

AFP enters Space Age in fight against drugs

PROFILE

Dr Malcolm Hall has an impressive list of qualifications as a scientist. He graduated from Melbourne University with Bachelor of Science, Master of Science and Doctor of Philosophy degrees. He added to these studies with a post-graduate Diploma of Administration from the Canberra College of Advanced Education. Dr Hall joined the Commonwealth Police Service as a civilian in 1971 and has worked in that capacity ever since. He is currently seconded



to the Scientific Research Directorate of the AFP. In 1974 he visited New Zealand for a year as an Anzac Fellow and studied Forensic Science.

He is a Visiting Fellow at the ANU and has been offered an honorary appointment at the University of Adelaide. He has published an impressive list of papers and articles on forensic science, information processing, drug abuse, equine veterinary physiology and latent fingerprint development techniques. Dr Hall is married and has three children.

by Sen. Const. Barbara Andrews

AFP may soon use satellites to detect Cannabis crops. A leading researcher in this field, Dr Malcolm Hall, predicts that our narcotics officers could be using satellites for this purpose within two years. Dr Hall sees this prospect as a major breakthrough for the authorities in their growing battle against illicit drug use in Australia. He explained that till now Police have had to rely mainly on tip-offs to help them locate Cannabis crops. But once satellite detection is perfected there will be no need for Police to wait for informers to come forward. Thirty-five-year-old Dr Hall, who is currently administering the AFP Scientific Research Programme, says computers would be used to sift through the information relayed from satellites 800 kilometres above the earth.

Dr Hall explained; "Once a 'signature' for a Cannabis crop is determined for a given set of environmental conditions, the computer can then be trained to apply that information to an area of 185 square kilometres at a time, and to identify within that area other locations which possess the same spectral characteristics." Dr Hall, who joined the Commonwealth Police Service as a civilian in 1971, is proud of AFP's role as the only Police force in Australia to operate a scheme like the new

contract Forensic Science Research Programme.

He outlined 'Platypus' the projects within the Programme, which had been wholly endorsed by previous Conferences of Commissioners of Police. Four of the projects are being conducted at various Universities throughout Australia, one is being held at a State forensic science laboratory and the other is being run in conjunction with the Department of Defence.

The projects are:

1. Speaker Identification and Authentication of Tape Recordings
2. Latent Fingerprint Development Techniques
3. Remote Sensing in Law Enforcement
4. Detection Techniques of Explosives
5. Investigation of Arson
6. Forensic Odontology and Mass Disaster Victim Identification

Dr Hall explained that often in legal cases the forensic science expert is required to express an opinion as to whether two or more physical evidence specimens have common origin. The examination of such physical evidence for the purpose of origin determination is often an exercise in shape and

pattern recognition, and this is an area where computers are becoming increasingly involved. This was outlined in a paper which he presented at the Digital Equipment Computer Users Society meeting in Canberra about eighteen months ago.

Research into speaker identification is currently being undertaken within Canberra. However, speech is variable, unlike fingerprints which do not change significantly throughout life. Factors such as age, mental state, medical conditions, fatigue and drug usage can affect the speech patterns, which are known as spectrograms. The use of computers in this area enables a more readily identifiable speech pattern to emerge, whereas otherwise it would probably not be identified. Australian research has shown that so-called "voice-prints" are not reliable and Dr Hall said he wishes that use of the term would be discouraged. The use of "voice-prints" in law courts has had a varied history in the United States, but had never been admitted in any Australian legal case until 1977.

Computers are being used to validate and authenticate tape recordings of interviews and the like, which could be the subject of dispute in legal proceedings. Tape

recordings are being used more frequently by police, and in conjunction with the provisions within the new Criminal Investigation Bill, police may in future be compelled to make routine use of tape recordings during all interviews.

At the moment it is not possible to determine whether a tape has been skilfully edited even when using computer technology. However under some circumstances, tampering can be detected. Dr Hall showed me printouts, or spectrograms, which had been used to detect a break, or editing point in background hum lines. Other sounds which had been "dubbed" over the editing were also visible on the spectrograms. This indicated that an attempt had been made to disguise the tampering.

