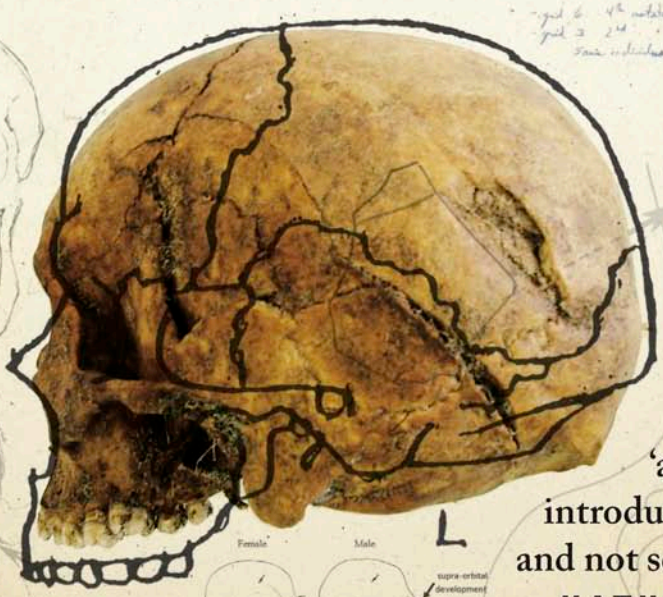
Missing & Murdered

A personal adventure in Forensic Anthropology



'a fascinating introduction to old, and not so old, bones'
— KATHY REICHS

Alan G. Morris

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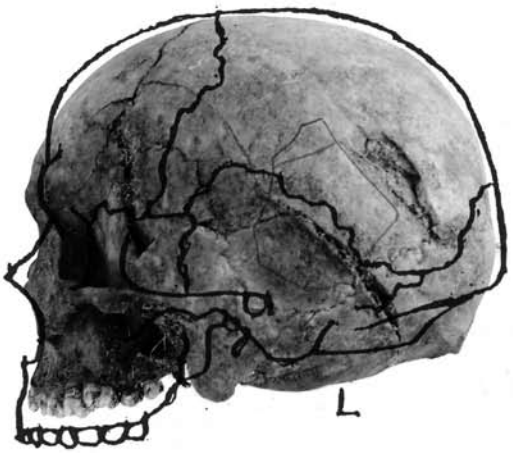
A PERSONAL ADVENTURE IN
FORENSIC ANTHROPOLOGY



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ALAN G. MORRIS
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List of Abbreviations

AAFS: American Academy of Forensic Sciences
AFAT: African Forensic Anthropology Team
AFIP: Armed Forces Institute of Pathology
AI: Amnesty International
ANC: African National Congress
ASSA: Anatomical Society of Southern Africa
BBC: British Broadcasting Corporation
CO^2: carbon dioxide
CSI: Crime Scene Investigation
CSU: Crime Scene Unit
CT: Computed Tomography
DJD: degenerative joint disease
DNA: deoxyribonucleic acid
DSO: Directorate of Special Operations
EAAF: Argentine Forensic Anthropology Team (Equipo Argentino de Antropología Forense)
FARC: Forensic Anthropology Research Centre
FBI: Federal Bureau of Investigation
FORDISC: Forensic Discriminant Analysis Program

FPS: Forensic Pathology Services
GNC: Griqua National Conference
IDASA: Institute for Democracy in South Africa
LODOX: low dose digital X-ray
LSA: Later Stone Age
MK: Umkhonto we Sizwe
MPTT: Missing Persons Task Team
mtDNA: mitochondrial DNA
NMB: National Museum Bloemfontein
NMC: National Monuments Council
NMHM: National Museum of Health and Medicine
NPA: National Prosecuting Authority
PAC: Pan Africanist Congress
Pebco: Port Elizabeth Black Civic Organisation
PCLU: Priority Crimes Litigation Unit
PCR: Polymerase Chain Reaction
PMI: postmortem interval
SAHRA: South African Heritage Resources Agency
SAP: South African Police
SAPS: South African Police Service
STR: short tandem repeat
SWAPO: South West African People's Organisation
TB: tuberculosis
TMJ: temporomandibular joint
TRC: Truth and Reconciliation Commission
UCT: University of Cape Town
UN: United Nations
UNESCO: United Nations Educational, Scientific and Cultural Organisation
USSR: Union of Soviet Socialist Republics
UWC: University of the Western Cape
Wits: University of the Witwatersrand

