



Select Committee on Science and Technology

Corrected oral evidence: Forensic Science

Thursday 24 January 2019

9.30 am

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Members present: Lord Patel (The Chairman); Baroness Manningham-Buller; Lord Hunt of Chesterton; Lord Mair; Baroness Neville-Jones; Lord Oxburgh; Lord Renfrew of Kaimsthorn; Baroness Young of Old Scone.

Evidence Session No. 19

Heard in Public

Questions 214 - 221

Witness

Professor Claude Roux, Director of Centre for Forensic Science, University of Technology, Sydney, and President of the International Association of Forensic Sciences.

USE OF THE TRANSCRIPT

This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.

Examination of witness

Professor Claude Roux.

Q214 **The Chairman:** We are going to make a start. My name is Narendra Patel. I am the Chairman of the Science and Technology Committee. Thank you very much for taking part and giving evidence to us today. We would like to hear from your experiences in other jurisdictions about how forensic science provision to the judiciary is organised in other countries.

Professor Claude Roux: It is a great pleasure and honour to be invited.

Q215 **The Chairman:** If I might make a start, what can the United Kingdom learn about forensic science provision to the criminal justice system from other jurisdictions that you have had experience of in Australia and Switzerland? I know you also represent internationally your organisation. Could you please tell us of your experience and how the UK differs?

Professor Claude Roux: It is a very interesting and difficult question. The first thing I would like to say is that we have to be careful about definitions and what we mean by forensic science provision. There is a tendency sometimes in some jurisdictions, and I am not too sure about your country but it may be the case, for forensic science provision to be seen as a laboratory providing, essentially, an analytical service. Very simply said, it is seen almost as a pure testing facility, where forensic scientists mainly wear lab coats and work in a laboratory. The reality is that forensic science starts at the scene. If we are talking about criminal investigations, we are talking about a crime scene. It is very hard to make sense and answer questions if we do not consider crime scene investigation, because it is the start of everything, and it is where a lot of scientific processes, thought processes and logic occur. In all my answers I will make a big point about that. We cannot talk about forensic science provision without looking at the whole end-to-end process, from the scene to the court.

Having said that, different models are possible for how we do that. My experience is that the interfaces between the field and the lab, and more broadly with policing, are crucial. It is impossible to keep police forces out of the equation. In my observation, features of successful models could be summarised in a few short points. First, forensic science is provided in a non-commercial environment, so it is mainly government based. The provision of services is accessible to the broader justice system, to the prosecution and defence. A main feature of very successful models is where the service is providing genuine expertise and advice, and not a simple analytical service.

Another feature is the need for an adequate workforce in an adequate system. By that I mean a workforce with strong relevant education and continuing training and engagement in research and development. Another feature is scientific culture and quality management that are consistent across the board. In my observation, there is also a need for a strong alignment of scientific and managerial leadership with appropriate representation at senior executive level. If we are talking about the

police, for example, it should be at the chief constable level for England and Wales, because there is a need to make appropriate decisions and have the same batting powers as everybody else in the organisation. Successful models are supported by a strong funding commitment, including the funding of ongoing relevant research, which is best achieved by very strong links between forensic science providers and academia.

You asked a question about Australia and Switzerland. Australia has two very good examples of successful holistic provision within policing—the Australian Federal Police and Victoria Police. In addition to what I mentioned before, the Australian Federal Police has recently introduced a consultancy model between investigators and scientists as well as among specialists within the various forensic disciplines. It is a science-led multidisciplinary enterprise with a problem-solving approach. It is very effective in the early hours of receipt of exhibits. The recovery starts very quickly. There is a single point of contact and there is dynamic access to a range of experts. The collection of exhibits and traces and analysis of items are directed at investigative problem-solving, and it uses the full potential of the intelligence value of forensic science. Even the physical space of the laboratory is designed to maximise interactions between forensic disciplines.

