - 121:7 MELANIE ^[3] - 45:8, 84:29, 86:6 MEMBER ^[5] - 17:25, 18:3, 80:2, 108:25, 108:27 MEMBERS ^[17] - 15:26, 16:4, 18:17, 24:13, 28:2, 29:9, 29:11, 29:17, 29:20, 29:23, 37:3, 37:5, 37:8, 38:12, 44:18, 67:22, 98:13 MEMBERSHIP ^[6] - 4:9, 19:24, 31:22, 37:3, 37:10, 37:12 MEMORABLE ^[1] - 152:20 MENTION ^[2] - 58:16, 108:20 MENTIONED ^[11] - 4:17, 4:23, 6:10, 8:26, 25:12, 32:17, 84:23, 116:21, 122:1, 122:13, 127:12 MENTIONING ^[3] - 55:19, 79:15, 101:17 MENTIONS ^[1] - 77:1 MERCEDES ^[2] - 118:28, 119:21 MERCEDES- BENZ ^[2] - 118:28, 119:21 MERELY ^[2] - 50:24, 55:15 MESSAGE ^[4] - 117:10, 125:4, 155:29, 157:1 MESSAGES ^[5] - 155:24, 156:15, 156:23, 156:24, 157:7 MESSAGING ^[1] - 117:9 MET ^[1] - 77:3 MET ^[1] - 94:25 METAL ^[1] -	139:3 METHOD ^[3] - 126:15, 142:24, 144:11 METHODOLO GY ^[1] - 149:19 METHODS ^[6] - 70:1, 108:5, 128:2, 149:20, 150:4, 150:12 METRES ^[1] - 135:7 METROPOLITA N ^[3] - 73:21, 77:8, 89:21 MICHAEL ^[14] - 6:4, 23:20, 23:26, 27:28, 29:24, 29:26, 30:23, 31:8, 31:17, 32:3, 32:13, 32:20, 35:5, 35:18 MICROSCOPE ^[1] - 48:25 MICROSCOPY ^[5] - 65:27, 78:6, 80:12, 80:13, 83:4 MICROSPECT ROPHOTOMETRY ^[1] - 80:13 MICROSPECT ROSCOPY ^[1] - 80:15 MID ^[2] - 37:20, 92:14 MIGHT ^[68] - 8:10, 46:11, 46:22, 47:5, 47:6, 47:15, 47:16, 48:19, 48:24, 49:1, 49:8, 51:23, 52:7, 55:21, 55:25, 63:2, 64:11, 65:25, 66:20, 71:24, 71:29, 74:24, 75:3, 76:24, 76:25, 81:21, 82:4, 82:9, 83:27, 84:1, 87:12, 87:14, 87:15, 87:19, 88:8, 88:9, 88:13, 88:14, 91:15, 100:4, 104:8, 104:13, 104:15, 104:24, 104:26, 105:13, 108:18, 119:7, 119:12, 121:24,
M					
MACHINE ^[2] - 62:2, 66:1 MACHINES ^[1] - 65:29 MACKEY ^[1] - 35:10 MAIN ^[14] - 4:23, 29:10, 58:5, 67:19, 68:18, 68:26, 69:14, 70:6, 84:14, 92:22, 95:24, 101:10, 101:22, 150:10 MAINTAIN ^[1] - 144:12 MAJOR ^[6] - 18:23, 30:5, 30:7, 30:11, 101:16, 121:7 MAJORITY ^[6] - 13:17, 13:22, 19:24, 26:29, 33:18, 99:23 MAKER'S ^[1] - 73:5 MAKEUP ^[1] - 83:10 MALE ^[3] - 60:25, 60:26, 60:29 MALE-ONLY ^[2] - 60:25, 60:29 MALONEY ^[1] - 6:3 MALONEY'S ^[1] - 32:28 MAN ^[3] - 23:20, 24:6, 26:6 MANAGE ^[3] - 54:24, 127:27, 157:6 MANAGEMENT ^[7] - 77:24, 86:24, 91:27, 94:23, 95:22, 101:5, 151:26					

122:6, 124:15, 124:19, 128:7, 128:21, 133:18, 135:7, 135:11, 145:15, 146:1, 149:6, 153:26, 157:8, 157:26 MILITARY [3] - 33:6, 33:14, 72:15 MILITARY [1] - 30:2 MILLION [5] - 60:9, 60:15, 60:16, 79:12, 143:2 MIND [11] - 17:20, 50:29, 59:4, 100:11, 111:15, 114:16, 120:7, 130:13, 138:18, 140:26, 155:10 MINISTER [1] - 26:27 MINOR [4] - 61:19, 61:22, 84:16, 101:13 MINUTE [1] - 86:26 MINUTES [10] - 8:24, 15:10, 70:26, 102:24, 125:7, 131:4, 139:27, 151:27, 152:2, 152:18 MIRROR [6] - 21:6, 21:7, 21:12, 21:14, 35:22, 35:24 MIRRORED [2] - 13:26, 35:26 MIRRORING [1] - 16:29 MISCARRIAGE S [1] - 95:15 MISINTERPRE T [1] - 129:10 MISSED [1] - 76:29 MISSPOKEN [1] - 152:16 MISTAKE [1] - 100:22 MISUNDERST OOD [1] - 150:20 MITCHELL [4] - 28:14, 28:16, 28:19, 28:24 MIXED [1] -	148:3 MIXING [1] - 70:14 MIXTURE [2] - 60:26, 69:5 MIXTURES [1] - 49:18 MO [2] - 26:22, 27:2 MOBILE [1] - 112:19 MOBILE [32] - 59:23, 111:6, 111:22, 111:25, 112:17, 112:24, 113:26, 114:9, 114:11, 114:21, 115:4, 115:7, 115:19, 118:20, 119:12, 119:14, 119:15, 119:16, 122:17, 125:12, 125:13, 127:13, 128:15, 130:19, 143:12, 148:29, 153:17, 153:21, 154:15, 155:19, 155:22, 156:11 MODEL [5] - 62:28, 63:14, 63:16, 63:23, 64:13 MODERN [1] - 117:12 MODULE [1] - 108:28 MOMENT [13] - 18:25, 19:8, 19:29, 20:27, 26:26, 55:1, 73:7, 87:6, 93:29, 95:29, 102:14, 111:8, 124:24 MOMENTS [1] - 135:25 MONEY [1] - 57:19 MONITORING [1] - 10:6 MONTHS [1] - 13:21 MOONEY [3] - 6:3, 32:27, 38:13 MOREOVER [1] - 94:16 MORGAN [1] - 151:15 MORNING [2] - 39:17, 39:18 MORRISON [1] -	159:3 MORRISON [5] - 11:19, 11:24, 38:26, 39:3, 39:8 MOST [23] - 11:14, 19:3, 30:8, 36:4, 43:21, 49:19, 58:5, 58:7, 65:6, 69:6, 69:7, 69:8, 79:29, 82:17, 92:6, 100:8, 101:1, 111:24, 112:5, 113:24, 117:15, 124:4, 125:2 MOSTLY [2] - 102:5, 102:7 MOUNT [3] - 19:16, 19:27, 38:12 MOUNTING [1] - 37:26 MOUTHS [1] - 45:13 MOVE [16] - 12:11, 20:5, 22:8, 41:12, 64:21, 87:6, 89:3, 93:15, 114:18, 115:13, 115:22, 116:22, 124:20, 135:15, 135:18, 143:25 MOVED [5] - 7:14, 9:6, 30:17, 108:1, 137:27 MOVEMENT [13] - 3:4, 11:20, 14:13, 14:16, 15:11, 18:11, 18:29, 22:4, 24:11, 26:21, 28:24, 34:16, 35:17 MOVEMENT [6] - 15:28, 16:7, 17:4, 34:8, 34:28, 35:16 MOVEMENT'S [1] - 34:19 MOVES [1] - 29:10 MOVING [8] - 13:10, 29:6, 31:4, 56:24, 91:10, 115:3, 115:24, 117:3 MOWLAM [2] - 26:22, 27:2 MR [25] - 38:26, 39:2, 39:5, 39:14,	39:22, 39:24, 102:13, 103:17, 103:20, 103:22, 105:26, 105:28, 106:2, 106:15, 106:23, 106:25, 151:25, 152:7, 152:13, 157:20, 157:25, 159:4, 159:7, 159:9, 159:12 MSP [1] - 80:14 MULTIDISCIPLI NARY [2] - 40:14, 44:20 MULTIPLE [3] - 10:16, 22:21, 127:9 MUNDANE [1] - 66:17 MURDER [2] - 140:1, 152:25 MURDERS [1] - 44:15 MURDERS [2] - 139:4, 139:5 MUST [4] - 36:21, 92:6, 122:24, 132:13 MUSTN'T [2] - 61:6, 65:16	NATIONAL [4] - 16:17, 73:22, 96:1, 129:16 NATIONALLY [1] - 73:26 NATIONWIDE [1] - 121:21 NATURE [4] - 30:12, 30:14, 130:3, 146:29 NEAR [2] - 130:28, 131:21 NEAT [1] - 110:20 NECESSARILY [2] - 118:5, 140:10 NECESSARY [2] - 98:16, 116:13 NEED [39] - 11:1, 11:19, 13:22, 17:16, 21:16, 22:14, 23:12, 23:14, 36:12, 48:24, 60:1, 60:2, 62:12, 62:15, 62:24, 65:4, 98:29, 104:16, 107:13, 109:14, 111:15, 112:23, 115:15, 115:23, 120:6, 125:6, 129:13, 137:11, 139:23, 140:7, 141:1, 141:4, 141:14, 141:29, 143:23, 152:26, 153:20, 155:24 NEEDED [3] - 13:17, 14:24, 78:25 NEEDING [1] - 79:3 NEEDS [11] - 42:21, 58:3, 64:25, 72:23, 108:17, 125:7, 130:13, 140:28, 144:4, 145:28, 145:29 NERVOUSNES S [1] - 75:20 NETWORK [1] - 93:25 NETWORK [31] - 97:8, 111:25, 112:25, 114:20, 115:1, 115:3, 115:10, 115:17, 116:17, 119:14,	119:17, 119:19, 121:15, 121:17, 122:21, 126:17, 127:15, 127:24, 128:11, 128:17, 131:14, 131:15, 131:16, 132:14, 143:9, 156:11, 156:16, 157:3, 157:4, 157:8, 157:18 NETWORK'S [1] - 145:11 NETWORKS [3] - 71:6, 133:13, 142:3 NEVER [11] - 76:21, 112:19, 116:11, 138:9, 145:8, 145:9, 145:12, 145:20, 153:21, 153:23, 153:24 NEVERTHELE SS [2] - 110:22, 110:28 NEW [13] - 29:27, 31:9, 37:2, 54:27, 55:11, 55:19, 61:7, 65:15, 81:19, 92:1, 96:18, 108:29, 111:27 NEWER [2] - 6:17, 79:18 NEWLY [1] - 90:6 NEWS [1] - 34:21 NEWSPAPER [1] - 34:19 NEXT [52] - 6:29, 8:24, 11:19, 17:8, 21:15, 36:14, 44:14, 44:18, 45:17, 46:20, 47:28, 51:6, 52:15, 59:28, 61:17, 62:9, 64:20, 66:28, 67:20, 69:27, 70:29, 73:16, 77:13, 79:21, 82:12, 88:6, 89:3, 94:22, 106:15, 107:14, 110:3, 111:5, 114:18, 116:23, 119:4, 119:16, 119:20, 120:22, 121:23,
---	--	---	---	--	--