Introduction

This book is not a textbook on forensic anthropology. While I discuss some anthropological techniques, I have avoided technical jargon as far as possible, as I would like the forensically uninitiated to understand and enjoy it. There is some anatomical and medical discussion from time to time, but I promise not to bury anyone in detail prematurely.

There are, in fact, relatively few textbooks on forensic anthropology. The 'bible', Krogman and İşcan's *The Human Skeleton in Forensic Medicine*, is still the best technical book on the subject, but it is dense with detail, outdated in some areas and too rigid in interpretation in others. Other books, such as White and Folken's *The Human Bone Manual* and Blau and Ubelaker's *Handbook of Forensic Anthropology and Archaeology*, are more accessible but tend to be very anthropological.

There certainly is room for a new text for undergraduate university students, one that contains many pretty (and pretty gory) pictures, but that is not what I wanted to write.

One of the reasons that there are so few textbooks on the subject is because the practice of forensic anthropology is very much

experience-based. Each case brings its own complexities and analytical procedures, and nothing is more valuable than the experience of the anthropologist. You can learn only so much from a book.

So what *did* I want to write? There are two things that I aimed to put across to my readers when I started writing this book. Firstly, I wanted to convey some impression of the experience of forensic anthropology from a practitioner's perspective, but I didn't want it to be purely a list of interesting cases. I wanted this book to reflect my experiences as a teacher, anthropologist, archaeologist and forensic investigator. It is very personal because that is the nature of the subject.

I have written about cases in which I have been involved and those that have influenced my thoughts on forensic science and anthropology, but I've aimed to go beyond the clinical cases. Thirty per cent of the cases that are brought to me by the police are archaeological and don't involve anything more than a brief report to the investigating officer so that he can close his file and move on to the next inquiry. The investigating officer may have lost interest in the old bones in question, but I remain fascinated by them. The methods I use when working with skeletonised human remains all come from physical anthropology and its specialised subdivision, skeletal biology. My own training is much closer to 'bioarchaeology' than it is to forensics. Although forensic anthropology is grounded in the sciences of anatomy and medicine as applied to the law, it cannot survive without an understanding of the nature of history, politics and social anthropology. In this book I do not hesitate to delve into all three when the occasion demands it.

Secondly, in this book I wanted to describe the nature and importance of forensic anthropology in southern Africa. I know that I run the risk of making the book too 'local', but I hope that not all readers will see it that way. Nearly all of the forensic anthropological research that has been published to date is by European or North American authors. Their work is very valuable: much of

it is ground-breaking and a source of wonderful information that is universally useful. But the experience of the practice of forensic anthropology is *not* the same everywhere. Human biology differs from region to region, and techniques that work well in Boston may not be applicable in Botswana. Laws and cultures also differ and, although the nature of police work and the gathering of evidence might be the same everywhere, the interpretation of the data may vary in different locations. There is almost nothing published about this from an African perspective.

In the context of forensic anthropology, South Africa is unique and can contribute to this field of study. Of critical importance is the depth of human presence on the continent. We have evidence of the remains of people who were alive tens of millennia before the ancestors of the modern North American First Nations set foot on the coastal plains of Alaska. At least a third of living people in Cape Town can track directly their own lineage back through mitochondrial and Y-chromosome DNA to forebears who lived in southern Africa a hundred millennia ago.

But such antiquity, although of interest in anthropological science, is of relatively little use in the practice of forensic anthropology. Much more important is the modern dynamic in South African society, which offers us a workshop of humanity that is rarely paralleled in other places. Capetonians proudly call their town the 'Tavern of the Seas', where mariners have stopped for over 300 years to obtain fresh supplies, rest in the lee of Table Mountain and weave their genes into the fabric of Cape society. Some came willingly as traders and settlers, while others were brought here against their will as part of the slave trade. In downtown Cape Town you will meet people whose ancestors hail from Batavia (now Jakarta) on the Indonesian coast, or Ceylon (Sri Lanka) or southern China. Their ancestors could be from the Hook of Holland, the villages of Cornwall, the principalities of Germany or the shtetls of Lithuania.