Another interesting and, I would say, successful model for Australia is the Victoria Police. Its forensic science department has 500 staff and is led by an executive director, with the chief scientist's office in charge of research and development and scientific leadership. One thing to note is that in Australia forensic science provision is accredited across the board, including within police and crime scene investigation.

You mentioned Switzerland. Switzerland has small services with strong ties with the University of Lausanne. A main feature is its very strong ties with the academic world and one specific university, including joint appointments. It is ensuring that the science is up to date and the research and development questions are relevant. Obviously, there are big benefits for education, continuing education and training, and there is a strong common forensic science culture across all the stakeholders. Forensic science is seen as a complete discipline, not only as a service using other disciplines, and it provides value-added information from intelligence to the courts and investigations.

One interesting feature in Switzerland is that there is effective use of the general forensic scientist model. General forensic scientists are a bit like a general practitioners in medicine. These people have fundamental knowledge of traces and an understanding of criminal phenomena and they usually attend the scene. There is a combination of academics and scientists in forensic science services and in the field.

A third country I would mention in passing, although I have never experienced working there, is the Netherlands. From my observation, an interesting model, which appears to be successful, is that involving the Netherlands Forensic Institute. The main lab and the police forces are segregated, and the main feature here is that, again, they are backed up by very strong scientific leadership.

The Chairman: Thank you. That was very useful information. Can I now pass on to Lord Mair?

Lord Mair: Thank you, Chairman. You talked about the police forensic science and other laboratories. Can you say something about the private sector and how the forensic science market operates, in your experience?

Professor Claude Roux: That is a very interesting question again. I would start with a general observation. When I was a student, England and Wales held, essentially, the international benchmark. It was the “Mecca” for forensic science. Some 30 years later, my observation from the outside—and I make no judgment here; it is a rational and objective observation—is that it has been an ongoing national crisis and, at this stage, is more of an example not to follow.

I understand the philosophical and ideological dimension to the argument and the discussion here. I will stay away from that as it is not my role. Objectively, when we look at the outcomes of the privatisation of forensic science in England and Wales, from what I observe and what I read, it still could be said that it does not work. Forensic science provision, in my opinion, is not about selling test results or selling products; it is about providing the most relevant, informative and transparent expert advice. When you talk about research and development, it is not about developing products or intellectual property; it is about advancing the science. There is a need for co-operation and co-ordination between all stakeholders—especially providers—including the police, academia and courts. That is all essential. Again, I can understand that it is linked to a very strong commitment to appropriate funding for forensic science provision, training and research.

Lord Mair: Could you clarify whether there are any private sector forensic science organisations in Australia, Switzerland or the Netherlands?

Professor Claude Roux: They are usually small organisations and quite often sole traders. They are in areas of forensic science provision which are more amenable to privatisation, especially some document examination, some drug testing, even some DNA testing. Those are things to which it is relatively easy to apply a costing and a charge, and for which you want some kind of binary—almost digital—examination. When it comes to complex cases or typical analysis of chemicals, chemical traces and so on, in my experience, there are very few, if any, private laboratories.

Lord Mair: Thank you.

The Chairman: I am now going to move on to another question, from Lord Oxburgh.

Q216 **Lord Oxburgh:** From your experience in different jurisdictions, and in Australia of course, do you see any major gaps in scientific understanding which could be addressed by suitably targeted research? Research done in abstract without a particular aim in mind can end up not being very useful. Can you see obvious areas that need more work that could be

done?

Professor Claude Roux: That is a very good question. I am tempted to say there are major gaps everywhere, but let us start with the easy part. As I tried to explain before, forensic science is an end-to-end process, a continuum from the crime scene to court. It may surprise you that the middle bit, which is the traditional forensic science laboratory, is relatively well mastered. As very eminent colleagues have said, it is the easy bit; it is trivial, almost. Interestingly, when you look at research going on in forensic science, a lot of it is undertaken in that space. There is a very simple reason for that: academics need research funding and research grants, and it is an area which is closer to traditional science—or at least, academic science—and it is easier to get funding for. Unfortunately, it is not where the gaps are, so there is a bit of a disconnect.

