

The future of forensic science

The following article is based on a paper presented at the Asia Pacific Police Technology conference by James Robertson BSc (Hons), PhD, Assistant Secretary, Head of AFP Forensic Services Division. (The views expressed in this paper are those of the author alone.)

THIS paper deals with the application of technology to problem solving in forensic science and, in particular, to what information value can be gained from a particular analysis. Thus, while I will touch on what the future might hold for forensic scientists in new techniques, the main focus of my talk is unashamedly on the future viewed from a more philosophical viewpoint.

The present

In order to look to the future it is necessary to ask the question, "Where is forensic science today and what are the real issues confronting its practitioners?"

One only has to look at recent headlines in the print media to gain some idea of these issues.

Faulty forensic testing convicted Maguire Seven

Can we balance science and justice?

Forensic science needs open minds

Revamping the jury system

Forensic science on trial

Call for independent forensic advice

Today there are four major issues confronting forensic scientists:

- organisational structures
- independence
- jury/adversarial problems
- standards.

Organisational structures

No two States in Australia have identical organisational structures for their forensic services. Only two States, South Australia and Victoria, have laboratories which offer a comprehensive service in an integrated facility. Changes to existing structures are being considered in most, if not all, of the remaining States. Specifically, a new Forensic

Biology Institute is planned for Queensland where the police forensic areas are also undergoing rapid civilianisation. A review committee is currently considering the future organisation of forensic science laboratories in New South Wales and the NSW Police Service has recently completed a major review of its physical evidence or crime scenes group.

In predicting the future, I feel that it is highly improbable that any unified approach will emerge in Australia along the lines of the Home Office system in England or the RCMP system in Canada. The federal nature of Australia and the different histories of the States work against such a system developing. Each jurisdiction will make up its own mind what works best. There seems little doubt, however, that there is general agreement that forensic science laboratories should be independent of other agencies involved in the legal system such as the police, the Directors of Public Prosecutions or Attorneys-General Departments.

For example, I understand that in NSW the proposed Forensic Science Institute will answer to an independent authority. In South Australia, however, State forensic science is part of the State Services Department.

I have long held the view that an ideal model would be for forensic laboratories to be associated with a university in a symbiotic relationship. The university would receive rent for premises, and have access to scientific research with a social value. The forensic laboratories would benefit from being part of a larger group with access to library facilities, expertise and equipment which might be too expensive, or its use too infrequent to justify purchase by the lab on its own. Staff would also be able to form co-operative links with academic staff, students would be available for projects and so on. The poten-



Dr James Robertson

tial benefits could be enormous.

Having said all that, I manage a forensic division within a police agency: the Australian Federal Police. The forensic laboratory in Victoria is also part of the Victoria Police. The Metropolitan Police laboratory in London is one of the most respected forensic laboratories in the world and the Royal Canadian Mounted Police (RCMP) also have a highly respected series of forensic laboratories. Does this mean that all these organisations are wrong? In my view the answer is a definite 'no'. I base my opinion on the experience of almost 10 years in academia, five years in State forensic science in South Australia, numerous court appearances as a defence witness and now as a manager within the AFP. In my own Division, the benefit of being part of a police department is that we have carriage of the complete forensic investigation: from the crime scene examination to the completion of the scientific examination.

The key to making this arrangement work successfully is having appropriately qualified people in the right positions. The introduc-

tion of a unified workforce to the AFP has been a key factor. Police members and staff members have virtually equal pay and conditions, issues which can otherwise cause problems in police departments between sworn officers and civilians.

The importance of clearly defining the roles and responsibilities of each group in the Division cannot be overstressed. People need to understand what part they play in the overall investigation. When it works well, I believe it is an organisational structure which is difficult to beat. There is, however, the argument for independence.