Some of our forefathers came in the holds of Portuguese or

Dutch slave ships from the Congo or Madagascar, while others arrived as free men from Bechuanaland or the Transkei as navvies needed for the industrial growth in the first half of the twentieth century. Still others came as Royal Navy 'Kroomen' – African sailors recruited from the Ghana coast by the Royal Navy in the nineteenth and early twentieth centuries – or as traders from the teeming lands of India and Pakistan via Durban and Johannesburg. And all of these people have mingled with the descendants of the original Khoekhoen (or Khoikhoi, historically referred to as 'Hottentots') and San, who lived in the region long before any of the 'foreigners' had ever heard of the Cape of Good Hope. This dynamic flow and intermixing of people is the reality of South African society.

This story alone would make southern Africa special, but our recent history, much of it unpleasant, has added other issues that have an impact on forensic anthropology. South Africans today are still celebrating the great events of 1994, which gave rise to a democratic society for the first time in our history, but the events of our past have not been erased by the political transformation.

We are still a society obsessed with race and racial identity, even if few of us really understand the meaning of biological variation. Even today we tend to cluster according to the groupings defined and separated during the years of apartheid. There is undeniably some progress towards a unified society, but the vast majority of us still see our identity in terms of 'white', 'coloured', 'Indian' and 'black' South Africans. This is not a biological classification but a 'folk' taxonomy or vernacular naming system based on biology and overlaid by culture, language, religion and history.

You might ask whether the practice of forensic anthropology is any different here from what it is overseas. Isn't crime the same everywhere? Surely murder is murder and it doesn't differ between the Cape and London? In fact, it is not different. The evidence of death is the same, but the context is local. We live in a society where

it is easy to become invisible. Bureaucratic records are incomplete and many people here actually hide from bureaucracy. Therefore, when an unknown skeleton turns up (something that probably happens at least half a dozen times a month in South Africa), we don't have an easily manageable database to match with missing persons' records. Add to this the thousands of our fellow Africans who cross our borders undocumented each year and it becomes obvious that identification of unknown bodies is a special problem for South Africans. We are also a relatively under-studied population. Forensic anthropology standards of bone growth, maturation and variation are well documented for the populations of European origin, but there is far less information available for Africans.

In addition, we have particular local twists to murder. Favourite weapons in the rural districts include the knobkerrie, a knobbed stick of hard wood, and the panga, a broad-bladed bush knife. One of my first observations on the cadaver collection of skeletons when I was a student in Johannesburg was a deeply depressed skull fracture with a thin longitudinal depressed trough leading away from the frontal bone – the very clear mark of a knob and its shaft. Even more amazing was that the skull bones had healed, telling me that the poor man had survived the attack and lived on to die of something else later.

Politics and social beliefs are also local issues. We have the infamous 'necklace' of the apartheid years, when cooperation with the apartheid state could earn you a horrible death from having a burning tyre placed over your head and shoulders. Long after the end of apartheid, we now have the task of finding those who were killed and disposed of secretly by the apartheid state and the liberation armies. And we have the horror of muti murders, which deserves a chapter of discussion in its own right.

So these are the things I write about in this book. Call it a personal adventure in forensics. It is part text, part case list and part story. Above all, it is set in Africa and the experiences are South African.

I need to ask one last question: Why should I have written this? Who am I to wear the crown of forensic anthropology? I did not train as a forensic anthropologist; in many ways I fell into the field rather than followed a worn pathway. I arrived in South Africa as a freshly picked postgraduate student in January 1975 to study physical anthropology under Phillip Tobias in Johannesburg. In Canada, where I had spent my undergraduate years, this would have meant joining a Department of Anthropology, but at the University of the Witwatersrand (Wits), it meant working in anatomy in a medical school. The core knowledge was anatomical, but with Professor Tobias at the advisory helm, it could not stay that way. Anatomy intersected with fossil man, human variation, archaeology, social anthropology and politics. And every so often it overlapped with forensic medicine.