One area has been emerging, growing and improving recently, not least due to the efforts of my colleague at the University of Lausanne in Switzerland. Despite the community's awareness of the potential of traces beyond supporting decisions in court, forensic science results are still generated and used on a case-by-case basis, as well as in separate organisations. There is the need—interesting research is going on but there are still major gaps—to see how we can use forensic science more effectively and much earlier in an investigation, and for intelligence purposes as well: linking the dots, which is what is difficult, and not simply for analysis.

There are gaps in the fundamental principles, and by that I mean the fundamental principles of forensic science. That was identified in the 1960s by a number of authors and I do not think we have moved significantly from there. It is linked to the need to highlight, understand and agree on the philosophies and logic used in forensic science. I mentioned forensic intelligence and the link to policing and security. These are all very interesting topics where there are gaps.

I am sure an area in which you are most interested is the space around evaluation and communication, and especially the value of evidence in court. There are still major gaps in our understanding of how forensic traces are generated, how they persist, how common they are and what happens depending on different scenarios. There are gaps in research linked to ethics and the effectiveness of forensic science: how effective is it if we apply forensic science in such cases? It is not simply an economic argument. A lot of sociological research linked to criminology is needed.

More recently, there has been the impact of decentralisation and digital transformation. Again, I think there are major gaps in our understanding of what it actually means to forensic science provision. What I am trying to say here is that the research in forensic science must go beyond the technical elements; otherwise, it is very protracted and only feeds this middle bit, which is already relatively well mastered. As I mentioned, we need to do research linked to criminology, to policing, to law and, more broadly, to social sciences.

The research questions usually come out of casework. The translation of these questions into robust valid research requires collaboration with academia. Usually, forensic science providers are not in a position to conduct this type of research, and the extent of the research, on their own, so it is essential for any provider to have people with very strong ties with academia.

There is also a need for an appropriate and relevant research culture at all levels, and a need to be strategic and have a national strategic plan for forensic science research, which should be co-ordinated by an appropriate body. For example, in Australia we have the National Institute of Forensic Science, which has been in operation since the early 1990s. Part of the co-operation and collaboration role of NIFS is to identify an R&D plan—an innovation plan for the forensic science sector. Again, my observation is that there was genuine engagement with forensic science research in the UK when I was a student 30 years ago. I am a bit concerned that a lot of that has been lost, despite the plethora of forensic science programmes you have in your country. Ultimately, the research questions need to be articulated to the decision-makers, because it is the decision-makers who will secure and allocate the funding.

The Chairman: Claude, Lord Mair has a couple of supplementaries.

Lord Mair: In your biography details, you refer to Australia being world leading in research on fingerprinting. Are there any remaining gaps and are the results of your research on fingerprinting being applied elsewhere in the world?

Professor Claude Roux: Fingerprinting is a very interesting topic because historically, it is how forensic science research started in Australia through the Australian National University in the 1980s, in collaboration with the Australian Federal Police. The model was already there in the early 1980s. We have done a lot of research on fingerprinting, especially fingermark detection, in collaboration with law enforcement agencies, especially the Australian Federal Police but others too. We are trying to tackle difficult surfaces. For example, in Australia—and now the UK—we have polymer bank notes. One problem with the polymer bank note is that it is a difficult surface to detect fingerprints on. Traditional methods do not work very well. Many years ago we did a fair bit of research in that space and, given the proliferation of the polymer bank note around the world, our research outcomes have been implemented in a lot of different countries. We have had a very good relationship with CAST—which I understand has changed its name, or there has been a change in the structure in the UK—in the Home Office for many years.

The Chairman: Claude, I am going to ask my colleagues to make their questions short and not give any background because we have key questions to go through. Lord Hunt has one short question for you.