123:22, 124:23, 125:3, 128:6, 128:27, 130:1, 130:11, 133:25, 134:12, 138:27, 140:17, 144:6, 147:26 NICKELL [1] - 44:15 NINE [1] - 127:3 NITRATE [1] - 70:10 NMAS [1] - 96:1 NO.16 [1] - 129:7 NON [3] - 10:16, 10:22, 116:6 NON- CHARGEABLE [1] - 116:6 NON-VIOLENT [2] - 10:16, 10:22 NONE [5] - 143:20, 147:11, 150:26, 154:7, 155:7 NONETHELES S [1] - 6:19 NORMAL [3] - 126:24, 127:6, 147:13 NORMALISATI ON [5] - 141:23, 141:25, 141:26, 141:27, 143:2 NORMALISE [1] - 143:4 NORMALISED [2] - 143:23, 145:27 NORMALITY [1] - 31:28 NORMALLY [6] - 54:5, 127:8, 127:28, 132:9, 147:10, 156:28 NORMAN [4] - 44:27, 45:12, 67:28, 70:6 NORTH [5] - 118:15, 118:18, 118:21, 135:2 NORTHERN [10] - 10:5, 10:21, 10:28, 26:23, 27:2, 32:5, 37:27, 90:23, 91:19, 94:11 NORTHINGS [2] - 118:6, 129:15	NOTABLE [1] - 19:3 NOTABLY [2] - 59:14, 95:16 NOTE [1] - 32:11 NOTED [4] - 32:27, 36:21, 146:8, 149:17 NOTES [1] - 90:1 NOTHING [3] - 61:11, 87:1, 88:13 NOTICED [3] - 43:9, 70:6, 93:9 NOTWITHSTA NDING [2] - 9:13, 153:14 NOUGHT [2] - 118:15, 129:24 NOWADAYS [2] - 78:24, 83:29 NUDGE [1] - 95:13 NUMBER [53] - 12:6, 13:5, 14:29, 17:23, 24:20, 24:21, 26:18, 36:1, 36:8, 36:28, 40:24, 44:3, 45:19, 45:24, 47:1, 70:3, 70:11, 70:12, 77:26, 77:29, 85:22, 87:6, 87:9, 87:19, 88:7, 88:14, 88:16, 102:23, 109:17, 113:19, 114:7, 114:12, 115:5, 117:7, 117:16, 117:19, 117:24, 120:24, 132:20, 132:25, 132:28, 133:2, 136:10, 137:16, 137:19, 146:6, 150:2, 151:14, 154:5, 154:27 NUMBER'S [1] - 131:18 NUMBERS [5] - 30:5, 30:7, 30:11, 132:17, 143:27	OBLIGATION [2] - 27:8, 27:11 OBLIQUE [1] - 74:4 OBSERVATIO NS [3] - 4:20, 142:5, 146:7 OBSERVE [1] - 38:6 OBSERVED [1] - 143:8 OBTAIN [2] - 156:4, 156:5 OBVIOUS [5] - 91:17, 111:8, 131:8, 150:18, 153:3 OBVIOUSLY [24] - 24:23, 25:21, 43:15, 47:16, 48:23, 54:16, 54:22, 56:26, 57:25, 59:9, 60:3, 64:23, 65:8, 65:27, 82:7, 88:13, 90:24, 112:22, 126:9, 136:10, 140:9, 141:8, 147:23, 153:29 OC [1] - 24:1 OCCASION [6] - 17:21, 36:13, 38:27, 40:27, 102:8, 132:27 OCCUR [2] - 33:24, 60:8 OCCURRED [5] - 19:13, 28:20, 72:7, 86:8, 139:5 OCCURRENCE [1] - 60:13 OCCURRING [1] - 139:22 OCTOBER [5] - 25:25, 25:28, 28:29, 107:15, 157:22 ODD [1] - 126:14 OFCOM [1] - 136:14 OFFENDER [1] - 47:13 OFFERING [1] - 55:17 OFFICE [5] - 42:7, 42:20, 73:24, 97:19, 107:28 OFFICER [13] -	51:12, 52:25, 52:26, 52:28, 53:3, 55:14, 75:11, 98:8, 99:3, 104:2, 104:22, 105:7, 105:11 OFFICERS [3] - 138:29, 139:18, 139:22 OFFICIAL [12] - 11:28, 12:1, 12:3, 12:23, 13:6, 14:17, 14:21, 14:27, 15:3, 16:15, 16:16, 16:27 OFFICIAL [1] - 16:25 OFTEN [10] - 10:26, 37:29, 66:26, 69:9, 85:25, 117:24, 117:25, 120:13, 137:23, 139:4 OLD [4] - 12:17, 12:21, 48:13, 74:13 OLD- FASHIONED [1] - 74:13 OLDER [1] - 16:14 OMAGH [29] - 11:10, 36:17, 36:20, 37:2, 38:3, 38:20, 40:19, 53:23, 130:28, 131:21, 132:1, 132:2, 132:5, 134:11, 134:20, 134:28, 140:22, 140:23, 148:18, 148:21, 148:23, 148:24, 148:25, 149:1, 149:7, 149:9, 151:7 OMNICELL [2] - 119:28, 129:24 OMNICELLS [1] - 120:3 ONCE [12] - 28:19, 61:27, 61:29, 65:21, 104:3, 104:4, 104:13, 122:22, 123:29, 143:23, 146:1, 157:11 ONE [85] - 4:19, 10:17, 12:21, 17:29, 18:23,	20:21, 22:19, 26:5, 29:5, 30:6, 35:16, 40:16, 44:14, 49:14, 49:19, 52:2, 55:1, 55:3, 55:24, 56:19, 57:3, 60:8, 60:10, 62:2, 65:29, 69:1, 69:2, 69:8, 69:10, 69:12, 73:7, 81:28, 81:29, 87:16, 87:26, 88:6, 88:25, 89:19, 89:21, 90:21, 90:22, 92:6, 92:23, 93:6, 96:6, 98:4, 101:21, 102:14, 102:27, 103:25, 104:4, 108:6, 108:13, 114:9, 118:5, 120:16, 122:1, 123:10, 124:7, 126:4, 128:1, 129:18, 129:23, 129:25, 131:4, 132:12, 132:20, 133:3, 136:18, 137:21, 138:6, 138:29, 143:16, 145:29, 146:1, 147:5, 147:9, 149:3, 152:14 ONES [5] - 63:9, 69:21, 70:5, 82:26, 123:10 ONGOING [1] - 140:12 OPEN [4] - 3:17, 5:28, 6:12, 25:1 OPENING [4] - 7:3, 36:6, 40:10, 131:3 OPERATE [6] - 21:9, 35:27, 35:28, 35:29, 102:17, 144:13 OPERATED [3] - 62:25, 103:7, 154:24 OPERATES [1] - 156:28 OPERATING [7] - 75:16, 95:23, 101:12, 101:24, 111:23, 113:12, 145:21 OPERATION [1]	- 12:9 OPERATION [4] - 38:16, 38:20, 96:16, 156:16 OPERATIONAL [6] - 31:1, 38:7, 38:20, 71:3, 93:13, 93:18 OPERATIONS [3] - 36:8, 95:21, 108:2 OPERATIONS [3] - 32:14, 32:22, 33:7 OPERATOR [1] - 157:18 OPERATORS [1] - 128:12 OPINION [4] - 36:24, 99:4, 126:19, 151:5 OPINIONS [3] - 5:26, 146:9, 150:25 OPPORTUNITI ES [1] - 28:26 OPPORTUNITY [4] - 27:13, 50:19, 76:28 OPPOSED [7] - 19:1, 19:3, 19:6, 30:9, 37:17, 79:3, 128:25 ORAL [2] - 9:24, 40:25 ORDER [6] - 17:15, 39:28, 45:18, 52:1, 60:1, 60:3 ORGANISATIO N [11] - 11:6, 11:13, 15:22, 15:24, 26:15, 36:22, 43:6, 72:1, 73:4, 82:5, 93:24 ORGANISATIO N [1] - 108:29 ORGANISATIO NS [9] - 4:9, 8:23, 9:15, 11:22, 12:27, 16:24, 34:12, 38:16, 108:13 ORGANISED [2] - 10:20, 14:26 ORIGINAL [2] - 102:4, 115:18 ORIGINALLY [2] - 41:25, 95:8 ORIGINS [1] -
---	---	--	---	--	--

4:2 OTHERWISE [2] - 10:11, 121:5 OUGHT [4] - 53:15, 53:17, 87:21, 97:10 OURSELVES [3] - 20:27, 51:4, 145:25 OUTCOME [1] - 88:3 OUTGOING [1] - 131:21 OUTLINE [1] - 123:28 OUTPUT [2] - 115:27, 146:17 OUTSET [2] - 33:5, 37:13 OUTSIDE [2] - 58:13, 122:23 OVERALL [3] - 38:17, 87:23, 100:12 OVERLAP [3] - 98:1, 120:20, 127:8 OVERSEAS [3] - 43:17, 82:19, 85:10 OVERVIEW [4] - 45:27, 107:3, 147:26, 153:19 OVERWHELME D [2] - 56:14, 56:16 OWN [8] - 31:22, 45:13, 77:6, 82:9, 87:25, 92:22, 110:24, 111:22 OWNS [1] - 59:12 OXFORD [1] - 90:18	61:17, 62:9, 64:21, 64:29, 67:27, 69:27, 72:11, 73:17, 76:11, 77:11, 77:12, 77:13, 77:14, 79:6, 80:29, 84:8, 84:28, 84:29, 86:11, 89:14, 91:22, 93:15, 94:20, 94:27, 98:6, 99:12, 103:3, 114:19, 116:23, 121:23, 133:3, 135:16, 137:18, 140:24, 146:12, 152:17, 153:17 PAGES [9] - 17:12, 38:14, 41:5, 52:12, 52:17, 59:6, 70:27, 79:23, 82:13 PAINSTAKING [1] - 142:14 PAINT [1] - 83:9 PALM [1] - 76:25 PAPER [2] - 85:20, 136:7 PAPERS [2] - 63:18, 75:29 PARAGRAPH [6] - 4:7, 10:12, 36:18, 36:28, 38:17, 146:11 PARAMILITARI SM [8] - 9:26, 9:29, 10:2, 10:4, 10:7, 10:13, 10:24, 10:29 PARAMILITAR Y [9] - 7:24, 10:19, 11:6, 11:12, 13:11, 14:20, 31:9, 34:15, 35:1 PARAMILITAR Y-STYLE [1] - 10:19 PARLIAMENT [1] - 12:15 PART [33] - 16:2, 17:18, 22:27, 23:24, 26:24, 27:15, 27:20, 27:23, 28:15, 47:17, 54:19, 54:21, 57:6, 62:13, 66:13, 68:10, 70:26, 76:22, 77:10, 77:11, 77:13, 93:28, 108:4, 117:23, 118:7, 120:25, 133:18, 137:5, 137:9, 138:20, 145:9, 153:17, 154:9 PARTAKE [1] - 28:16 PARTICIPANT [3] - 20:5, 35:22, 151:28 PARTICIPANT S [4] - 5:1, 41:27, 57:4, 102:18 PARTICIPATIO N [1] - 93:23 PARTICULAR [30] - 3:3, 6:14, 11:22, 15:17, 17:10, 18:19, 20:8, 20:10, 32:9, 32:10, 36:2, 38:13, 38:21, 49:28, 56:10, 66:22, 87:27, 91:19, 93:7, 105:11, 117:19, 121:25, 127:25, 130:9, 133:27, 134:17, 141:2, 152:21, 155:18, 157:7 PARTICULARL Y [19] - 32:27, 43:19, 48:13, 50:22, 52:5, 53:21, 56:1, 60:26, 70:9, 70:17, 75:2, 75:29, 77:4, 90:2, 93:24, 100:16, 100:21, 127:29, 146:28 PARTIES [1] - 34:14 PARTLY [3] - 43:9, 78:24, 78:25 PARTS [14] - 17:29, 22:17, 25:3, 26:14, 43:19, 72:24, 76:20, 78:12, 97:7, 102:1, 111:24, 115:20, 128:17, 137:3 PARTY [2] -	16:28, 26:21 PARTY [4] - 130:11, 131:27, 132:21, 140:26 PASCAL [3] - 29:27, 32:16, 32:26 PASS [1] - 13:16 PASSED [2] - 13:16, 55:20 PASSING [1] - 58:16 PASSIVE [1] - 55:22 PASSIVELY [1] - 50:4 PAST [1] - 48:6 PATH [1] - 44:15 PATH [3] - 9:4, 9:7, 18:18 PATHOLOGIST S [1] - 100:3 PATTERN [3] - 49:20, 49:24, 155:10 PATTERNS [4] - 49:19, 49:20, 49:25, 154:7 PAUSE [7] - 18:25, 22:13, 26:26, 55:1, 56:24, 115:23, 146:27 PAUSE [2] - 73:8, 102:15 PAUSING [1] - 93:5 PAY [2] - 56:5, 121:13 PCR [1] - 78:10 PEACE [3] - 26:24, 27:7, 31:20 PEACE [2] - 31:19, 31:28 PEACEFUL [1] - 28:18 PEAKS [1] - 102:10 PEER [2] - 4:4, 136:8 PEER-REVIEW [1] - 136:8 PEER- REVIEWED [1] - 4:4 PENNSYLVANI A [2] - 3:14, 6:9 PENULTIMATE [1] - 101:22	PEOPLE [34] - 3:19, 6:2, 8:3, 8:10, 13:5, 14:29, 19:3, 25:2, 26:16, 27:27, 30:8, 30:15, 32:9, 43:6, 43:18, 49:12, 60:9, 60:11, 60:15, 72:28, 76:4, 79:13, 90:15, 92:13, 100:4, 112:11, 119:7, 121:9, 121:12, 128:7, 151:8, 152:19, 154:29 PER [1] - 118:27 PERCEPTIONS [2] - 46:10, 67:15 PERFORM [2] - 52:2, 125:17 PERFORMANC E [1] - 86:27 PERFORMED [1] - 87:21 PERFORMING [1] - 93:7 PERHAPS [14] - 5:24, 91:16, 91:19, 103:22, 105:5, 105:7, 117:15, 120:6, 124:4, 128:6, 130:16, 135:7, 139:21, 140:10 PERIOD [19] - 11:21, 25:6, 48:19, 48:20, 68:5, 69:23, 72:7, 75:13, 80:24, 83:23, 107:7, 132:17, 136:18, 142:27, 154:20, 156:23, 157:5, 157:10, 157:15 PERISH [1] - 48:10 PERMISSION [3] - 102:23, 152:1, 153:15 PERSON [8] - 30:27, 47:23, 59:12, 73:3, 105:11, 109:21, 154:22, 156:26 PERSON'S [1] - 154:25 PERSONALITI ES [1] - 23:15 PERSONALLY	[2] - 94:11, 96:9 PERSONNEL [4] - 30:5, 30:12, 30:15, 91:13 PERSONS [1] - 18:29 PETER [1] - 89:5 PHASE [1] - 143:25 PHD [4] - 3:2, 3:13, 4:1, 107:21 PHILIP [2] - 45:2, 77:16 PHONE [29] - 111:6, 113:26, 116:5, 116:11, 116:12, 118:20, 119:14, 119:16, 122:6, 123:19, 125:1, 125:3, 125:12, 125:13, 129:9, 129:11, 131:16, 132:1, 144:2, 144:3, 145:11, 148:17, 148:24, 148:29, 149:4, 153:22, 154:3, 154:24, 155:19 PHONES [4] - 132:5, 143:12, 145:21, 153:17 PHONING [1] - 154:5 PHOTOCOPIE RS [1] - 85:27 PHOTOGRAPH [2] - 44:4, 133:4 PHOTOGRAPH S [2] - 44:4, 65:23 PHOTOGRAPH Y [2] - 74:5, 83:3 PHRASE [4] - 10:13, 116:21, 135:21, 141:13 PHRASED [1] - 110:6 PHRASEOLOG Y [1] - 9:17 PHRASES [2] - 9:18, 9:21 PHYSICAL [10] - 46:28, 48:5, 65:2, 76:14, 83:1, 99:16, 114:14, 117:25, 118:4, 119:5 PHYSICALLY [1] - 114:13 PHYSICS [1] -