Yaşar İşcan, one of the pre-eminent figures in American forensic anthropology, has written about the rise of forensic anthropology as a discipline in the United States. He tells us that, in the early years, anthropologists filled an advisory role as anatomists and weren't recognised as forensic experts. A critical issue in the development of the science was the growth of large collections of human skeletons assembled for research by these anthropologists. Two collections in particular, the Terry Collection, originally in St Louis but now in Washington, and Cleveland's Hamann-Todd Collection, became major resources for sex, age and race determination of skeletons.

It was only after the creation in 1972 of a Physical Anthropology section of the American Academy of Forensic Sciences (AAFS) that things began to change. With the official recognition that physical anthropology had a role to play in forensic science, the forensic anthropologist changed from being an *advisor* to being an *authority*. No longer was the forensic anthropologist simply an anatomical 'fundi' who gave advice to pathologists; he became a specialist in his own right.

Although we are at least thirty years behind the United States, the same kind of process has occurred here. In the past, the training of forensic pathologists rarely included much information about skeletonised human remains, so when a 'bone case' appeared on the gurney, the pathologists frequently turned to their anatomical colleagues for help. All of my anatomical predecessors have assisted in this way and many have developed a great deal of expertise. Ron Singer published a very important paper in 1953 that showed how the cranial vault sutures (the joints between the flat bones of the skull) did not fuse like clockwork and that age estimations based on cranial suture closure were unreliable. In the same year, the young Phillip Tobias in Johannesburg wrote a paper on the problems of racial identification of human skulls. The paper outlined the very issues that we continue to struggle with today.

The earliest published paper I can find on South African forensic anthropology was published in 1948 by Matthew Drennan, a professor of anatomy at the University of Cape Town (UCT). Drennan was an obvious pick for the task. He had published a book on physical anthropology in 1930 and he was well known as an anatomist with an anthropological bent. Drennan had joined forces with the senior government pathologist in Durban to identify the remains of a body burnt beyond recognition in a car discovered on a country road near the city. Together, the pathologist and anatomist confirmed that the body was that of the late Michael Wolkersdorfer, a German immigrant, and they found solid evidence of cranial fractures that showed his end to have been no accident.

Drennan would never have called himself a forensic anthropologist. He was a classically trained anatomist who simply applied his knowledge of human osteology to forensic problems. All of the anatomists in South Africa did the same thing when requested.

Of greater importance in the development of forensic anthropology in South Africa, though, is the fact that we followed the

American lead by creating research collections of human skeletons. The largest of these, the Raymond A. Dart Collection in Johannesburg, has over 3 000 individual skeletons from cadaver dissections, and it has eclipsed in size the Terry Collection in the United States, on which it was modelled. These collections have become seedbeds for research on human variation, and this has opened up research on forensic questions.

Three institutions in South Africa have developed a tradition of skeletal biology research. The most important has been the University of the Witwatersrand under the influence of Raymond Dart and Phillip Tobias.

In the Department of Anatomy (now called the Department of Human Biology) at the University of Cape Town, some physical anthropology was a focus of research under Matthew Drennan and Ron Singer, but this has expanded with my involvement since the 1980s.

The third institution is the University of Pretoria, which has developed into a school of anatomical excellence with a forensic flavour under the able leadership of Maryna Steyn.

Maryna is the first of the anatomists/anthropologists to have made the move to forensic anthropology as a separate discipline from skeletal biology. Under her guidance, the University of Pretoria has launched a full slate of forensic anthropology research and invited forensic specialists of the calibre of Yaşar İşcan and Steven Symes to visit and share in research projects.

But one significant problem has prevented the full development of a forensic speciality in anthropology in South Africa: until recently, only a person with a medical degree was legally entitled to sign a postmortem report. A scientist, no matter how knowledgeable about pathology, could not hang out a shingle as a 'forensic anthropologist' because the state perceived the discipline of forensic anthropology to be a special division of pathology, and therefore

demanded a medical degree as a minimum requirement for qualification. Only Maryna's department has been able to bridge the gap, because she is clinically qualified, but even her students faced this problem if their only qualification was the research PhD degree.