Lord Hunt of Chesterton: When you were reviewing the academic aspects of forensic science, you did not talk about data. My short question is: where is the data stored and by whom? Are academics

developing databanks or is this done by the Government, because that obviously changes when the organisation changes?

Professor Claude Roux: It is a good question but difficult to answer without having a bit of background to understand the context here. From an academic viewpoint, there is now a very strong move toward the need to share publicly the data as much as possible. Because research is publicly funded, there is an expectation that we should share the data with interested parties. There are a lot of different guidelines from an academic perspective as to who has stewardship of the data, on privacy and so on. That is one aspect.

We can deal with research using data that is owned by the forensic science provider in the first place. For example, we have done a fair bit of research in the area of drug intelligence, trying to improve and streamline the value of forensic drug data that is collected by the forensic science lab through the federal police. The data is owned by the AFP, so in that situation we are given the data, and, in most cases, it is some kind of sanitised version to ensure that all the legislation is well covered in terms of privacy, confidentiality and all that. We use the data for research purposes but, ultimately, it is owned by the forensic science provider, which is the AFP in that case. I do not think there is a simple answer.

The Chairman: Thank you, Claude. I am now going to ask Baroness Manningham-Buller to ask the next question.

Q217 **Baroness Manningham-Buller:** Thank you for your answers, which have been very full and interesting. You have touched on what I am interested in in your earlier answers. You have emphasised the importance of science and it being good science, but what is the minimum structure you need to make the connections between the academics and the community who wants this information? You have added the intelligence community to the police and others. What is the minimum you would suggest we need to ensure that information flows properly?

Professor Claude Roux: This is again a very interesting question. I would start by saying that the ideal structure is not common. There are a rather limited number of examples. I mentioned Switzerland and Australia, and more recently there is Quebec, in Canada, and there has been some development in Scotland. There is a need to have a transdisciplinary structure. There is a need for an academic unit. Whether we talk about a centre, a department or whatever, there is a need to understand that there is a discipline called forensic science, and it is not simply a glamorised chemistry or biology department, and it is not simply a glamorised ... **[break in connection]**¹ Do not get me wrong, they are very useful people, they would do fantastic science and they are extremely useful to forensic science, but in my view, this is not enough if we really want to tackle some of the main challenges we now see occurring in forensic science. There is a need for a transdisciplinary

¹ [Glamorised science applied to the forensic context]

structure with a good number of academics, with good vision. These academics must be dedicated and well supported, including by the university, and work in conjunction with forensic science providers. There is no point in doing academic research in forensic science with no strong ties with the forensic science providers. In the successful models I mentioned before, often there is integration—or at least some kind of involvement—of these academics in the governance of forensic science. There is a national body with some kind of committee, and key academic players are invited to contribute to the shaping of the forensic science landscape in that country.

Often there are joint appointments. That is especially the case with my colleagues in Switzerland, in Lausanne, where there are people who have a shared appointment between the forensic science service and the university. That is absolutely ideal for bringing the science up to speed in the practising sector and, at the same time, bringing back very relevant research questions and training issues to the academic institution.

In some kind of ideal vision—and I must admit I have not seen it completely achieved yet, although I think the University of Lausanne is probably the closest to it—I would lean towards a teaching hospital model. In medicine, you have universities linked with teaching hospitals. There are complex cases going to emergency. There is a transdisciplinary consultancy model here. There is training; there is research; there are real cases—all concentrated in pretty much one site or one organisation. That model has worked in medicine for many years, and it has sometimes been mentioned in forensic science. Unfortunately, as I said, I have not seen it completely achieved yet. I am not sure if I have answered your question.

Baroness Manningham-Buller: You certainly have; thank you very much.

The Chairman: Baroness Morgan has a supplementary question.

Baroness Morgan of Huyton Can you help me understand what a successful faculty, department, institute of forensic science is and what the skill set is? Collectively, we have struggled as we have gone through our inquiry with precisely where the boundaries are in forensic science; they are clearly rather porous. What, for you, are the absolutely core elements, and to what extent are you a clearing house or network bringing in other skills?