Independence

The independence of forensic scientists, both individually and in organisational structures, has been widely questioned. The aim of any credible service agency is to provide objective advice which can be relied upon by the courts. How to achieve that at the organisation and individual level is the challenge. It might be argued that a forensic area within a police service can never be independent. I would dispute this assertion. It is an easy criticism to make against the police that their investigations are sometimes less than even-handed and open-minded. I will not present the evidence for or against this assertion, but it is nonetheless my firm view that the police are far less guilty of these shortcomings than would be the view of some players in the adversarial arena. Police are easy targets for criticism. This is not to diminish in any way the need to maintain an awareness of the potential to be less than thorough, even-handed and open minded. Working from within, however, it is possible to influence the way in which our colleagues think and act.

It is not my purpose to sell the AFP model versus any other model. What is important is to enunciate the need for forensic scientists to face up to the criticisms that they are in some way lackeys of the system and acknowledge the fact that unless they take a more public stance to defend themselves, those perceptions will become self fulfilling.

To borrow from a document produced by the AFP's Intelligence

Division, information has four elements: fact, opinion, rumour and inference.

It seems to me that many of the facts about forensic science, as espoused by non-forensic scientists, are based on ill-informed opinion born of rumour, tardy analysis and inference. In a recent editorial in *Science* titled 'The willingness to risk failure', the author concluded: "A willingness to accept the risk of failure is one of the costs of leadership and therefore, the price of all success."

Forensic scientists, indeed scientists in general, have not been noted for taking risks in entering philosophical debates on issues which affect their lives. Most of the

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'opinions', the erudite statements, are made by the 'other' players in the game. My hope for the future is that as a community we can find a more effective voice to balance the books.

To return to independence: within an adversarial system I believe that, wherever the forensic organisation 'sits', defence lawyers will remain reluctant to have their work done in a government laboratory. I'd like to see a laboratory which is completely independent of any prosecution work, perhaps as part of a university teaching department. I'm encouraged that an undergraduate program is planned to start in 1993 at the University of Technology, Sydney under Professor Bob Breakspeare.

Jury/adversarial problems

Much debate has centred around the adequacy or inadequacy of the jury to understand scientific or expert evidence. Some commentators have gone as far as to say that 'the resolution of scientific disputes must be

taken out of the courtroom'.¹

There has been much talk of miscarriages of justice and forensic scientists being castigated for errors. Certainly there is no room for a complacency from forensic scientists. In fact, there has been very little response at all from forensic scientists — another example of the profession not tackling the hard issues and (in my opinion) a lack of leadership in our senior ranks. One way or another, as a group, we must find a way of making a meaningful contribution to this debate.

My own view is that the jury system is capable of dealing with scientific evidence. However, forensic scientists do need to look hard at their skills in presenting scientific evidence in court; the court aspect is, after all, what makes one a forensic scientist as compared to any other kind. I suspect, perhaps unfairly, that too many of my colleagues do not see going to court as a major aspect of their work.

There are many reasons why mistakes may occur in court. Forensic science is only one side of the equation — very much the small part. Kevin Borick, president of the Australian Criminal Lawyers Association, commented in a letter published in the *Weekend Australian* (26-27 October 1991) that these reasons include:

- complex and confusing laws
- outmoded procedures
- inadequate professional training of judges and lawyers, and
- an underfunded legal aid system.

Perhaps if the legal fraternity was better informed and educated in forensic matters, scientific evidence would be dealt with more effectively in court with less chance of jurors drawing the wrong conclusion or attaching the wrong weight to the evidence. It is up to all of us to try and make the existing system work better.

Having had some very limited exposure to the inquisitorial approach with court-appointed experts, I'm not persuaded that the solution lies in a non-adversarial approach.

Standards

The key to solving many aspects

of the problems I've raised lies in this final issue of standards.

What does the future hold?