Computers can also be used to improve the intelligibility of some poor quality tape recordings which contain interference of a particular type.

The same basic computer system can be used for fingerprint enhancement. Latent fingerprints left at crime scenes are often fragmentary and image processing offers potential for assisting the fingerprint examiner in identifying some points of identity in the print than is usually possible. I was shown an image taken from a blurred print. The computer had been able to reduce this blurring and some points of identity were therefore made clear and identifiable. Re-

search into fingerprint techniques which could well include the use of lasers, is likely to be undertaken at the ANU in the near future.

Apart from using computers for fingerprint enhancement and tape recordings, the same procedure can be applied for de-blurring of photographs, comparison of handwriting and matching striation marks on bullets and arising from tools.

The AFP is taking the initiative in these fields within Australia and is only the fourth law enforcement-related agency in the world to be getting involved in this scientific area. The other agencies are the FBI, the West German Federal Police and the UK Home Office Scientific Development Branch. Aspects of the AFP computer system are comparable with those of the other agencies and it is envisaged that in the future information could be readily exchanged. "The West Germans are currently the most advanced in image processing work", said Dr Hall. He is hoping that the AFP 'hardware' will be completed within the next two years.

Detection of explosives and investigation concerning suspected arson are two other areas in the Programme along with Forensic Odontology — an area which includes mass disaster victim identification. Dr Hall is hoping to establish an internationally-standardised chart for identifying bodies through teeth.

Other methods of identification along these lines involve the use of

highly-refined TV equipment. This entails superimposing a photograph of a possible victim over a TV picture of the skull — an "electronic mix". By using this method it is now possible to make a positive identification within an hour or so, instead of days. This technique was developed by police and scientists in Adelaide.

Dr Hall admits it would be extremely difficult for the forensic scientist to be an expert in all the areas covered by the Programme. The scientist's task is now made easier in the UK and Australia by the use of a computer-based literature system which includes over 12,000 scientific references and is operated by the UK Home Office Central Research Establishment in England.

A related data system is the Register of Human Toxicology, also operated by the Central Research Establishment, which incorporates data on drug or poison levels identified in human organs. By using the AFP's Australian Forensic Science Information Service, scientists in Australia and New Zealand can have access to this data. The Service transmits enquiries via telex to the Central Research Establishment, which interrogates the data base and identifies any suitable papers which have been published on the subject. Dr Hall has handled over 150 such inquiries in the last two years and more than half of them related to toxicology in one form or another.

DOGS GNAW TYRES OFF SQUAD CAR

Two pit bulldogs were in custody in the Santa Clara County Animal Shelter, charged with chewing the tyres off a Sunnyvale police car while an embarrassed policeman was trapped in the car.

Patrolman Rubin Grijalva didn't want to talk about his encounter with the 35-pound dogs — Lady 3, and her son, Isaac, 2.

Bill Manley, an animal control officer, had to stop laughing to discuss the scene he was called to one Sunday morning recently.

"There was this patrol car in the middle of the intersection with its

red lights on and it had one flat tyre in front, with a hubcap lying in the road, and two pit bulls chewing on the back tyres and I saw all the tyres go flat. The officer (Grijalva) could not get out of the car.



"When he got out of his truck", Manley said, "the dogs ran toward him. I hollered at them and they ran away into a yard".

He went to the house adjacent to the yard, knocked on the door and was greeted by the owner of the

dogs, Noel Alfare, 17, who said he had no idea the dogs were loose.

"They're friendly dogs", Alfare said. "They just don't like uniforms".

According to police reports, officer Grijalva had been cruising in Sunnyvale when he saw the unleashed dogs, got out of his car to look at them — and was chased back into his car.

After the dogs were chased away, Grijalva had to wait until other patrol cars arrived and contributed their spare tyres.

Alfare was cited for allowing his dogs to run about without a leash. The dogs are being held until Alfare pays for the tyre. — San Francisco Chronicle.