Professor Claude Roux: Again, it is an interesting question. I am not sure you can talk about a paradigm shift being required. First, there is a need to reconsider the definition of forensic science. By reconsidering forensic science not so much as a service only or mainly for the courts, using all the sciences as an application, but as the science of traces—the remnants of the activities and presence of people—people will gain an understanding of these major forensic science concepts and what it means across the board.

Let me give you an example of what quite often happens when there is a new field or technique coming up. When analytical chemistry grew

significantly, all of a sudden a lot of people started to be interested in forensic science. They started to almost reinvent the wheel, thinking about the value of chemical analysis and how we express that finding. There are all the questions around quality assurance, around the chemical trace, and so on.

We are now seeing the same thing happening with the new digital space. A whole sector of technologists is mainly interested in the technology of the digital space, and there is nothing wrong with that; it is just a question, I guess, of perspective. But without considering these questions within the fundamental forensic science framework and looking at the digital trace as the trace and recognising that as it is—we tend to reinvent the wheel, and we miss opportunities to exploit that new trace effectively. There is a sense of almost reinventing the wheel all the time when something new comes up, because we have not managed to get the major fundamental principles well accepted in a consensual way, pretty much universally. That is probably the first thing to do when we talk about what kind of skill set we need. We need to identify what we mean by, and what we need in, forensic science; then we can then talk about the specialties.

The Chairman: Thank you, Claude; that was very helpful. The next question is from Baroness Neville-Jones.

- Q218 **Baroness Neville-Jones:** Professor Roux, thank you very much for your very helpful answers. I would like to take what you have already said and ask you to broaden out your thinking a little. What would you say were the main characteristics of a culture of innovation in forensic science, which incorporates both technological advance and the basic forensic science research? What would you like to see be its main characteristics? What should the role of government be in creating that kind of attitude to and culture of forensic science?

Professor Claude Roux: That is a very good question. I have already touched base on some of the fundamentals of some kind of epistemological research that is needed in forensic science research and innovation. It is very difficult if we do research only on the technical element. The technical element is very important, but we need to go beyond it and understand how it is linked to the provision of intelligence, of help in an investigation, of evidence in court, to being more efficient, and to the ethics of that. There are a lot of questions across the board, and, again, there is a need for a transdisciplinary approach to forensic science research, otherwise we tackle only a very small part, usually the easy part, and mostly the aspect of evidence in court.

One observation I would make is that when you look at what is published, the efforts, and what people are concerned about, quite often it is about the court space. Do not get me wrong; I am not saying that that should be forgotten and that it is not important, I am trying to say that the vast majority of cases and aspects where forensic science can have an immediate impact on society and security are in the policing and security space.

There is a strong need to see the provision of forensic science not as one player helping security or intelligence, helping investigations or policing, or helping courts, and having it tried in court, but as all that. Again, it is almost impossible to have a helicopter view of all that if we do not have enough academic units that see forensic science as the discipline and not simply as the application of someone else's discipline.

Baroness Neville-Jones: Professor, that is very interesting. Do you see a particular role that public policy should play in creating a culture of that kind?

Professor Claude Roux: It is a question of co-ordination and public policy investing in creating an appropriate body that can pretty much embody the co-operation and collaboration that is needed between apparently very disparate fields. I do not want to be patronising, but the main outcome of some very famous miscarriage of justice cases in Australia in the 1980s was the creation of the National Institute of Forensic Science.

The National Institute of Forensic Science has played a major role in busting the silos between different geographical entities, different culturally diverse fields, different disciplines. It has played a major role in providing a quality environment where we talk about accreditation and certification, and providing a proper framework to form and assist the strong partnerships that are needed between different providers, academia and regulatory agencies.

Baroness Neville-Jones: Is the national institute publicly funded?