Unlike the United States, where change came in the form of professional recognition by the AAFS, the change in South Africa was unheralded and occurred at the stroke of an administrative pen. Under pressure from forensic pathologists, the Department of Health began to recognise this new kind of clinically allied creature in 2006 and 2007. As a result, students in the Departments of Anatomy in Johannesburg, Pretoria and Cape Town are starting to call themselves forensic specialists instead of anatomists, and those who are graduating with higher degrees are now taking on official roles as forensic anthropological scientists.

Important in this development has been the creation of the Missing Persons Task Team (MPTT) by the National Prosecuting Authority (NPA). They have been charged with finding the bodies left over from the apartheid era, and they have drawn heavily on students who have been trained in Cape Town, Pretoria and Johannesburg. This bodes well for the future and I am pleased to be part of it.

I started this long-winded talk about anatomists and forensics to explain why I am the person to have written this book. Certainly Maryna and her team in Pretoria have completed more cases than me. The part of my work that fills me with the most pride, however, and the part that I believe qualifies me in some measure to have authored this book, is my teaching work and the group of students to whom I have taught the skills necessary to become forensic anthropologists. This is especially true of those who have passed through my office in the past half a dozen years or so. We have examined new cases, worked with the police in the field, argued about anatomy and pathology, and had a terrific time doing it. I suspect that I have learnt almost as much from them as they

have from me, although they have attained the degrees. In the end, it is the students who will build the field of forensic anthropology in the future, and I hope to leave a legacy of forensic anthropology through them.

1

The Role of the Forensic Anthropologist

We need to start right at the beginning by defining the role of the person we call a forensic anthropologist. This should be straightforward, but it isn't. The catch is not in the anthropologist part, but in the forensic qualifier. 'Forensic' simply means 'pertaining to the law' and comes from the Latin word *forum*, which was the site in ancient Rome where court cases were heard. The forum was a place for robust debate (including the occasional knifing, like the incident that ended the career of Julius Caesar) but overall it would not have been very different from traditional courts in our own southern African context.

Two villagers have a dispute about a cow and the case is brought before the local headman in the designated court space – the *kgotla* in Setswana or the *imbizo* in isiZulu. This is not just a convenient spot under a tree, but a formally designated location. When the *kgotla* is in session, there are rules to be obeyed. The complainants each have a turn to tell their side of the story and the debate might go on for days if the issue is important. The chief, *nkosi* in isiZulu or *kgosi* in Setswana, acts as a judge, making decisions based on the advice of his *indunas*, his lieutenants or assessors. The *nkosi* has the

power to invite other parties to join the discussion. These are expert witnesses – perhaps an old man who has memories of similar disputes in the past, or maybe someone who knows something about the markings on the cattle of the herds in the district.

This is no different from the South African court system. We have a judge (the *nkosi/ǂgosi*) and assessors (the *indunas*) who make the final call based on the testimony heard from both the complainants and the expert witnesses. The major difference is the addition of advocates, who act as official speakers in the court (the *ǂgotla/imbizo*), managing the testimony and supporting one specific view or other.

The forensic anthropologist is clearly one of the expert witnesses in this system. Sometimes we use the general term 'forensic scientist' to represent all of these expert scientific witnesses, but this is not technically correct. In my opinion, there is no such thing as a forensic scientist. There is only a scientist with knowledge of a specific field who, when called as an expert witness, gives his or her opinion about that subject in the court. Many scientific specialists can contribute to the legal debate: psychologists, demographers, geneticists, entomologists, physicists, chemists, archaeologists, toxicologists and pathologists, and even zoologists and botanists if the discussion involves rare or valuable animals or plants. There are even a few experts who are knowledgeable about several of these fields and come very close to being undifferentiated forensic scientists. Each of these authorities has a different expertise, but what they share is the approach to the presentation of their information to the courts. Each needs to be able to explain technical issues to non-specialists and each must also understand legal procedures.