P				
PA [1] - 153:14 PAEDOPHILE [1] - 140:2 PAGE [1] - 159:2 PAGE [52] - 11:24, 16:11, 21:16, 29:25, 31:29, 36:19, 41:16, 41:29, 44:3, 45:17, 46:23, 51:6, 52:10, 59:4,				

107:21 PICK [3] - 61:19, 101:21, 145:1 PICKED [4] - 64:20, 93:8, 93:9, 101:17 PICKING [3] - 71:24, 80:9, 140:24 PICTURE [5] - 13:9, 44:8, 90:25, 138:15, 154:9 PIECE [1] - 134:13 PIECES [1] - 150:11 PIGEON [6] - 133:3, 133:26, 133:27, 134:10, 135:5, 151:2 PIRA [1] - 32:6 PIVOTAL [2] - 52:20, 53:28 PLACE [18] - 13:11, 25:25, 25:28, 28:29, 36:7, 47:3, 70:22, 75:24, 86:24, 116:7, 123:9, 128:16, 133:8, 135:8, 137:26, 145:12, 145:29, 150:18 PLACES [8] - 38:2, 81:20, 84:24, 132:16, 134:17, 149:10, 154:28, 154:29 PLAINLY [3] - 140:26, 157:5, 157:9 PLANNING [2] - 25:21, 51:22 PLASTIC [2] - 66:6, 66:7 PLAYED [1] - 158:9 PLAYING [1] - 16:10 PLOT [2] - 125:16, 125:22 PLURAL [1] - 149:28 PLUS [1] - 129:29 POER [4] - 106:3, 106:14, 151:23, 152:12 POER [9] - 106:15, 106:23,	106:25, 151:25, 152:7, 152:13, 157:20, 157:25, 159:12 POINT [29] - 5:24, 29:10, 33:3, 38:4, 72:28, 103:23, 104:5, 104:28, 119:18, 122:2, 127:11, 127:14, 127:17, 132:24, 133:11, 133:28, 134:3, 134:16, 136:24, 137:27, 142:13, 142:18, 143:7, 146:11, 151:21, 153:3, 153:19, 155:9 POINTED [9] - 10:21, 118:14, 119:2, 119:29, 120:2, 120:19, 123:26, 126:7, 126:9 POINTING [5] - 118:18, 118:25, 124:5, 124:18, 126:29 POINTS [11] - 34:19, 38:15, 38:19, 67:19, 92:25, 103:26, 103:27, 133:13, 133:16, 141:10, 153:25 POLARISED [1] - 66:8 POLICE [30] - 40:18, 41:3, 42:20, 43:13, 47:23, 52:26, 56:3, 57:15, 58:3, 59:15, 61:2, 62:22, 64:8, 67:9, 73:25, 75:10, 82:18, 88:25, 90:17, 90:20, 91:13, 140:13, 149:27, 151:7, 151:9, 151:13, 156:3 POLICE [10] - 73:20, 73:21, 77:3, 77:8, 89:22, 90:23, 138:28, 139:6, 139:17, 139:22 POLICY [4] - 12:14, 12:18,	13:16, 53:3 POLISHES [1] - 83:10 POLITICAL [12] - 9:11, 12:20, 14:28, 15:6, 15:14, 16:23, 18:18, 21:18, 26:20, 27:10, 28:18, 34:15 POLITICISATION [3] - 7:15, 7:22, 22:4 POLITICS [2] - 12:12, 12:13 POLLEN [1] - 66:4 POLYMERASE [1] - 78:10 POOL [1] - 126:14 POOR [2] - 12:19, 43:20 POPULATED [1] - 127:4 POPULATION [1] - 121:10 PORTION [1] - 116:15 POSE [1] - 91:17 POSED [5] - 5:1, 6:27, 20:5, 35:21, 57:4 POSITION [23] - 24:3, 24:4, 26:9, 26:10, 37:16, 57:16, 64:6, 64:13, 64:17, 64:18, 67:16, 99:6, 101:27, 109:21, 111:10, 120:29, 136:4, 138:10, 145:14, 145:25, 146:25, 147:18, 157:13 POSITIONS [3] - 63:10, 138:4, 147:4 POSSIBILITY [2] - 88:11, 158:7 POSSIBLE [5] - 60:22, 88:17, 88:19, 93:20, 101:9 POST [4] - 22:3, 68:4, 71:8, 109:27 POST-CHARGE [1] - 109:27	POSTCODE [1] - 118:4 POSTDOC [1] - 6:10 POSTDOCTORAL [1] - 3:14 POTENTIAL [2] - 61:21, 142:26 POTENTIALLY [6] - 35:2, 65:3, 116:15, 124:2, 124:26, 142:3 POTS [1] - 127:1 POWDER [2] - 69:11, 69:12 POWDERS [1] - 74:5 POWER [2] - 26:14, 29:15 POWERFUL [1] - 61:11 POWERPOINT [1] - 41:21 POWERS [1] - 97:28 PRACTICALLY [1] - 67:12 PRACTICE [5] - 92:24, 136:6, 145:16, 150:22, 155:26 PRACTISING [1] - 42:4 PRACTITIONERS [1] - 149:22 PRACTITIONERS [1] - 97:18 PRE [2] - 112:7, 112:8 PRE-DIGITAL [2] - 112:7, 112:8 PRECISE [4] - 118:5, 118:6, 120:10, 122:7 PRECISE [1] - 142:23 PRECISELY [4] - 76:21, 99:26, 118:8, 118:20 PRECISION [4] - 122:6, 144:9, 148:28, 151:1 PRECONCEPTIONS [1] - 74:24 PRECURSOR [3] - 128:10, 136:15, 141:8 PREDOMINANT [3] - 12:28, 12:29, 112:1	PREDOMINANTLY [4] - 3:12, 4:5, 126:8, 127:19 PREJUDICE [1] - 87:16 PRELIMINARY [1] - 68:20 PREPARE [1] - 24:18 PREPARED [11] - 4:14, 4:18, 4:19, 4:28, 19:23, 41:11, 46:26, 56:5, 106:29, 111:7, 150:1 PREPARING [1] - 4:14 PRESENCE [1] - 122:2 PRESENT [3] - 4:11, 86:29, 100:9 PRESENTATION [9] - 41:21, 59:1, 84:13, 103:4, 111:7, 113:16, 116:27, 130:25, 158:3 PRESENTED [3] - 72:20, 147:14, 147:19 PRESENTING [2] - 56:27, 117:23 PRESSURES [1] - 38:28 PRESUMABLY [1] - 85:13 PRETTY [6] - 49:16, 81:9, 81:16, 92:2, 138:25, 142:12 PREVENTED [1] - 124:9 PREVIOUS [7] - 13:21, 70:5, 71:17, 121:29, 122:3, 128:14, 141:27 PREVIOUSLY [2] - 6:11, 29:23 PRIMARILY [1] - 23:25 PRIMARY [4] - 4:10, 4:19, 4:21, 122:1 PRIME [1] - 26:27 PRINCIPLE [2] - 18:21, 18:27	PRINCIPLES [3] - 109:21, 110:23, 150:29 PRINCIPLES [4] - 28:15, 28:16, 28:19, 28:24 PRINT [3] - 61:27, 61:28, 61:29 PRINT-OUT [3] - 61:27, 61:28, 61:29 PRINTED [1] - 49:13 PRINTERS [1] - 85:27 PRINTING [1] - 86:1 PRINTS [2] - 76:16, 76:19 PRISONERS [1] - 140:3 PRISONS [1] - 18:15 PRIVATE [2] - 90:4, 108:11 PRIVATISED [2] - 90:7, 90:8 PROACTIVE [1] - 55:13 PROACTIVELY [2] - 57:10, 57:13 PROBABILITY [1] - 110:6 PROBATIVE [2] - 147:8, 147:10 PROBLEM [1] - 95:17 PROCEDURES [1] - 95:24 PROCEEDING [7] - 42:13, 105:3, 109:29, 138:2, 138:16, 146:28 PROCESS [12] - 27:24, 27:26, 54:19, 74:23, 78:8, 94:10, 137:9, 141:4, 141:23, 142:9, 142:14, 147:28 PROCESS [2] - 31:19, 31:28 PROCESSES [6] - 22:29, 23:3, 60:29, 62:7, 74:8, 99:24 PROCESSING [1] - 70:14
---	--	--	--	---	---

PRODUCE [6] - 68:29, 79:16, 82:4, 86:6, 96:22, 96:26 PRODUCED [5] - 62:28, 80:26, 83:25, 95:23, 146:16 PRODUCES [1] - 60:4 PRODUCING [8] - 72:4, 74:20, 78:17, 80:21, 93:3, 96:14, 143:18, 146:15 PRODUCT [4] - 115:9, 146:2, 146:4, 146:15 PRODUCTS [1] - 113:7 PROF [8] - 39:6, 39:15, 39:17, 40:12, 89:5, 102:28, 106:6, 141:12 PROF [4] - 39:21, 103:1, 103:20, 159:6 PROFESSIONAL [4] - 42:1, 42:26, 80:3, 107:19 PROFESSIONALISED [1] - 95:20 PROFESSOR [12] - 39:24, 39:27, 40:10, 40:23, 41:11, 42:3, 44:17, 46:24, 67:20, 87:12, 104:29, 105:29 PROFICIENCY [3] - 92:27, 93:6, 101:18 PROFILE [8] - 47:21, 49:2, 60:2, 60:3, 60:8, 60:11, 71:3, 79:16 PROFILES [6] - 60:4, 60:16, 62:1, 79:13, 79:19 PROFILING [1] - 59:29 PROFILING [10] - 45:2, 60:23, 61:7, 61:13, 77:17, 77:26, 77:27, 78:2, 78:5, 79:8 PROGRAMME	[1] - 73:23 PROGRESS [1] - 78:20 PROGRESSED [1] - 47:9 PROJECT [1] - 3:15 PROJECT [1] - 3:17 PROLIFERATION [1] - 143:12 PROMINENT [1] - 36:4 PROMISE [1] - 40:7 PROMONTORY [1] - 135:8 PROPAGATION [1] - 120:11 PROPER [1] - 143:28 PROPOSAL [6] - 13:18, 18:1, 21:29, 22:1, 28:14, 28:16 PROPOSALS [1] - 18:15 PROPOSE [1] - 9:23 PROPOSED [5] - 9:11, 17:28, 18:5, 32:4, 108:3 PROPOSING [5] - 12:10, 12:11, 12:12, 33:6, 33:7 PROPOSITION [11] - 63:5, 71:29, 82:5, 82:10, 110:10, 110:11, 147:11, 148:2, 154:21, 154:29 PROPOSITIONS [4] - 63:12, 111:8, 146:24, 146:29 PROSECUTE [1] - 104:4 PROSECUTION [14] - 42:10, 51:1, 57:6, 57:7, 63:1, 63:10, 85:6, 86:29, 103:27, 137:28, 138:4, 139:7, 139:8, 147:5 PROSECUTOR [4] - 110:7, 148:4, 148:9, 148:13 PROTECT [1] -	105:24 PROTOCOL [2] - 70:3, 102:18 PROTOCOLS [2] - 84:16, 101:14 PROVE [1] - 79:11 PROVIDE [13] - 5:13, 45:27, 67:18, 71:29, 72:11, 78:10, 79:6, 81:4, 91:8, 109:28, 121:21, 138:1, 140:17 PROVIDED [10] - 45:19, 86:17, 90:16, 100:17, 100:27, 102:5, 128:11, 129:27, 130:8, 141:19 PROVIDER [2] - 140:13, 157:4 PROVIDES [4] - 61:23, 121:25, 128:1, 132:27 PROVIDING [10] - 7:7, 35:2, 43:18, 54:23, 55:2, 57:1, 101:2, 102:9, 147:25, 153:25 PROVISIONAL [8] - 4:6, 14:12, 15:11, 18:10, 19:23, 22:4, 24:11, 28:23 