Professor Claude Roux: Yes, it is. One thing to understand is that Australia is a federal country, which is sometimes a good thing but sometimes creates some additional difficulties. The NIFS has been publicly funded by police agencies for many years. My understanding is that now it is funded not only by police agencies but by all forensic science providers in government. All different forensic laboratories, whether they are police or not, contribute to the funding of the NIFS.

I am aware that you have the Forensic Science Regulator. My personal view is that at the very least the role of the regulator should be significantly increased and made broader. There are interesting lessons that can be learned from what happened with the NIFS in Australia, and I am more than happy to assist you in making contact with the appropriate people in these organisations if you do not know them.

The Chairman: Thank you, Claude. We are now going to move on. Lord Hunt will ask the next question.

Q219 Lord Hunt of Chesterton: We have heard in written and oral evidence about the value of a sterile corridor between investigators and the delivery of forensic science. To what degree is this achieved in other jurisdictions? In your view, what challenges does having a separation of this nature create and address?

Can I add my own comment? One of the questions we have heard about

is the trend in the last 10 years in the UK for the judge or the chairman of the court to have a better overview of the science being introduced by both the prosecution and the defence and to see that it is properly compared rather than just used in an adversarial way. I would be very interested to know your comments about the role of the judge in that.

Professor Claude Roux: I am not sure I can answer the question about the sterile corridor directly, but I guess that in an ideal world forensic science would clearly be independent of policing, mainly for public perception reasons. **[Break in connection]**² ... some concerns around independence, bias and so on.

But the reality is different. The forensic scientist deals with the police on a daily basis through investigation or they work in a police organisation, so it is difficult to see full and absolute independence. My view is that impartiality rather than independence is crucial. Impartiality can be built into the organisational culture through education and management.

I mentioned trying to make forensic science more effective and have more impact, especially at the early stages, and the increased intelligence value of forensic science. Again, that requires the dismantling of silos and appropriate data sharing, so there is a bit of a tension with the idea of a sterile corridor here.

I am not sure that this goes directly to your question, but if we are talking about whether forensic science should be within policing or completely separate, I guess the advantage of having it within policing is the ability to have forensic science where it can impact in the most effective and timely fashion, as I mentioned, and where it is probably more likely to have an adequate funding stream, although that is not always the case.

Again, the AFP is a good example. Another example is the French National Gendarmerie, which has recently established a facility that comprises three integrated pillars: crime intelligence, crime in the digital environment, and a forensic science laboratory. Again, there is the idea of a problem-orientated approach, where the problem is treated transversally and by combining different knowledge from multiple domains.

I have some reservations as to whether there is a strong sterile corridor in that there is a risk of introducing silos and miscommunications. It is probably a question of having structures in place that favour integration and remove the silos but at the same time can manage the negative aspects of that, and manage the risk appropriately. I have not really commented on the core aspects of that. I am not sure if I am in a position to answer that question.

Lord Hunt of Chesterton: Did you understand my question about the role of the judge? I have seen science being brought by different interests and finally the judge has to explain to the jury how these different areas of science relate to the case. That is relatively new, as

² [It would address]

explained to us by the judges.

Professor Claude Roux: Yes.

Lord Hunt of Chesterton: Would you like to comment on that?

Professor Claude Roux: On that particular aspect, I think that is the job of the forensic scientist. In a way, the expression of the value of the evidence that is presented is what the forensic scientist should be doing primarily. I understand that forensic scientists may come and go for very specific aspects of the case, and it is very rare for one forensic scientist to have a helicopter view of the whole case.

So I can understand that in that case the judge would make these comments, but a good way to deal with cases like that would again probably be to have a general forensic scientist, who can be a sort of maestro of an orchestra. In an orchestra, you have different players playing different instruments. Nevertheless, you have a maestro who understands how the whole thing fits together. I think there is a need to have a forensic scientist in a similar role.

Baroness Young of Old Scone: In the good systems that you have experienced, how do they ensure that the defence gets access to good forensic science?