It doesn't take particularly astute observer to work out that in the next few years forensic laboratories will move towards accreditation. State Forensic Science in South Australia have set the example by successfully gaining accreditation from the American Society of Crime Laboratory Directors (ASCLAD). Other laboratories will follow. The ASCLAD system looks at quality management. The National Association of Testing Authorities (NATA) in Australia also has a broadly based program which tests quality systems based on ISO9000 series guidelines. It may be that a model incorporating the two systems will be developed in Australia.

The value in this approach is that it tests the whole of the organisation and its demonstrable commitment to its staff and to standards. It does not necessarily follow that the laboratory will be doing the most appropriate tests or that individual workers are competent. These issues need to be addressed in other ways. Two other groups will play important roles in addressing these issues: the Special Advisory Groups (SAGs) which exist under the mantle of the Senior Managers Australia and New Zealand Forensic Laboratories (SMANZFL) group and the soon-to-be established National Institute of Forensic Sciences (NIFS).

NIFS has the potential to influence in a highly positive way the development of the subject across the board from the police technical level to the forensic science laboratory.

The issue of accreditation of individuals, especially those operating outside major laboratory systems, is a more difficult matter. There may be a role here for a professional body such as the Australian and New Zealand Forensic Science Society. However, I think this is some way in the future. The 'profession' has a considerable need to develop further before it takes on the issue of accreditation.

A final contributor to standards is of course education. In the AFP we have made a major commitment to training and education.

Through the ACT Technical and Further Education College (TAFE), an Associate Diploma in Applied Science/Forensic Investigation has been established. Many police services are well under way in introducing similar initiatives. The future must see a greater degree of professionalism for police technical officers.

One word of caution against this optimistic view. Increasingly, the staff of forensic laboratories are becoming more and more specialised. The introduction of DNA has meant that a degree in molecular biology is almost a prerequisite for entry to the biology section of larger laboratories. The role of the generalist has decreased in recent

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years. It is hard to argue against this. Certainly today's scientist needs to have an in-depth knowledge of his or her subject and perhaps it is now impossible to keep a broad base of expertise. However, I think it fair to say that there is a much narrower set of skills available in laboratories today than 10 or 20 years ago. I doubt this is beneficial in the long term and I hope that decision makers have the foresight to ensure a balanced view on staffing. Once skills and knowledge are lost, they are difficult to recover. Many forensic skills are like rare species, still existing in isolated pockets, but under threat of extinction.

Conclusion

I have attempted to look at the future from what I perceive to be the issues to be addressed by the forensic community in the next 10 years. I think there is much about which we can be positive and optimistic.

New technologies and improved instrumentation will continue to

emerge. Forensic science usually has a lag period before these are adopted. This is to be expected, given the conservative nature of the legal arena. In the past, the lag period has been too long. We need to be quicker to recognise potential applications to forensic problems. We also need to be able to carry out research aimed at helping us to interpret what analytical data means.

Above all, forensic science is an information subject. The power of technology has far outstripped our capacity as a subject to fully utilise the data available. DNA is a very good example. The major approach currently being used in laboratories involves the use of so called single locus probes. The potential discrimination offered by this approach is enormous, with figures of one in several million often quoted. There has been considerable discussion in the scientific literature and in the popular press regarding the issues surrounding the use of the data. However, assuming the analysis is beyond criticism, the fundamental difficulty has been in presenting these figures in court, where arguments have centred on population genetics. For this and many other compelling reasons, the single locus approach will be replaced by the application of polymerase chain reaction (PCR) technology. The results produced on analysis of the DNA produced by PCR are much simpler to interpret and present in court.

As a practitioner subject, there is never the time to fully analyse or collate the information we need to properly answer the questions which have bearing on the weight and significance of issues. If forensic science is to fulfil its potential, we must marry the superb technology available, which is opening up access to increasingly sophisticated data, with our ability to make sense of it in our reports and in court.

The future is challenging. It will require leadership and commitment and the willingness to risk failure.

Reference

1. J. Lloyd in Talking Point, *New Scientist*, p. 2, 21 September 1991.