PROVISIONAL [5] - 6:14, 7:15, 7:23, 8:4, 9:1, 9:5, 12:6, 12:25, 12:29, 13:4, 13:21, 13:24, 13:29, 14:3, 14:5, 14:11, 14:22, 16:16, 16:18, 16:26, 16:29, 17:1, 18:17, 20:8, 20:10, 20:17, 21:3, 21:9, 21:22, 22:15, 24:6, 25:3, 25:8, 25:13, 25:16, 27:6, 27:16, 27:20, 28:3, 28:4, 28:23, 29:15, 30:8, 30:22, 31:2, 31:8, 31:24, 31:25, 35:25, 35:26 PROVISIONAL [1] - 9:8 PUBLIC [2] -	22:6, 138:19 PUBLICATION [1] - 136:8 PUBLICLY [1] - 21:28 PUBLISH [1] - 96:18 PUBLISHED [10] - 3:28, 4:1, 4:3, 5:29, 6:2, 96:2, 107:12, 108:19, 108:26, 109:13 PUGH [3] - 45:8, 84:29, 86:6 PULL [3] - 16:9, 60:27, 60:28 PUNISHMENT [1] - 10:18 PURELY [2] - 28:18, 150:21 PURPLE [1] - 127:1 PURPOSE [8] - 5:12, 70:2, 109:28, 116:14, 117:21, 138:1, 138:16, 151:27 PURPOSES [6] - 20:21, 109:3, 115:26, 116:18, 128:16, 136:24 PURSUE [2] - 28:18, 32:4 PUSH [2] - 31:20, 69:12 PUSHING [1] - 69:10 PUT [18] - 4:20, 9:18, 10:12, 13:15, 13:19, 18:15, 21:29, 27:12, 56:6, 75:5, 75:24, 95:28, 105:24, 128:28, 134:7, 134:8, 142:13, 145:24 PUTTING [2] - 39:29, 133:22	86:23, 91:27, 94:22, 95:21, 95:22, 97:13, 98:2, 101:4, 108:5, 150:12 QUANTIFYING [1] - 78:9 QUARTER [1] - 143:1 QUARTERMAS [4] - 23:25, 30:25, 32:13, 32:20 QUARTERMAS [1] - 30:16 QUEEN'S [1] - 43:23 QUESTIONED [4] - 45:8, 85:1, 85:13, 86:13 QUESTIONED [9] - 39:21, 103:1, 103:20, 106:22, 159:4, 159:7, 159:8, 159:9, 159:12 QUESTIONED [1] - 84:27 QUESTIONING [1] - 103:25 QUESTIONS [23] - 4:29, 6:27, 20:4, 35:20, 35:21, 38:27, 39:3, 46:9, 87:9, 99:14, 102:19, 102:23, 102:26, 103:18, 103:23, 105:29, 113:15, 136:28, 141:15, 142:7, 151:29, 152:2, 157:23 QUICK [2] - 54:23 QUICKLY [2] - 15:8, 125:4 QUITE [15] - 11:20, 59:28, 61:11, 61:18, 83:28, 91:29, 93:3, 93:18, 94:6, 124:26, 126:24, 127:6, 134:3, 150:15, 152:3	RADAR [1] - 138:20 RADICAL [1] - 9:18 RADIO [4] - 111:27, 114:23, 119:17, 123:17 RADIO [2] - 136:15, 136:17 RAFT [1] - 100:3 RANDOM [1] - 134:29 RANGE [21] - 46:28, 65:4, 66:2, 66:10, 74:3, 74:5, 76:14, 84:11, 86:13, 86:18, 90:16, 90:17, 99:16, 119:10, 122:15, 131:11, 131:12, 144:5, 149:4, 155:20 RANGE [1] - 139:5 RANKS [1] - 91:14 RAPIDLY [1] - 135:13 RARE [2] - 49:8, 49:16 RARELY [1] - 124:16 RATE [1] - 58:2 RATHER [8] - 46:24, 49:11, 105:19, 109:25, 110:10, 126:19, 129:27, 148:2 RAW [1] - 131:15 REACH [4] - 98:3, 132:12, 149:3, 158:7 REACHED [6] - 45:15, 64:12, 64:16, 64:17, 80:25, 104:5 REACHING [1] - 6:26 REACTION [1] - 78:10 REACTIVE [1] - 55:15 READ [4] - 59:23, 142:17, 149:24, 152:29 READILY [1] - 10:19 READS [1] - 142:19
					Q
					QD [1] - 85:13 QUALIFICATION [1] - 42:1 QUALIFYING [1] - 109:24 QUALITY [15] - 6:1, 6:23, 46:17, 77:23, 85:12,
					R
					RACHEL [1] - 44:15

REAL ^[2] - 59:8, 134:10 REAL ^[42] - 8:19, 8:29, 9:15, 11:4, 11:23, 15:19, 15:29, 16:20, 17:11, 20:2, 20:6, 21:15, 21:17, 23:10, 29:12, 29:21, 29:28, 30:3, 30:9, 30:23, 31:4, 31:14, 31:17, 32:10, 33:1, 33:8, 34:11, 34:21, 34:22, 34:29, 35:6, 35:24, 36:3, 36:9, 36:15, 36:16, 36:20, 37:8, 37:17, 37:22, 37:26, 38:11 REALISE ^[1] - 66:14 REALISED ^[2] - 97:9, 123:19 REALISTIC ^[1] - 50:19 REALITY ^[1] - 120:9 REALLY ^[35] - 37:20, 37:25, 41:8, 47:14, 49:23, 49:26, 51:21, 51:24, 51:26, 52:7, 52:8, 53:21, 54:14, 54:19, 54:23, 56:13, 62:27, 62:28, 65:27, 70:17, 88:3, 88:21, 91:2, 97:1, 97:15, 97:21, 103:25, 109:13, 112:12, 130:4, 133:16, 134:15, 143:7, 144:16 REASON ^[6] - 19:7, 19:10, 56:10, 56:19, 58:12, 137:13 REASONABLE ^[1] - 147:6 REASONS ^[5] - 19:28, 20:19, 25:22, 104:20, 131:10 RECEIVED ^[2] - 129:6, 130:13 RECEIVES ^[2] - 114:27, 115:19	RECEIVING ^[1] - 117:7 RECENT ^[2] - 102:4, 102:11 RECENTLY ^[3] - 10:22, 56:20, 82:20 RECOGNISE ^[1] - 44:6 RECOGNISED ^[2] - 82:15, 94:16 RECOGNITION ^[2] - 59:24, 62:15 RECONSIDER ^[2] - 18:18 RECORD ^[7] - 105:2, 115:28, 116:4, 116:6, 128:15, 128:25 RECORDED ^[3] - 131:5, 131:6, 143:15 RECORDING ^[1] - 145:21 RECORDS ^[10] - 107:22, 116:25, 128:8, 128:10, 132:6, 132:23, 138:19, 138:27, 143:2, 155:12 RECOVERED ^[3] - 71:15, 72:22, 80:11 RECOVERING ^[1] - 80:8 RECOVERY ^[4] - 83:2, 83:5, 83:12, 99:22 RED ^[3] - 121:14, 123:28, 130:25 REDUCE ^[1] - 135:13 REDUCED ^[3] - 122:8, 122:9 REDUNDANT ^[1] - 108:10 REFER ^[3] - 7:29, 9:7, 10:6 REFERENCE ^[8] - 10:5, 41:18, 41:22, 52:15, 80:10, 80:11, 118:13, 152:17 REFERENCES ^[2] - 41:17, 52:10 REFERRED ^[9] - 12:9, 14:12, 24:11, 29:7, 31:23, 62:10,	111:28, 133:2, 139:4 REFLECT ^[1] - 41:26 REFLECTANC ^[1] - 68:28 REFLECTED ^[1] - 99:17 REFLECTS ^[2] - 58:2, 90:29 REFORMATTE ^[1] - 116:19 REGARD ^[5] - 9:1, 36:9, 36:11, 50:26, 104:22 REGARDED ^[7] - 54:18, 69:21, 72:4, 74:20, 78:17, 80:21, 83:19 REGARDS ^[1] - 23:3 REGIMES ^[1] - 108:6 REGIONS ^[1] - 68:6 REGISTER ^[1] - 131:20 REGISTERED ^[1] - 132:2 REGISTRATIO ^[1] - 97:18 REGULAR ^[1] - 92:17 REGULARLY ^[2] - 20:18, 25:22 REGULATION ^[1] - 135:29 REGULATION ^[2] - 95:3, 136:11 REGULATOR ^[5] - 97:28, 101:6, 108:21, 135:27, 136:3 REGULATOR'S ^[3] - 80:4, 85:14, 108:24 REINVESTIGA ^[3] - 44:1, 48:8, 65:13 REJECTED ^[1] - 21:27 RELATE ^[1] - 105:13 RELATED ^[2] - 74:16, 131:10 RELATES ^[4] - 36:16, 103:26, 120:22, 130:11 RELATING ^[2] -	87:9, 107:7 RELATION ^[32] - 3:25, 3:29, 12:15, 12:16, 12:17, 18:11, 18:21, 19:2, 26:19, 30:19, 35:23, 47:2, 47:26, 55:7, 55:11, 64:24, 72:11, 75:16, 76:8, 76:10, 77:3, 86:19, 89:17, 96:12, 103:10, 131:9, 133:13, 134:27, 137:9, 145:2, 152:21, 157:9 RELATIONS ^[1] - 3:3 RELATIONSHI ^[8] - 34:11, 51:10, 52:27, 53:8, 55:12, 98:18, 101:28, 101:29 RELATIONSHI ^[1] - 34:15 RELATIVELY ^[2] - 37:3, 138:15 RELEASED ^[1] - 157:26 RELEVANT ^[6] - 65:3, 66:15, 66:20, 71:1, 73:18, 101:3 RELIABILITY ^[8] - 46:10, 67:15, 69:25, 72:8, 76:7, 78:22, 80:26, 83:25 RELIABLE ^[10] - 69:21, 72:5, 74:20, 78:17, 80:21, 83:20, 84:7, 86:6, 96:14, 146:17 REMAIN ^[3] - 19:23, 84:19, 100:14 REMAINED ^[1] - 30:8 REMARKS ^[3] - 7:3, 40:10, 131:3 REMEMBER ^[6] - 65:10, 75:27, 92:17, 96:9, 103:9, 111:2 REMIND ^[1] - 155:25 REMOVED ^[1] -	156:18 REPORT ^[67] - 4:7, 4:19, 4:21, 4:23, 4:24, 4:29, 5:5, 10:13, 11:25, 16:11, 17:12, 17:13, 21:16, 23:23, 24:18, 29:25, 31:29, 36:18, 36:25, 38:5, 38:6, 38:14, 41:5, 41:6, 41:17, 52:11, 52:13, 52:18, 59:6, 64:29, 70:27, 77:10, 77:11, 77:13, 79:23, 79:24, 80:7, 80:21, 82:12, 82:14, 82:26, 83:18, 84:28, 89:15, 94:8, 94:19, 98:6, 99:12, 99:18, 104:24, 107:3, 107:4, 107:11, 107:15, 109:10, 109:28, 112:11, 113:18, 113:20, 135:15, 137:1, 137:19, 139:25, 153:1, 155:4 REPORT ^[4] - 10:7, 34:23, 41:25, 66:29 REPORTED ^[10] - 14:9, 22:18, 23:1, 23:6, 24:21, 24:26, 33:11, 38:9, 38:13, 74:26 REPORTING ^[3] - 24:24, 32:29, 80:16 REPORTS ^[14] - 4:14, 4:17, 4:18, 5:10, 5:21, 11:24, 40:15, 67:3, 91:7, 107:1, 150:1, 150:2, 150:19, 151:9 REPRESENT ^[3] - 3:27, 44:4, 44:7 REPRESENTA ^[2] - 114:20, 115:24 REPRESENTA ^[1] - 124:26 REPRESENTA	TIVES ^[3] - 25:15, 25:19, 93:26 REPRESENT ^[1] - 120:7 REPRESENTIN ^[4] - 25:20, 43:6, 85:13, 120:23 REPRESENTS ^[1] - 102:22 REPUBLIC ^[3] - 18:3, 18:21, 34:24 REPUBLICAN ^[10] - 3:4, 3:18, 4:8, 7:18, 8:18, 9:19, 11:20, 14:16, 18:29, 34:16 REPUBLICAN ^[7] - 3:16, 6:8, 15:13, 15:15, 16:28, 17:1, 19:11 REPUBLICANI ^[18] - 3:11, 3:13, 3:26, 4:6, 5:15, 5:18, 6:1, 6:13, 7:11, 7:17, 7:19, 7:27, 9:7, 9:20, 9:21, 12:19, 28:25 REPUBLICANI ^[1] - 4:3 REPUBLICANS ^[9] - 7:4, 7:5, 7:10, 7:11, 8:11, 8:16, 9:4, 9:16, 9:19 REPURPOSED ^[1] - 116:19 REPUTATION ^[1] - 79:29 REQUEST ^[5] - 99:3, 140:28, 141:8, 141:18, 145:26 REQUESTING ^[1] - 140:14 REQUESTS ^[1] - 139:28 REQUIRE ^[1] - 142:14 REQUIRED ^[6] - 49:2, 54:12, 67:14, 79:16, 110:1, 140:25 REQUIREMEN ^[3] - 109:22, 156:17, 156:19 REQUIREMEN
--	---	---	--	---	--