Professor Claude Roux: Switzerland has a completely different system, as you know. It is an inquisitorial system, so the forensic scientist is appointed by the court and appears as an expert for the court. In that aspect, it is not fundamentally different in Australia from what you experience in England and Wales.

A strong point would be for government laboratories to have the ability to provide forensic expertise equally to the defence as to the prosecution. That happens on a regular basis in Australia where you have another jurisdiction that is involved perhaps to provide expertise in a case where another jurisdiction, the government provider, provides the advice to the prosecution.

Lord Oxburgh: I am slightly surprised that in all the evidence that we have had on this I have heard no mention of CSIRO. Is that just chance, or does CSIRO have no role here?

Professor Claude Roux: It is interesting. CSIRO has contributed to some very focused technical aspects of forensic science research here and there, or in some specific fields. For example, where there is a very strong forensic soil expertise in a CSIRO department, these people would provide some forensic service. Across the board, simply said, it is not a major player in forensic science research or education, or even provision in Australia.

The Chairman: Thank you, Claude. We move on now to the next question, from Baroness Young, who is about to ask you a very important question about digital forensics. You mentioned this earlier, but please feel free to go into as much detail as you like.

Q220 **Baroness Young of Old Scone:** Professor Roux, we are really enjoying

your evidence. It is very useful to us. One of the areas we are struggling with in the UK is digital forensics, where we are being swamped by the amount of digital information that is potentially available and is often not extracted quickly and comprehensively or analysed effectively, and which appears to lie primarily with police services. Could you tell us about your experience in good services and what we should learn from them?

Professor Claude Roux: You are probably not the only ones struggling. This is obviously a major challenge, and for a number of reasons. We have seen the digital transformation of society ... **[Break in connection]**

The Chairman: I am afraid the connection failed here. Are you able to carry on answering Baroness Young's questions? I think most of us can hear you through my iPad.

Professor Claude Roux: I am not sure where the connection dropped.

The Chairman: Start from the beginning.

Professor Claude Roux: I was saying that the digital transformation of society is a major challenge. If you are struggling with how best you can deal with it, you are not the only ones. There have never been so many options and opportunities to get traces of what people are doing and how they are doing it and so on since the advent of this digital world.

The volume of the data, the variability of the sources of the data, the speed, the scope, et cetera, have never been seen before and are exposing some pre-existing challenges that I have already mentioned, such as the need for fundamental concepts and philosophies and it being transdisciplinary and in collaboration and so on, but it is also completely catalysing the need for transformational changes. I gave the example that if you have a major fire or a major incident, you immediately have half a dozen people taking photos and videos with their smartphones.

The nub of the question is how best we can harvest all that information, how it can be combined with other types of information, be it digital or physical, and how it can be exploited and interpreted using appropriate quality management systems. Digital transformation is expanding the scope of forensic science and exploring the challenges faced by traditional forensic science organisations.

There is a need for different types of personnel and different expertise, including investigative reasoning and knowledge, codification, data analytics, forensic intelligence, and the need to incorporate digital traces, or digital forensic science, into the traditional or the normal forensic trace paradigm, otherwise we run the risk of reinventing the wheel, as I mentioned before, and of not being effective in the exploitation of this information.

It is crucial for organisations to design collaborative problem-solving settings that integrate specialists from different disciplines to form transdisciplinary solutions. It is important for everyone—managers, educators, researchers, policymakers—to look beyond the usefulness of forensic results for solving digital investigation and to realise the value of

combining forensic knowledge intelligence for developing broader strategies to deal with crime in a digitalised society. It is a major work.

A few opportunities have already started, at least partially, and they have started to embrace the transformation. They have redefined their processes to integrate and formalise some new functions. One example is the Australian Federal Police. As I mentioned before, it has a digital forensics group, which is accredited within a normal forensic science framework accreditation system.