In theory these expert witnesses are neutral, presenting the scientific facts so that the court can make an informed decision, but our legal system, unlike that of the traditional courts, is adversarial and the expert witness may be called by either the prosecution or the defence. This does present potential conflict. Although the facts

are always the facts, a scientific witness called by the defence may concentrate on the unreliability of the data to sow doubt, whereas the same witness if called by the prosecution could emphasise his skill of observation in order to enhance the reliability of the data. This becomes critical when the case is being built on circumstantial evidence. The bottom line is that our expert is a specialist whose primary job is explaining his or her field of knowledge to the court.

Forensic anthropology is a specialist field that deals with the evidence that can be gleaned from human remains – both hard tissue in the form of dry bones and soft tissue in the form of dried flesh from desiccated or mummified bodies. The basic knowledge is of the anatomy, in particular the understanding of skeletal biology in humans as seen by anthropologists. The anthropologist who has specialised in skeletal biology understands a great deal about the growth, ageing, structure, function and variation of bone. The last-mentioned aspect of variation is something that makes anthropological understanding of anatomy different from that of clinically trained pathologists. Variation is studied not just as differences between individuals, but also as differences between populations and between species. The medically qualified pathologist focuses on the study of disease and the causes of death, but once decomposition of the body has advanced to the stage where organs are unrecognisable, the anthropologist steps in. When the body is down to bones, it is the anthropologist rather than the clinician who is better qualified to deal with the evidence.

Although the roots of forensic anthropology have grown from the anthropological study of skeletal biology, the application of this knowledge has become highly specific. Whereas the skeletal biologist working on the skeletons from an archaeological site will be interested in all sorts of questions about the ancient population, including historical demography, health issues and patterns of human behaviour, the forensic anthropologist restricts his or her

inquest to only two key issues: the identification of the individual, and the evidence that relates to the events at death. The forensic focus also requires a different analytical viewpoint. The anthropological approach examines as many individuals as possible in order to quantify the range of variation within the group. It is inherently statistical in its analysis. By contrast, the forensic approach works with single individuals and uses statistics far less frequently. This difference may not seem terribly important, but it has major implications when the two approaches cross swords over racial identity and racial identification. But more of that later.

Not only is the anatomy of the bone important, but also the events that have led to the preservation of that bone. The archaeologists and palaeontologists call this the study of 'taphonomy'. It embraces the evidence of death, and the accumulation and preservation of bones over time. Forensic anthropology has borrowed this knowledge and applies it directly to forensic questions. Forensic anthropologists therefore speak of four taphonomic periods in relation to a dead individual: the antemortem period, which covers all of the time before the death of the person; the perimortem period, which is around the time of death; the postmortem period, which includes the time between death and discovery; and the post-recovery period, which includes the process of recovery, analysis and storage of the bony evidence. Each period provides different contexts for inquiry.

During the antemortem period, the skeleton records its own details of growth and development. These can be used to develop a biological profile of the individual and help in securing identification. The perimortem period is obviously important because it includes the events and cause of death, but the postmortem stage is significant as well because it gives the time context of the crime by revealing information about the postmortem interval (PMI). In the archaeological context, the post-recovery period seems the least valuable, but the forensic context demands a careful accounting of this too. Each and every event after the discovery needs to be

recorded as part of the 'chain of custody' so that there are no questions about the data when the case is discussed in court.

As mentioned earlier, forensic anthropology is a relatively new field. It has been recognised only for the past thirty years or so, but it has become incredibly well known to the public in recent years as a result of the popularity of television programmes such as *CSI: Crime Scene Investigation*, *Silent Witness*, *Da Vinci's Inquest*, *Cold Squad*, *Waking the Dead* and *Bones*. I must admit that I enjoy watching programmes with anthropological or forensic themes. It is even more fun when the central hero is an anthropologist or a forensic scientist of some sort and he (or she) is able to bring superior knowledge into play to solve the crime or unravel the mystery. Indiana Jones is great, but I would have him arrested and shot for destroying archaeological sites if he were a member of my university department. I am sure that other archaeologists around the world feel the same way about Indiana Jones's predilection for site destruction, but that doesn't stop them wearing Indiana Jones–style hats and *Raiders of the Lost Ark* T-shirts as standard field attire.