TS [2] - 96:9, 96:12 REQUIRES [2] - 51:21, 155:8 RESEARCH [5] - 89:27, 93:12, 93:16, 103:11, 107:29 RESEARCH [11] - 3:10, 3:14, 3:22, 4:10, 77:24, 91:11, 91:12, 91:13, 93:17, 108:2, 108:4 RESIDUE [1] - 88:10 RESIGNED [1] - 29:21 RESOURCE [3] - 6:6, 136:20, 136:22 RESOURCES [1] - 86:20 RESPECT [1] - 96:29 RESPECTIVE [1] - 63:10 RESPECTS [2] - 46:4, 48:27 RESPONSE [1] - 95:15 RESPONSES [1] - 4:20 RESPONSIBILI TY [2] - 98:9, 99:26 RESPONSIBLE [5] - 58:18, 82:6, 87:23, 98:21, 99:29 RESPONSIVE [1] - 4:29 RESTRICT [1] - 140:7 RESTRICTING [1] - 139:28 RESTRICTION [2] - 152:21, 153:5 RESULT [15] - 6:25, 16:15, 23:7, 24:14, 25:27, 26:13, 27:15, 27:17, 48:12, 48:15, 55:25, 56:28, 78:27, 78:29, 151:7 RESULTED [3] - 15:18, 57:7, 86:8 RESULTS [24] - 12:23, 15:3, 52:5,	62:22, 63:4, 63:11, 69:21, 72:5, 74:20, 74:25, 78:13, 78:18, 80:22, 80:26, 83:20, 83:25, 86:6, 88:7, 88:17, 91:7, 96:14, 101:2, 104:15, 126:13 RESUMED [2] - 39:11, 152:9 RETALIATION [1] - 14:23 RETICENCE [1] - 145:14 RETICENT [1] - 145:13 RETTENDON [1] - 139:4 RETURN [9] - 5:20, 26:1, 29:3, 37:24, 39:7, 91:23, 107:14, 145:24, 157:26 RETURNING [2] - 123:4, 157:21 REVIEW [6] - 98:25, 99:3, 136:8, 139:21, 145:1, 151:5 REVIEWED [6] - 4:4, 146:13, 148:6, 149:13, 150:28, 151:8 REVIEWS [1] - 101:19 REYNOLDS [1] - 22:1 RIDER [1] - 138:6 RIDGE [1] - 74:11 RIGHT-HAND [4] - 61:28, 65:22, 115:4, 126:11 RIGHTS [1] - 42:22 RIRA [3] - 37:1, 38:21, 38:22 RISE [1] - 4:2 RISE [1] - 144:29 RISK [5] - 75:15, 75:26, 100:19, 147:17, 150:19 RISKS [2] - 65:17, 65:18 ROADS [2] - 125:19, 125:29	ROBSON [2] - 45:4, 79:25 ROBSON'S [1] - 80:29 ROBUST [1] - 145:18 ROBUSTNESS [4] - 110:12, 150:6, 150:8, 150:10 ROGER [1] - 79:25 ROGER [1] - 45:4 ROLE [14] - 27:6, 35:12, 35:14, 40:9, 45:28, 52:16, 52:20, 53:28, 55:22, 90:26, 90:29, 138:17, 145:10 ROLES [2] - 32:10, 77:23 ROLLED [1] - 69:9 ROOM [1] - 111:21 ROUGHLY [1] - 42:11 ROUTE [7] - 9:10, 87:29, 113:23, 119:5, 119:13, 146:14, 156:3 ROUTES [2] - 121:13, 156:5 ROUTINE [2] - 70:7, 144:11 ROUTINELY [4] - 125:4, 142:27, 143:15, 155:12 ROVER [1] - 139:5 ROW [2] - 129:17, 129:18 ROWS [1] - 130:27 ROYAL [2] - 3:23, 82:22 ROYALTY [1] - 140:5 RSF [1] - 15:14 RUAIRÍ [1] - 19:4 RUC [4] - 76:18, 77:3, 77:6, 99:25 RULE [1] - 102:17 RUMBLING [1] -	75:3 RUN [7] - 42:19, 104:29, 120:13, 124:11, 124:12 RUNNING [2] - 43:16, 91:25 RUNS [1] - 84:28 RURAL [1] - 124:15	S SAFE [1] - 132:14 SAFELY [2] - 104:7, 149:3 SAFER [3] - 101:2, 101:3, 101:7 SAFETY [2] - 140:1, 152:24 SAFRANAUSK AS [1] - 158:2 SAMPLE [6] - 49:2, 49:4, 69:1, 69:9, 69:12, 88:1 SAMPLES [5] - 70:14, 84:2, 91:5, 100:18, 100:28 SAND [1] - 104:21 SANDS [1] - 35:11 SARAH [3] - 45:6, 82:13, 84:14 SAT [2] - 20:16, 24:22 SAVE [1] - 45:11 SAVING [1] - 143:17 SAW [7] - 12:1, 12:3, 14:18, 15:12, 22:3, 22:8, 129:3 SCALE [2] - 124:8, 134:23 SCENE [1] - 82:23 SCENE [16] - 47:1, 47:5, 47:9, 50:12, 54:6, 54:7, 68:4, 71:8, 71:14, 71:15, 71:16, 81:29, 82:2, 97:11, 97:14, 106:28 SCENES [7] - 54:18, 72:20,	72:22, 91:3, 91:6, 100:8, 100:9 SCHEDULE [1] - 107:15 SCIENCE [28] - 42:7, 42:18, 42:19, 42:23, 42:27, 43:5, 43:15, 62:27, 80:4, 82:23, 89:18, 89:20, 90:11, 91:11, 92:28, 93:2, 93:11, 93:26, 95:9, 95:19, 97:5, 101:29, 107:28, 108:21, 108:24, 108:28, 135:27, 135:29 SCIENCE [49] - 40:13, 40:16, 41:2, 42:21, 43:8, 43:24, 45:28, 46:21, 46:27, 49:25, 51:16, 53:6, 54:2, 54:22, 57:20, 57:21, 57:22, 57:25, 57:28, 58:2, 58:7, 63:25, 63:27, 65:28, 66:26, 77:23, 81:25, 86:22, 87:7, 89:10, 89:15, 90:4, 90:16, 90:17, 91:10, 92:22, 93:19, 95:2, 95:16, 96:19, 96:21, 98:5, 99:15, 100:1, 100:2, 103:6, 104:1, 109:1, 118:11 SCIENCES [1] - 107:25 SCIENTIFIC [18] - 41:2, 41:4, 41:23, 51:2, 57:10, 63:18, 64:22, 65:19, 69:24, 72:8, 78:21, 80:25, 83:19, 83:24, 100:29, 105:2, 105:7, 136:8 SCIENTIST [25] - 42:4, 51:11, 52:29, 53:9, 53:12, 54:7, 55:12, 55:27,	55:29, 56:26, 57:6, 57:9, 62:13, 64:2, 66:13, 87:22, 87:25, 88:20, 94:10, 98:13, 98:21, 100:5, 104:6, 107:27, 146:26 SCIENTISTS [19] - 40:15, 44:22, 47:15, 50:7, 54:4, 62:20, 62:25, 62:29, 67:12, 72:21, 87:24, 91:1, 92:20, 97:20, 98:15, 98:19, 100:10, 102:5, 104:11 SCOTLAND [3] - 75:3, 75:11, 90:20 SCOTT [1] - 144:21 SCREEN [8] - 16:10, 16:13, 17:6, 63:13, 84:9, 123:4, 124:27, 132:26 SCREENING [1] - 70:7 SCRUTINY [2] - 110:13, 151:16 SDLP [1] - 22:6 SEA [1] - 131:13 SEAMUS [8] - 13:19, 14:19, 23:28, 27:28, 29:24, 29:26, 32:15, 32:24 SEARCH [1] - 62:1 SEARCHED [1] - 72:23 SEARCHES [1] - 78:14 SEARCHING [2] - 71:14, 74:15 SEASHELLS [1] - 66:5 SEAT [2] - 17:27, 18:4 SEATS [1] - 12:13 SECOND [14] - 4:29, 10:12, 36:18, 36:25, 38:4, 38:14, 40:18, 40:27, 99:3, 107:6,
---	--	--	--	--	---	---

107:15, 137:9, 155:23, 156:10 SECONDED [1] - 73:24 SECONDLY [7] - 58:25, 110:26, 131:12, 132:16, 133:20, 155:28, 157:9 SECONDS [2] - 118:27, 125:5 SECRETARY [2] - 26:23, 27:2 SECTARIAN [1] - 10:9 SECTION [7] - 67:18, 94:19, 109:9, 113:18, 133:29, 135:15, 136:29 SECTIONS [1] - 66:29 SECTIONS [2] - 67:4, 113:21 SECTOR [2] - 108:11, 129:21 SECTORISATI ON [2] - 119:22, 119:26 SECTORISED [1] - 119:27 SECTORS [5] - 120:1, 120:9, 120:15, 129:23, 129:25 SECURITY [1] - 140:4 SECURITY [4] - 20:18, 25:22, 71:2, 71:4 SEE [79] - 20:26, 21:8, 22:9, 27:25, 34:29, 38:2, 41:22, 44:3, 50:11, 61:27, 65:22, 66:14, 69:15, 71:25, 85:25, 85:27, 109:6, 110:26, 110:29, 112:11, 112:14, 113:12, 113:20, 114:2, 114:13, 114:21, 115:9, 115:16, 115:23, 115:26, 116:24, 117:4, 118:2, 120:8, 120:28, 121:15, 122:16, 123:4, 125:21, 125:25,	125:29, 126:3, 126:8, 126:11, 126:12, 126:14, 126:23, 126:27, 127:22, 128:28, 128:29, 129:13, 129:17, 130:17, 130:27, 131:3, 132:25, 133:19, 133:20, 133:22, 133:25, 134:8, 134:10, 134:13, 134:18, 134:19, 135:2, 135:9, 143:3, 144:12, 144:17, 147:2, 147:6, 147:11, 150:13, 151:19, 154:7, 155:13, 155:17 SEEING [4] - 71:19, 94:6, 122:28, 131:19 SEEK [3] - 21:12, 41:8, 57:4 SEEKING [5] - 51:2, 57:28, 71:20, 141:10, 154:12 SEES [1] - 118:17 SEIZE [1] - 32:6 SELECTED [3] - 58:12, 126:2, 134:29 SELECTION [1] - 56:18 SELL [3] - 28:26, 125:7, 148:21 SENIOR [12] - 51:11, 52:25, 52:28, 53:2, 55:14, 77:22, 98:8, 99:2, 99:29, 104:2, 104:22, 105:11 SENSE [4] - 42:21, 57:12, 88:10, 131:8 SENSITIVE [5] - 50:23, 51:17, 100:20, 100:21, 140:4 SENSITIVITY [3] - 81:7, 84:20, 100:17 SENT [1] - 156:15 SENTENCE [4] - 68:25, 142:17,	142:19, 153:1 SENTENCES [3] - 5:25, 17:23, 116:3 SEPARATE [3] - 59:26, 78:12, 150:20 SEPARATING [1] - 69:5 SEPTEMBER [1] - 158:14 SEPTEMBER [1] - 5:5 SEQUENCE [3] - 47:8, 47:11, 54:9 SERIES [7] - 38:15, 51:17, 87:13, 95:15, 97:29, 104:14, 147:14 SERIOUS [3] - 82:17, 149:21, 152:22 SERVE [5] - 118:23, 127:9, 148:18, 155:1 SERVED [6] - 71:7, 80:4, 117:29, 123:27, 148:21, 149:5 SERVES [4] - 121:26, 149:9, 149:10, 154:25 SERVICE [29] - 21:10, 35:27, 38:10, 42:19, 42:25, 108:3, 117:9, 118:25, 118:29, 119:1, 121:8, 121:13, 121:21, 121:22, 121:24, 122:1, 122:8, 122:11, 126:2, 126:6, 126:13, 126:14, 126:19, 127:7, 127:19, 128:1, 135:11, 147:15, 150:28 SERVICE [20] - 42:7, 42:18, 42:19, 42:24, 42:27, 43:5, 43:15, 62:28, 89:18, 89:20, 90:11, 91:11, 92:28, 93:2, 93:11, 95:9, 95:19, 96:1, 97:5, 107:28	SERVICES [8] - 43:19, 43:24, 73:19, 73:25, 86:18, 90:17, 96:3, 102:9 SERVING [1] - 126:23 SESSION [2] - 107:11, 117:12 SET [18] - 43:5, 43:12, 43:17, 53:3, 76:26, 90:11, 90:15, 94:27, 96:2, 96:10, 96:18, 97:19, 99:11, 108:5, 109:14, 110:16, 155:5, 157:5 SETS [1] - 81:23 SETTING [4] - 40:17, 46:18, 94:14, 106:28 SETTINGS [1] - 157:3 SEVEN [2] - 65:6, 127:2 SEVENOAKS [2] - 89:26, 103:13 SEVERAL [5] - 49:14, 61:9, 61:10, 80:13, 82:20 SHADOW [1] - 135:11 SHALL [2] - 106:7, 152:6 SHAPES [1] - 127:6 SHARED [1] - 86:20 SHARING [1] - 102:8 SHED [1] - 49:28 SHINING [1] - 120:4 SHOE [1] - 66:18 SHORT [12] - 39:5, 48:19, 73:8, 102:14, 112:27, 117:9, 132:17, 144:29, 151:10, 151:23, 153:12, 155:23 SHORTENED [1] - 116:1 SHORTHAND [1] - 111:28 SHOW [10] - 16:12, 16:22,	31:22, 66:2, 66:7, 66:9, 66:21, 86:27, 133:29, 136:21 SHOWED [1] - 76:2 SHOWING [1] - 123:11 SHOWN [2] - 55:24, 133:28 SHUT [2] - 42:25, 108:1 SIDE [15] - 19:24, 26:7, 43:7, 49:21, 61:28, 65:22, 124:1, 125:25, 126:9, 126:11, 126:27, 127:21, 135:10, 143:19, 147:5 SIDED [1] - 33:9 SIDES [2] - 29:8, 63:1 SIFT [1] - 132:8 SIGHT [5] - 133:15, 133:27, 134:1, 134:3, 135:3 SIGNAL [4] - 122:21, 124:6, 124:10, 135:12 SIGNALS [1] - 123:17 SIGNATURE [1] - 73:5 SIGNATURES [2] - 85:4, 85:20 SIGNED [3] - 28:19, 28:23, 28:24 SIGNIFICANCE [1] - 117:15 SIGNIFICANT [15] - 13:7, 25:21, 26:6, 30:13, 30:14, 31:1, 35:5, 36:8, 37:11, 43:27, 58:29, 116:15, 130:12, 139:21, 142:24 SIM [2] - 113:27, 114:6 SIMILAR [16] - 25:16, 29:6, 61:18, 62:1, 71:21, 71:28, 84:15, 84:20, 100:15, 100:28, 101:12, 101:24, 101:28, 134:13,	135:4 SIMPLE [7] - 21:24, 68:20, 112:5, 113:3, 118:12, 146:16, 148:11 SIMPLIFIED [1] - 114:19 SIMPLY [4] - 55:27, 58:13, 69:7, 111:18 SINGLE [2] - 49:14, 88:17 SINN [36] - 7:15, 7:22, 8:5, 9:5, 13:9, 13:13, 13:14, 13:23, 13:24, 13:27, 13:29, 14:5, 14:6, 14:11, 15:13, 15:15, 15:23, 15:26, 16:2, 16:25, 16:26, 16:27, 16:29, 17:2, 17:26, 18:3, 18:17, 19:12, 25:17, 25:18, 26:24, 27:7, 27:13, 31:25, 31:26 SIO [6] - 52:24, 52:25, 53:9, 53:11, 55:27, 98:14 SIO'S [2] - 52:20, 53:28 SIT [3] - 20:18, 134:20, 152:6 SITE [2] - 135:28, 142:21 SITE [60] - 66:22, 106:5, 107:6, 107:23, 108:4, 108:12, 108:14, 108:23, 109:22, 111:6, 116:9, 116:11, 116:12, 116:21, 117:26, 117:29, 118:9, 119:4, 119:17, 120:22, 121:25, 122:15, 124:22, 124:29, 125:6, 127:4, 127:5, 127:21, 127:23, 128:18, 129:8, 129:14, 129:21, 129:29, 131:18, 132:8, 132:11, 133:1,
---	--	--	---	--	---

133:14, 133:20, 134:11, 135:21, 136:20, 137:1, 137:7, 137:10, 137:20, 138:24, 139:9, 139:23, 140:14, 142:1, 148:29, 151:6, 151:21, 153:20, 154:8, 155:28 SITES [16] - 116:24, 119:6, 120:14, 120:24, 122:4, 122:15, 122:27, 122:29, 127:5, 130:27, 132:2, 136:21, 143:26, 153:29, 154:11, 154:13 SITTING [2] - 20:24, 134:6 SITUATION [7] - 21:18, 55:23, 56:7, 56:11, 57:5, 60:7, 158:6 SIX [6] - 48:14, 60:16, 89:18, 89:22, 120:17, 127:2 SIX [1] - 95:17 SIZE [4] - 36:16, 36:20, 123:3, 123:12 SIZES [1] - 122:5 SKILL [1] - 66:13 SKILLED [1] - 82:15 SKILLS [2] - 150:14, 150:18 SLIDE [35] - 46:25, 48:1, 51:14, 52:18, 55:5, 59:7, 59:28, 65:1, 65:22, 66:28, 68:10, 95:7, 114:14, 114:18, 116:23, 118:2, 119:20, 120:22, 121:26, 121:29, 122:3, 122:10, 123:4, 123:22, 124:23, 128:6, 128:14, 128:27, 129:3, 130:1, 130:11, 133:17, 133:25, 134:12, 134:26 SLIDE [6] -	52:16, 52:17, 79:22, 89:14, 90:26, 98:6 SLIDES [1] - 99:11 SLIDES [7] - 52:12, 76:11, 91:22, 113:19, 113:23, 135:14, 141:27 SLIDESHOW [3] - 41:11, 41:21, 64:21 SLIGHTLY [4] - 115:14, 115:23, 134:14, 135:2 SLIMMED [1] - 54:3 SMALL [9] - 17:22, 19:25, 37:3, 37:10, 48:22, 70:3, 87:9, 102:28, 106:28 SMALLER [7] - 35:29, 49:4, 61:19, 65:18, 84:21, 122:9, 122:11 SO-CALLED [3] - 5:14, 73:4, 110:7 SOAKED [1] - 47:5 SOCIALIST [1] - 16:28 SOCIETY [2] - 82:22, 107:24 SOCOS [1] - 97:12 SOFTWARE [1] - 125:12 SOIL [3] - 66:5, 66:17, 66:21 SOLDIERS [2] - 33:13, 33:15 SOLELY [1] - 137:5 SOMEONE [3] - 76:23, 79:19, 111:23 SOMETIME [1] - 151:18 SOMETIMES [12] - 14:12, 49:8, 51:25, 88:1, 88:6, 88:13, 92:23, 98:1, 122:14, 124:16, 154:17 SOMEWHERE [1] - 121:20	SOPHIE [1] - 34:18 SOPHISTICAT ED [3] - 68:23, 111:11, 143:17 SORRY [2] - 48:21, 64:7 SORT [26] - 43:17, 50:21, 53:5, 54:3, 54:9, 54:17, 54:18, 56:17, 61:28, 67:13, 69:11, 75:21, 75:23, 81:18, 89:28, 90:3, 91:26, 95:12, 96:12, 104:14, 105:17, 121:23, 132:7, 141:6, 154:11, 155:15 SORTS [14] - 43:4, 46:28, 47:12, 48:3, 54:11, 54:13, 59:14, 66:9, 67:4, 92:2, 95:11, 101:13, 101:17, 101:25 SOUGHT [3] - 21:7, 21:14, 38:9 SOUND [1] - 150:29 SOUNDS [1] - 148:26 SOURCE [8] - 3:17, 5:28, 6:13, 22:19, 25:1, 81:21, 149:23 SOURCES [18] - 5:27, 5:28, 6:11, 6:26, 22:18, 22:21, 24:12, 24:17, 32:8, 32:9, 36:23, 36:25, 45:22, 61:21, 70:11, 70:13, 74:5, 120:1 SOUTH [1] - 10:29 SOUTH [1] - 118:16 SOUTHALL [1] - 144:21 SOUTHERN [1] - 120:25 SOVEREIGN [1] - 34:19 SOVEREIGNTY [13] - 15:25,	15:28, 16:1, 16:7, 17:3, 17:4, 34:7, 34:18, 34:28, 35:9, 35:12, 35:16 SPARE [1] - 112:12 SPEAKER [2] - 89:4, 89:10 SPEAKING [1] - 49:17 SPEC [1] - 89:28 SPECIAL [4] - 49:11, 59:16, 69:11, 125:12 SPECIALISE [1] - 85:3 SPECIALISED [4] - 43:29, 79:29, 92:12, 108:14 SPECIALISES [2] - 44:24, 44:27 SPECIALISING [6] - 44:29, 45:2, 45:4, 45:6, 45:8, 82:16 SPECIALIST [7] - 71:2, 71:5, 87:25, 89:23, 92:5, 94:1, 94:4 SPECIALISTS [1] - 84:12 SPECIALITY [1] - 141:14 SPECIFIC [14] - 46:9, 54:25, 54:26, 74:14, 90:3, 92:20, 95:11, 96:8, 101:20, 105:19, 116:9, 117:27, 122:24, 136:28 SPECIFICALLY [2] - 109:1, 150:3 SPECTROMET RY [1] - 83:14 SPECTROSCO PY [1] - 68:27 SPENDING [1] - 51:26 SPLIT [38] - 12:2, 12:5, 12:22, 13:1, 13:7, 13:11, 13:14, 13:25, 13:26, 14:15, 14:17, 14:18, 14:26, 15:3, 15:10, 15:11, 15:12, 15:17, 15:18, 16:16,	16:26, 17:18, 18:1, 18:24, 19:22, 22:3, 23:9, 23:11, 30:5, 30:7, 30:13, 30:14, 42:9, 50:3, 99:25, 150:10, 150:13 SPLITS [6] - 3:4, 11:20, 16:18, 16:22, 16:28, 16:29 SPLITTING [3] - 16:14, 16:25, 29:18 SPOKEN [1] - 144:7 SPREAD [2] - 92:13, 121:15 SPREADSHEET [1] - 128:29 SPÉCIALE [1] - 112:19 SQUARES [1] - 124:8 SQUEEZED [1] - 24:14 STAFF [2] - 32:12, 32:18 STAGE [20] - 15:9, 16:6, 19:28, 27:5, 28:3, 39:4, 45:11, 51:14, 78:8, 109:12, 117:4, 137:3, 137:23, 138:1, 138:16, 140:12, 140:22, 143:28, 144:3, 152:5 STAGES [1] - 18:26 STAIN [1] - 78:27 STAINING [1] - 79:16 STALLING [1] - 99:2 STAMP [1] - 86:3 STAND [2] - 57:20, 112:17 STANDARD [17] - 60:22, 91:20, 91:21, 91:26, 95:23, 96:4, 96:19, 108:29, 109:29, 110:12, 110:15, 110:28, 126:25, 127:10, 135:26, 146:20, 147:26	STANDARD [1] - 96:3 STANDARDISE D [1] - 95:20 STANDARDS [16] - 40:17, 41:4, 43:14, 46:17, 80:3, 85:12, 91:18, 94:24, 94:25, 97:9, 101:10, 109:19, 110:18, 110:19, 111:18, 151:18 STANDARDS [1] - 108:29 STARK [2] - 19:29, 20:3 START [12] - 9:28, 11:27, 21:21, 42:26, 106:25, 117:16, 121:19, 127:26, 129:4, 140:28, 142:5, 146:9 STARTED [8] - 22:7, 61:8, 62:20, 63:19, 64:4, 97:2, 136:1, 142:12 STARTING [8] - 5:24, 23:8, 39:28, 59:4, 59:5, 78:26, 103:22, 153:19 STARTS [5] - 52:18, 54:5, 54:14, 94:20, 135:16 STATE [2] - 36:27, 78:21 STATE [4] - 3:15, 6:10, 26:23, 27:2 STATEMENT [3] - 21:28, 36:6, 36:10 STATEMENTS [5] - 6:6, 34:22, 91:8, 102:4, 102:12 STATION [2] - 115:18, 129:1 STATISTICAL [1] - 62:28 STATISTICS [1] - 60:10 STATUS [1] - 91:29 STATUTORY [1] - 97:28 STAYING [1] - 118:3
---	--	---	--	---	--