Also, as I mentioned, there are interesting things going on with the French National Gendarmerie. In that space, I would advise you to speak to my colleague Professor Eoghan Casey at the University of Lausanne. He is a world leader in digital forensics and has a very clear understanding and view on how his discipline relates to and should be integrated within a forensic science framework.

Baroness Young of Old Scone: Do you have a view about how rapidly we are going to be able to use other scientific approaches such as artificial intelligence and more modern ways of handling large volume data to lighten the load, as it were, of the analytical task in relation to digital information that is available for forensic science?

Professor Claude Roux: The line broke up a bit. Can you repeat the question?

Baroness Young of Old Scone: We hear a lot about new techniques in digital data handling that could be beneficial in a whole variety of fields such as artificial intelligence and management of very large databases. How fast do you think that sort of technology is going to be available, useful and developed to try to break the load of this huge volume of information that digital forensics is now facing and is not coping with?

Professor Claude Roux: I see where you are coming from. Broadly speaking, there is data analytics everywhere nowadays, and we talk a lot about big data and so on. It is quite important to have a very clear understanding of what are technological aspects and what is beyond the technology and the technological aspects. Some of the technology, whether we are talking about biometrics and making quick comparisons and quick profiling of large datasets and so on, will increasingly help.

However, it is quite important to realise that it is not a panacea in itself; it is not a magic bullet. It is only a technology, and there is always a very strong need for a very strong forensic science approach to identify the problem and identify the question at hand before we move towards a more technological environment. It is more about how the technology is used to assist with the questions we are trying to answer, rather than the technology itself.

- Q221 **The Chairman:** We are coming to the end of our discussion today, but, and this might be difficult, I would like to challenge you to assist us with our recommendations. The Committee will make recommendations in its report to try to improve the system of provision of forensic services to the judiciary. What should be the key elements of any recommendations

we might make that would contribute to improving the service?

Professor Claude Roux: I feel a bit uncomfortable telling you what you should be doing.

The Chairman: Feel free. We do not mind.

Professor Claude Roux: Transformational changes are needed. It is my understanding that there have been a number of reviews about the situation in your country. From the outside, my observation is that it is going round in circles, and I think there is now a need to push for transformational changes. There is a need to fund and establish a national integrated, impartial, scientific problem-solving forensic science provider, or possibly, at least, to have a much smaller number of focal centres compared to the number of providers that I understand you have in the country at the present time. I mean "integrated" in the sense of integration internally—the maximum possible integration of disciplines, from crime scene to digital forensic—and externally to bust the silos between science and law and between science and law enforcement, and so on.

I would recommend creating an environment where all the forensic science provision is conducted in a quality environment, which means dealing appropriately with accreditation and certification. I understand this is the case for lab providers, but it does not seem to be the case for the providers operating within the police, and all should be included. As an aside, police forensic science in Australia has been accredited for 20 years.

There is also a need to create an environment that includes a very strong partnership with academia, with appropriately funded high-level research and research that is relevant to problems related to forensic science—security, evidence in court and so on. I mention in passing again that my recommendation is either to establish a new body that promotes co-ordination and co-operation and has increased powers and resources, a bit like the role the NIFS had for many years in Australia, or—and it is really your call—to investigate whether the current Forensic Science Regulator could be such a body. In that case, the powers and the resources should be significantly increased and broadened.

Another recommendation that I would make to the Committee if you have the opportunity—I can make the offer here—is to visit some well-performing jurisdictions in Australia. We would be more than happy to facilitate that with some of my colleagues—or even to Switzerland. Again, I am sure you have the right contacts. If not, I am happy to provide them.

The Chairman: We will be on the evening flight, Claude. I am going to bring this session to a close. We are very grateful to you for taking part today. This session has been most helpful. In fact, I am tempted to suggest you might write the report and send it to us in a couple of weeks' time. Rather than us visiting you, perhaps you would consider visiting us. Thank you very much indeed for giving us the time. We appreciate it very much. Goodbye.