I know that these programmes are only make-believe, but sometimes the characters do the most amazingly unscientific things. I watched in disbelief a couple of years ago when the 'professor' in the English television series *Primeval* reached down and counted the ribs in order to identify the sex of a skeletonised body that had been dispatched by a prehistoric creature. Come on, the guy is supposed to be a palaeontologist! Counting ribs doesn't identify sex. What misinformed writer managed to get that into the screenplay without the knowledge of the scientific advisor?

It would be laughable if it were only television, but you would be surprised to discover how much forensic and anthropological knowledge is being passed to the lay public by such sources. The American forensic specialists are starting to call it the '*CSI* effect' after the forensic science drama *CSI*. Now anyone who has a

television set, goes to the movies or reads a good detective novel thinks he or she knows more about forensic science in general and forensic anthropology in particular than many of the practitioners in the field! The *CSI* effect is actually a dangerous phenomenon, because few of these media-educated investigators know much about solving crimes, and even less about the science that forms the backbone of investigative techniques.

The *CSI* effect causes problems by creating the misconception that forensic science can solve crime as quickly and as definitively as it is done in television crime shows. Not only that, but it creates the impression that scientific data are absolutely infallible. The public is therefore developing the unrealistic expectation that forensic science can solve all questions quickly and fully. In addition, no idea of the real cost of the tests and the time involved is given. Frequently the investigation, laboratory work and police interrogation all happen at the same time in these programmes and are carried out by the same individuals. The *CSI* investigator finds the evidence, analyses the data and interviews the suspects in just a day or two. This makes the stories dramatic and entertaining, but not very much like real life. The reality involves different teams of people and potentially long periods of investigation before a suspect is even identified, let alone interviewed. Certainly in South Africa a forensic pathologist will be brought out to a crime scene, but it is a rare occasion for a forensic *anthropologist* to be called out to the site of a crime.

In April 2009, the British Broadcasting Corporation (BBC) decided to film an episode of *Silent Witness* in Cape Town. The story was written by an English screenwriter who set the episode in the Western Cape. The producers really did want to get it right – Professor Lorna Martin, the head of forensic medicine at UCT, and I were asked to look at the script with a view to identifying any places where the story departed from what really would happen in modern South Africa. The plot involved the excavation of the

skeletons of six anti-apartheid activists who had been murdered by the security police some twenty years before, so there were plenty of skeletons for me to enthuse over. There was also plenty for Lorna to examine, as the story had a sub-plot involving people-trafficking and several scenes were set in a mortuary.

There was indeed a scene that I believed to be problematic. It concerned the use of lead 210 for the dating of the skeletons. The technique is a new one and it evaluates the amount of radioactive isotope lead 210 in human bone. This is a common (and harmless) isotope found in the air that has a short half-life of only twenty-two years. Since the half-life is the time it takes for one half of the original material to decay into something else, it is perfect for measuring periods of time of less than fifty years or so, and therefore has the potential accuracy to identify the time of death to within a year.

Rain washes the radioactive lead out of the air and the lead lodges in the soil. It is eventually taken up by plants and passed on to animals and humans, who eat the plants. However, not all plants pick it up at the same rate. Peanuts, coffee and seafood are all preferential lead 210 hoarders, so if a diet is heavy in these foods, there will be a higher lead 210 value in the tissues and biochemistry, which will indicate that a person is much younger than he or she really is. From the forensic perspective, the lead 210 analysis will show that this person died five years earlier, but in reality he or she has been dead for ten years. This will make a mess of the investigation. So, if we don't know a person's diet, we can't standardise their lead values and the date of death will be unreliable. The technique is still being refined and very few forensic laboratories use it.

Despite my concerns, the producers of the show decided to keep the scene in anyway. They showed a central character, Nikki, literally taking a bone sample and putting it into some kind of gadget that read out the lead 210 value. It made a great scene, but it was plain wrong.