STEELE ^[3] - 139:2, 139:3, 139:11 STEER ^[2] - 54:25, 55:3 STENCILLING ^[1] - 86:3 STENOGRAPH ER ^[2] - 73:10, 102:24 STEP ^[2] - 34:29, 144:6 STEPHEN ^[2] - 44:16, 106:27 STEPS ^[2] - 140:25, 146:1 STILL ^[19] - 6:1, 29:9, 43:15, 57:20, 65:28, 75:14, 79:9, 79:13, 79:16, 88:27, 95:2, 95:4, 95:5, 108:21, 112:3, 112:22, 132:6, 135:8, 147:12 STOOD ^[1] - 28:25 STOP ^[5] - 60:9, 104:7, 104:18, 105:14, 139:20 STOPPING ^[2] - 103:26, 103:27 STORAGE ^[1] - 157:6 STORE ^[2] - 59:11, 156:25 STORED ^[5] - 156:1, 156:23, 156:24, 157:10, 157:14 STORMONT ^[3] - 12:16, 17:27, 18:6 STRAIGHT ^[2] - 19:18, 128:13 STRANDS ^[1] - 16:9 STRATEGICAL LY ^[1] - 32:4 STRATEGIES ^[3] - 91:4, 98:5, 98:24 STRATEGY ^[17] - 9:8, 46:17, 46:23, 51:7, 51:10, 51:20, 52:21, 53:29, 98:9, 98:10, 98:12, 98:22,	100:1, 103:29, 141:14, 145:26 STRATHCLYD E ^[1] - 90:21 STREET ^[1] - 21:26 STRENGTH ^[4] - 84:3, 84:5, 84:23, 127:19 STRENGTHS ^[1] - 135:12 STRESS ^[2] - 66:7, 140:18 STRIDES ^[1] - 61:3 STRIPY ^[1] - 66:6 STRONG ^[1] - 121:2 STRONGER ^[3] - 61:23, 84:4, 100:29 STRONGEST ^[1] - 124:6 STRUCTURE ^[12] - 20:9, 20:11, 20:14, 20:15, 21:3, 21:5, 21:6, 21:7, 25:16, 35:24, 67:2, 133:23 STRUCTURE ^[1] - 66:29 STRUGGLE ^[4] - 8:1, 9:10, 28:27, 31:24 STUFF ^[4] - 49:15, 70:11, 123:18, 155:15 STYLE ^[1] - 10:19 SUBGROUP ^[1] - 8:13 SUBJECT ^[9] - 46:8, 65:6, 92:20, 108:19, 122:13, 122:16, 146:4, 151:15, 158:6 SUBJECT- SPECIFIC ^[1] - 92:20 SUBJECTIVE ^[2] - 74:22, 75:19 SUBMISSION ^[2] - 4:21, 64:9 SUBMITTED ^[1] - 136:9 SUBSCRIBER ^[3] - 114:9, 114:11, 154:2	SUBSEQUENT ^[1] - 91:4 SUBSEQUENT LY ^[4] - 4:28, 78:28, 149:29, 151:8 SUBSTANCE ^[3] - 5:21, 68:13, 107:17 SUBSTANCES ^[6] - 44:27, 67:27, 68:3, 69:28, 70:2, 92:8 SUBSTANTIAL ^[7] - 6:19, 26:29, 72:19, 73:11, 79:4, 100:9, 103:10 SUBURBAN ^[1] - 126:22 SUCCEEDS ^[1] - 134:1 SUCCESSFUL LY ^[1] - 77:19 SUFFICIENT ^[3] - 74:9, 78:11, 109:3 SUGGEST ^[5] - 55:13, 55:27, 87:2, 102:18, 139:13 SUGGESTED ^[1] - 62:11 SUGGESTING ^[4] - 54:27, 55:11, 56:4, 56:8 SUGGESTION S ^[1] - 55:17 SUMMARISE ^[3] - 31:29, 76:11, 86:11 SUMMARISED ^[3] - 69:27, 70:26, 84:8 SUMMARISING ^[1] - 56:27 SUMMARY ^[9] - 36:15, 45:14, 47:28, 67:19, 72:11, 79:6, 94:27, 98:3, 99:11 SUPERFLUOU S ^[1] - 108:18 SUPERINTEND ENT ^[1] - 158:8 SUPPLIED ^[1] - 42:20 SUPPORT ^[10] - 26:10, 31:22,	33:19, 35:2, 63:5, 63:12, 64:11, 71:29, 82:4 SUPPORTED ^[1] - 62:22 SUPPORTERS ^[1] - 28:22 SUPPORTIVE ^[1] - 27:28 SUPPOSE ^[1] - 103:28 SUPPOSED ^[1] - 70:10 SUPREME ^[2] - 20:17, 20:25 SURFACE ^[1] - 79:19 SURFACES ^[1] - 48:17 SURNAME ^[1] - 139:3 SURROUNDIN G ^[1] - 134:2 SURVEY ^[7] - 124:29, 125:11, 126:13, 126:16, 144:8, 144:23, 145:29 SURVEYS ^[4] - 124:23, 124:25, 128:4, 144:11 SURVIVORS ^[1] - 102:22 SUSPECT ^[6] - 46:29, 47:16, 47:22, 64:10, 104:4, 155:14 SUSPECTS ^[5] - 47:20, 54:25, 54:26, 76:19, 88:25 SUSPECTS' ^[1] - 54:17 SUSPICIONS ^[1] - 62:22 SWAMP ^[1] - 60:28 SWEAR ^[1] - 39:19 SWITCH ^[1] - 128:14 SWITCHING ^[1] - 128:15 SWORN ^[2] - 39:21, 106:22 SWORN ^[2] - 39:16, 106:18 SYNONYMOUS ^[1] - 10:3 SYSTEM ^[8] -	21:9, 35:27, 112:1, 112:6, 112:17, 113:12, 156:25, 156:28 SYSTEMS ^[6] - 43:21, 86:24, 91:27, 95:21, 95:22, 101:5 T TABLE ^[4] - 128:29, 129:12, 130:19, 154:23 TACT ^[1] - 76:19 TACTIC ^[1] - 37:29 TACTICS ^[2] - 10:16, 33:1 TALKS ^[10] - 22:5, 26:24, 27:7, 27:14, 28:17, 31:21, 74:28, 76:14, 86:13 TAOISEACH ^[2] - 21:29, 34:27 TAPE ^[1] - 80:9 TARGETING ^[1] - 33:14 TARGETS ^[1] - 33:6 TART ^[14] - 106:4, 106:17, 106:25, 106:27, 113:17, 133:7, 135:17, 137:22, 152:13, 153:13, 157:20, 157:23, 157:27, 158:10 TART ^[1] - 106:19 TART ^[3] - 106:22, 158:12, 159:11 TASKED ^[1] - 57:11 TAYLOR ^[2] - 44:14, 88:22 TAYSIDE ^[1] - 90:22 TD ^[1] - 18:3 TEAM ^[14] - 40:14, 40:15, 44:18, 44:20, 44:22, 44:24, 45:18, 58:14, 67:22, 67:28, 85:1, 98:14, 108:4, 153:14	TEAM'S ^[1] - 130:25 TECHNICAL ^[2] - 66:29, 134:28 TECHNICAL ^[11] - 46:8, 67:3, 73:25, 98:13, 100:2, 112:13, 115:14, 118:10, 141:28, 149:25, 150:26 TECHNICALIT Y ^[1] - 114:1 TECHNIQUE ^[7] - 55:24, 55:25, 61:7, 61:15, 68:26, 139:14, 144:26 TECHNIQUES ^[47] - 41:3, 41:24, 46:5, 46:9, 50:23, 55:18, 60:23, 64:22, 64:27, 65:5, 65:9, 65:11, 65:15, 67:9, 67:22, 68:12, 68:16, 69:20, 69:25, 70:23, 71:11, 71:12, 72:4, 73:29, 74:3, 74:20, 76:15, 78:4, 78:16, 78:17, 79:8, 79:18, 80:7, 80:20, 82:25, 83:18, 83:26, 84:7, 84:19, 85:17, 85:22, 86:5, 86:14, 95:25, 99:17, 100:22, 124:20 TECHNIQUES ^[1] - 68:9 TECHNOLOGI CAL ^[1] - 58:3 TECHNOLOGI CALLY ^[1] - 111:10 TECHNOLOGI ES ^[1] - 61:10 TECHNOLOGY ^[5] - 46:6, 59:24, 100:16, 111:6, 117:5 TEDDINGTON ^[1] - 90:9 TELECOMMUN ICATION ^[4] - 107:22, 140:27, 141:2, 141:6
---	--	---	---	--	---

TELECOMMUNICATIONS [4] - 140:13, 153:4, 153:10, 154:10 TELEPHONE [17] - 111:23, 111:25, 112:25, 114:12, 114:21, 115:4, 115:19, 115:25, 117:8, 119:12, 127:13, 130:19, 130:21, 130:23, 132:28, 154:15, 156:11 TELEPHONES [2] - 122:18, 155:23 TEMPERATURE [1] - 27:10 TEN [1] - 102:24 TEND [6] - 48:21, 118:26, 121:9, 122:5, 124:14, 124:15 TENDENCY [1] - 51:16 TENDS [1] - 121:6 TENS [2] - 124:13, 155:8 TENSION [6] - 20:28, 22:11, 22:15, 23:8, 28:7, 28:21 TENSIONS [1] - 23:6 TERM [12] - 7:11, 8:27, 9:25, 10:4, 10:7, 10:8, 10:25, 77:26, 84:27, 116:21, 118:10, 128:7 TERMINOLOGY [2] - 9:23, 11:5 TERMS [40] - 4:10, 6:26, 7:1, 7:4, 7:5, 7:8, 7:12, 9:25, 11:2, 21:24, 30:5, 30:7, 30:11, 30:14, 30:18, 76:6, 84:25, 91:28, 92:7, 95:1, 95:3, 105:6, 107:17, 110:23, 112:13, 113:6, 118:12, 129:17, 131:19, 135:3, 135:24, 136:11, 137:10, 138:7, 145:15,	157:6, 157:14, 158:3, 158:4 TERRAIN [13] - 121:27, 122:16, 123:10, 123:12, 123:21, 123:29, 124:7, 124:9, 124:19, 133:23, 133:29, 134:2, 134:10 TERRIBLE [1] - 11:14 TERRIBLY [1] - 51:19 TERRORISM [12] - 10:1, 10:2, 10:9, 10:15, 10:17, 10:25, 10:26, 11:16, 11:18, 37:26, 140:1, 152:24 TERRORIST [13] - 11:9, 11:11, 11:14, 12:27, 16:24, 19:17, 31:11, 33:2, 71:6, 73:21, 74:16, 76:19, 99:20 TERRORIST-RELATED [1] - 74:16 TERRORISTS [4] - 72:16, 77:4, 77:5 TEST [8] - 52:4, 83:4, 85:17, 87:17, 110:10, 146:29, 147:6, 153:28 TESTS [1] - 67:15 TESTED [5] - 55:24, 65:20, 65:21, 154:22, 155:1 TESTIMONY [2] - 57:1, 91:9 TESTING [13] - 78:17, 78:29, 87:9, 87:23, 92:27, 93:6, 96:13, 96:19, 97:14, 101:18, 104:7, 104:18, 104:20 TESTS [1] - 68:9 TESTS [55] - 41:23, 46:9, 48:14, 50:13, 50:15, 51:17,	51:19, 52:2, 54:11, 55:18, 55:20, 63:3, 63:8, 63:11, 64:22, 64:26, 65:4, 65:8, 65:11, 65:12, 65:15, 65:19, 67:8, 67:22, 68:11, 68:20, 68:21, 69:20, 70:23, 72:9, 73:29, 74:19, 76:2, 78:4, 78:6, 78:16, 78:22, 80:7, 80:20, 80:27, 81:7, 82:25, 83:18, 84:1, 84:21, 86:5, 86:14, 87:13, 87:16, 87:19, 95:24, 99:17, 101:1, 104:14, 105:18 TEXT [8] - 117:9, 125:3, 155:24, 155:29, 156:14, 156:22, 156:24, 157:1 TEXTBOOK [1] - 82:22 TEXTILE [8] - 45:4, 79:21, 79:28, 80:2, 81:2, 81:28, 88:22, 94:17 THE [10] - 39:1, 39:9, 39:11, 103:1, 106:9, 106:11, 106:20, 152:9, 158:14, 159:8 THEMSELVES [6] - 11:3, 59:16, 59:17, 59:22, 65:11, 102:20 THEORETICAL [2] - 122:14, 123:5 THEORY [1] - 124:6 THERE'LL [7] - 36:13, 87:22, 107:12, 118:24, 120:20, 128:16, 128:17 THERE.. [1] - 148:19 THEREFORE [5] - 18:2, 21:24, 27:12, 31:21, 54:12	THEY'VE [7] - 60:5, 65:20, 75:23, 121:18, 121:20, 128:12, 141:19 THINKING [9] - 18:11, 18:13, 48:3, 48:13, 55:6, 62:12, 69:23, 86:8, 111:14 THINKS [1] - 76:28 THIRD [5] - 37:6, 44:15, 110:12, 129:18, 140:26 THIRDLY [2] - 58:27, 156:3 THIRDS [2] - 13:17, 13:22 THOUSANDS [1] - 155:12 THREAT [1] - 71:2 THREE [1] - 44:9 THREE [9] - 118:26, 119:23, 120:15, 123:15, 130:18, 135:9, 150:10, 150:13 THROUGHOUT [2] - 7:25, 97:13 THROW [1] - 143:2 TICKET [1] - 128:13 TICKETS [4] - 113:7, 128:5, 128:9, 128:22 TIE [1] - 148:26 TIGHT [1] - 56:2 TIMED [1] - 32:4 TIMESCALE [1] - 43:11 TIMING [1] - 122:22 TIN [1] - 114:10 TINY [3] - 72:23, 79:1, 81:13 TITLE [1] - 30:3 TITLED [1] - 34:21 TLC [1] - 80:14 TODAY [21] - 3:8, 5:8, 5:9, 5:13, 38:5, 38:29, 39:29, 41:1, 41:7, 45:13, 61:11, 79:9, 81:3, 86:23, 100:15, 117:16, 142:28, 147:12,	157:28, 158:5 TOGETHER [12] - 14:12, 16:9, 25:20, 38:11, 71:24, 87:28, 93:15, 96:28, 98:29, 109:20, 142:2, 146:10 TOLL [5] - 113:6, 128:5, 128:9, 128:13, 128:22 TOMORROW [3] - 158:1, 158:9 TONY [1] - 26:26 TOOK [7] - 13:11, 25:28, 29:29, 63:17, 92:29, 93:28, 133:10 TOOL [1] - 143:2 TOOLS [4] - 59:16, 142:10, 143:17, 143:20 TOP [13] - 16:14, 20:15, 34:3, 114:22, 115:3, 115:24, 115:25, 123:13, 123:25, 124:3, 130:20, 133:23, 134:7 TOP [6] - 133:3, 133:26, 133:27, 134:11, 135:5, 151:2 TOPIC [10] - 3:7, 3:29, 72:12, 79:22, 94:22, 98:3, 106:5, 111:5, 140:20, 155:23 TOPICS [6] - 36:15, 102:23, 137:14, 151:10, 153:12, 153:16 TORTUOUS [1] - 148:26 TOTAL [2] - 119:24, 121:18 TOTALLY [1] - 56:16 TOUCH [3] - 51:23, 70:25, 113:29 TOUCHED [3] - 79:20, 119:21, 141:26 TOWARDS [3] - 22:8, 115:27, 130:20	TOWNS [3] - 33:17, 33:21, 38:1 TOXICOLOGY [1] - 68:3 TRACE [8] - 65:2, 65:20, 66:14, 82:21, 84:12, 145:3, 145:7, 145:10 TRACES [25] - 45:6, 46:28, 47:12, 48:3, 48:5, 48:10, 49:5, 49:6, 50:20, 65:5, 65:12, 65:16, 65:18, 65:25, 66:3, 70:16, 81:8, 82:12, 82:16, 83:5, 83:9, 84:21, 88:16, 99:16, 100:23 TRACK [1] - 73:17 TRADITION [1] - 34:14 TRADITIONAL [1] - 86:1 TRAFFIC [1] - 89:28 TRAGICALLY [2] - 33:24, 34:4 TRAILED [1] - 106:16 TRAIN [1] - 42:6 TRAINER [1] - 88:25 TRAINING [3] - 32:15, 32:24, 73:23 TRAINING [3] - 73:24, 82:18, 138:21 TRAJECTORY [2] - 29:10, 43:2 TRANSCIEVER [6] - 114:23, 114:26, 114:29, 115:18, 117:19, 119:8 TRANSCIEVER S [1] - 119:23 TRANSFERRE D [1] - 119:19 TRANSMITS [1] - 114:26 TRANSMITTAN CE [1] - 68:28 TRANSPAREN CY [3] - 110:15,
--	---	--	---	--	---

149:15, 149:18 TRANSPORT ^[1] - 89:26 TRANSPORT ^[1] - 34:1 TRANSPORTIN G ^[1] - 70:15 TRANPOSED ^[1] - 148:4 TRAVELS ^[1] - 124:7 TRENDS ^[2] - 142:26, 143:3 TRIALS ^[3] - 92:27, 93:3, 93:6 TRIANGLE ^[1] - 126:3 TRIANGULATE D ^[1] - 5:27 TRICKY ^[1] - 146:25 TROUBLES ^[1] - 13:3 TROUGHS ^[1] - 102:10 TRUE ^[4] - 9:3, 9:7, 49:5, 153:23 TRULY ^[1] - 62:12 TRUST ^[3] - 22:18, 131:27, 131:29 TRUTH ^[1] - 47:27 TRY ^[12] - 25:18, 31:20, 43:13, 48:22, 74:28, 104:28, 112:12, 113:20, 119:5, 125:8, 133:13, 144:8 TRYING ^[12] - 14:26, 59:20, 61:23, 66:1, 71:23, 71:24, 93:15, 118:11, 121:8, 123:19, 127:26, 142:2 TUBE ^[2] - 69:8, 69:10 TURN ^[20] - 21:15, 44:18, 46:8, 47:28, 52:6, 56:25, 77:12, 89:14, 92:29, 109:9, 111:5, 113:16, 114:29, 123:22, 128:4, 133:1, 136:29, 144:19, 152:16	TURNING ^[1] - 141:27 TWO ^[52] - 4:18, 8:23, 11:21, 13:17, 13:22, 14:8, 20:4, 23:22, 25:2, 26:3, 26:14, 28:7, 28:13, 30:21, 36:15, 40:15, 47:17, 50:6, 61:22, 63:4, 63:12, 66:6, 66:7, 66:9, 69:5, 69:14, 72:27, 81:19, 81:23, 84:1, 88:28, 90:15, 98:29, 107:1, 113:26, 114:23, 120:16, 124:8, 124:24, 130:27, 131:10, 131:20, 132:16, 133:16, 137:3, 145:3, 151:10, 151:12, 153:12, 153:16 TWO-THIRDS ^[2] - 13:17, 13:22 TWO-WAY ^[1] - 114:23 TYPE ^[10] - 11:15, 66:21, 79:8, 80:15, 82:1, 83:9, 92:9, 112:28, 117:7, 147:3 TYPES ^[12] - 49:15, 68:17, 68:26, 77:21, 80:10, 80:13, 86:16, 87:19, 88:28, 95:11, 95:24, 130:7 TYPEWRITERS ^[1] - 85:25 TYRES ^[1] - 82:29	ULSTER ^[1] - 6:5 ULTIMATELY ^[11] - 12:29, 14:27, 18:20, 22:1, 23:9, 27:17, 28:12, 32:6, 33:8, 56:9, 98:8 ULTRAISTS ^[1] - 9:19 UN ^[1] - 68:7 UNBROKEN ^[1] - 50:10 UNCOMMON ^[1] - 133:19 UNDER ^[5] - 22:29, 66:7, 98:25, 110:10, 156:16 UNDERSTOOD ^[4] - 8:3, 10:24, 18:7, 64:16 UNDERTAKE ^[1] - 142:26 UNFAMILIAR ^[1] - 128:7 UNHELPFULL Y ^[1] - 129:27 UNIONISTS ^[1] - 31:20 UNIQUE ^[7] - 114:2, 114:6, 114:7, 117:19, 117:22, 117:23, 118:1 UNIT ^[2] - 38:10, 71:7 UNITED ^[6] - 26:22, 82:19, 85:10, 95:2, 102:1, 111:24 UNITS ^[3] - 21:10, 25:20, 35:28 UNIVERSITIES ^[1] - 82:20 UNIVERSITY ^[7] - 3:15, 3:23, 3:24, 6:5, 6:10, 89:6 UNIVERSITY ^[1] - 89:29 UNLESS ^[1] - 49:10 UNPACK ^[2] - 8:2, 131:19 UNPARALLEL ED ^[1] - 94:14 UNRELIABLE ^[1] - 150:26 UNTIL ^[1] -	158:14 UP ^[54] - 4:11, 14:25, 14:29, 18:10, 19:22, 22:3, 28:19, 28:23, 28:24, 37:3, 38:3, 43:5, 43:12, 43:17, 50:3, 59:21, 61:19, 64:20, 66:7, 69:9, 71:19, 71:24, 77:9, 83:23, 86:27, 88:1, 90:11, 90:15, 91:16, 93:8, 93:9, 96:2, 96:10, 96:18, 97:19, 101:17, 101:21, 108:5, 115:3, 115:13, 125:16, 125:22, 127:1, 128:5, 134:19, 140:24, 145:1, 148:3, 148:26, 148:27, 150:10, 154:23, 155:5, 157:27 UPDATE ^[1] - 91:13 UPDATED ^[1] - 41:26 URBAN ^[1] - 126:22 USAGE ^[1] - 68:4 USEABLE ^[1] - 141:28 USEFUL ^[7] - 60:25, 69:18, 101:1, 128:18, 136:22, 143:19, 144:16 USER ^[2] - 154:13, 154:20 USERS ^[2] - 153:17, 155:22 USES ^[1] - 148:29 USHER ^[1] - 39:19 UTILISATION ^[1] - 11:2 UTILISE ^[2] - 10:14, 10:17 UTILISED ^[3] - 6:2, 6:4, 6:7 UTILISING ^[5] - 33:2, 37:29, 59:24, 83:15, 85:21	V VALIDATED ^[1] - 108:5 VALIDATION ^[1] - 55:20 VALIDITY ^[2] - 150:12, 151:20 VALUABLE ^[2] - 81:24, 81:27 VALUE ^[2] - 147:8, 147:10 VANS ^[1] - 59:23 VARIETY ^[3] - 3:25, 5:27, 99:17 VARIOUS ^[11] - 45:22, 65:22, 86:16, 87:3, 89:17, 91:13, 103:6, 135:24, 140:12, 140:25, 151:9 VAST ^[2] - 99:22, 143:9 VEERED ^[1] - 9:6 VEHICLE ^[2] - 125:19, 126:18 VEHICLE- BASED ^[1] - 125:19 VERIFICATION ^[1] - 74:17 VERSED ^[1] - 88:4 VERSION ^[1] - 54:4 VERSUS ^[1] - 121:27 VIA ^[1] - 114:23 VICTIM ^[1] - 47:1 VIEW ^[13] - 36:19, 38:17, 64:11, 64:12, 104:19, 142:23, 145:11, 147:19, 149:26, 150:5, 150:15, 150:28, 151:21 VIEWED ^[1] - 153:6 VIEWS ^[2] - 6:26, 45:12 VIOLENCE ^[5] - 8:7, 8:14, 10:9, 19:17, 37:13 VIOLENT ^[24] - 3:11, 3:12, 3:18, 3:25, 4:5, 4:8,	5:29, 7:4, 7:10, 7:19, 7:24, 7:27, 8:16, 8:18, 9:15, 9:20, 10:11, 10:16, 10:22, 12:11, 19:17 VIOLENT ^[2] - 3:16, 6:8 VIOLENTLY ^[1] - 37:7 VIS-À-VIS ^[1] - 103:27 VISIBLE ^[3] - 60:2, 79:14, 79:15 VISITING ^[1] - 54:16 VISUALISATIO N ^[1] - 83:1 VISUALISING ^[1] - 74:3 VITAL ^[1] - 40:3 VODAFONE ^[4] - 131:14, 131:17, 132:13, 144:20 VOICE ^[2] - 89:5, 89:11 VOICEMAIL ^[1] - 155:24 VOICEMAILS ^[3] - 155:29, 157:9, 157:14 VOLUME ^[2] - 6:12, 6:19 VOTE ^[2] - 13:15, 27:23
					W WAIT ^[1] - 57:11 WAKE ^[1] - 154:18 WALES ^[2] - 42:21, 136:1 WALKOUT ^[2] - 13:14, 13:23 WANTS ^[2] - 12:22, 109:6 WAR ^[1] - 34:21 WAS ^[4] - 39:21, 103:1, 103:20, 106:22 WATCHING ^[1] - 111:22 WAXES ^[1] - 83:10 WAYS ^[6] - 54:1, 73:25, 83:12, 83:13, 101:24,

135:24 WEAKENING ^[1] - 28:4 WEAPONRY ^[3] - 19:26, 30:20, 37:12 WEAPONS ^[1] - 30:19 WEAR ^[1] - 49:12 WEBSITE ^[1] - 107:12 WEDNESDAY ^[1] - 158:14 WEEK ^[1] - 107:14 WEEKS ^[2] - 31:7, 48:14 WELCOMED ^[1] - 97:22 WELL-RUN ^[1] - 104:29 WEST ^[3] - 118:16, 124:5, 124:9 WESTMINSTE R ^[3] - 12:17, 17:26, 18:6 WET ^[1] - 88:27 WHARF ^[1] - 25:11 WHATSOEVER ^[1] - 138:10 WHEREAS ^[6] - 7:24, 33:6, 37:22, 49:1, 49:12, 129:18 WHICHEVER ^[1] - 115:5 WHILST ^[1] - 73:7 WHITE ^[1] - 44:8 WHITING'S ^[1] - 34:18 WHO'VE ^[1] - 22:21 WHOLE ^[2] - 53:5, 91:10 WIDE ^[8] - 46:28, 65:4, 66:2, 66:11, 74:3, 76:14, 86:13, 99:16 WIDELY ^[10] - 10:4, 14:9, 29:28, 30:2, 31:13, 67:10, 70:12, 81:27, 82:14 WIDER ^[3] - 119:1, 154:9,	154:28 WIDESPREAD ^[4] - 79:9, 137:6, 140:7, 153:4 WILLING ^[1] - 27:7 WING ^[4] - 12:12, 14:28, 15:6, 15:14 WINGS ^[1] - 16:23 WISH ^[6] - 3:27, 20:12, 39:3, 102:19, 102:20, 105:29 WISHED ^[1] - 133:11 WISHES ^[1] - 41:18 WITHSTANDIN G ^[1] - 110:13 WITNESS ^[6] - 39:1, 39:9, 39:18, 106:9, 106:20, 159:2 WITNESS ^[4] - 39:14, 91:7, 106:16, 157:27 WITNESSES ^[1] - 140:19 WOKEN ^[1] - 154:23 WOKINGHAM ^[1] - 89:27 WONDER ^[3] - 103:17, 106:17, 157:25 WONDERING ^[1] - 76:27 WORD ^[3] - 9:28, 141:21, 149:15 WORDS ^[11] - 109:18, 110:13, 110:16, 117:9, 117:13, 119:22, 124:19, 131:21, 137:26, 138:15, 149:4 WORKINGS ^[1] - 110:16 WORLD ^[6] - 40:12, 43:19, 58:19, 92:8, 97:22, 119:5 WORRIED ^[2] - 78:24, 105:22 WORTH ^[5] - 48:6, 48:16, 49:10, 79:12,	109:24 WRAP ^[1] - 113:20 WRITE ^[2] - 64:8, 91:7 WRITTEN ^[5] - 40:15, 75:29, 80:1, 105:1, 150:4 WRONGS ^[1] - 42:22	Ó Ó ^[2] - 19:4 ÓGLAIGH ^[1] - 30:1
		Y	
		YEAR ^[6] - 25:24, 41:26, 41:27, 102:6, 133:10, 138:25 YEARS ^[20] - 3:28, 4:11, 12:7, 22:3, 42:4, 43:26, 59:9, 61:12, 62:26, 64:2, 80:4, 97:25, 108:1, 108:15, 108:22, 117:1, 128:9, 133:18, 142:11, 144:16 YELLOW ^[1] - 126:3 YESTERDAY ^[4] - 7:3, 36:6, 40:9, 131:2 YIELD ^[1] - 87:14 YIELDS ^[1] - 88:7 YORK ^[1] - 89:6 YOUNG ^[1] - 75:10 YOURSELF ^[4] - 40:1, 105:24, 146:15, 148:26	
		Z	
		ZERO ^[1] - 129:18 ZOOMED ^[1] - 123:24	
		É	
		ÉIREANN ^[4] - 12:15, 17:26, 18:2, 18:19	