**The Third Year**

The third year concentrated on pathology, chemical pathology, forensic pathology and microbiology.

Pathology lectures were predominantly given by Professor James Thompson, the very intimidating head of the department. He had a loud voice with a Scottish accent. His most intimidating feature was the bushiest eyebrows I have ever seen. They looked like handlebar moustaches and tended to flap when he frowned or moved his eyes. He was a stickler for people being on time; those who were late for his lecture never entered the room, they were so intimidated. He started with very basic concepts of inflammation and then reviewed other systemic diseases, then cancers and then lastly diseases that involved each organ system.

As part of pathology we rotated in groups through the post-mortem room and reviewed fresh pathologic processes firsthand. In some afternoons there were discussions in small groups in a large pathologic museum which contained a few hundred specimens in formalin containing glass or perspex containers. Within the alcove between the shelves of specimens were books containing commentaries corresponding to the specimen. These commentaries gave short descriptions of the patient’s symptoms and signs as well as a description of the specimen. I spent a lot of time in this museum and studied every specimen. While doing so I came across my father’s specimen of a carotid chemodectoma. He was not identified but the clinical history was recognizable to me. When I was a scholar in East London about 400 miles away a lump had been noticed in my father's neck. The local surgeon operated on my father, but when he explored his neck, he was hesitant to resect the tumor given the intimate relationship of this tumor to the carotid vessels – the tumor was lying between the internal and external carotid artery. He closed the neck of my father and then traveled with my parents to Cape Town where the current famous head of surgery Professor Jannie Louw, resected the tumor and arranged for it to be placed in a specimen jar. At the time of my father's operation I was too young to appreciate the gravity and consequences of this operation but in retrospect now realize that my father could have lost his life during the surgery. One of the most difficult decisions in surgery is knowing when not to operate. I am grateful that the local surgeon recognized his limitations when he exposed the tumor and did not proceed.

During my study of these specimens I was struck by the cardiac specimens particularly those showing heart valves and congenital defects. Every student held the bottled specimens containing the hearts of Louis Washkansky, who died 18 days after the first heart transplant performed by Christian Barnard. His old heart was in a clear, formalin containing container next to the transplanted heart. The old heart was large and dilated and the scarring and thinning of the ventricle was obvious. The new heart was much smaller. The anastomoses joining the chambers of the heart were striking – there were black silk sutures spaced regularly a cm apart. Next to Washkansky’s hearts were the hearts of Philip Blaiberg, Chris Barnard’s second heart transplant patient who lived 18 months before dying of chronic rejection characterized by diffuse coronary atherosclerosis; the pretransplant heart looked like Washkansky’s, dilated and scarred. The sutures of the transplanted heart, present in place far longer than Washkansky’s transplanted heart, were covered with a thin film of tissue – they had become incorporated into the heart tissue. The coronary arteries had been opened and it was obvious the vessels were narrowed and diseased. This heart demonstrated features that we now know represent chronic cardiac rejection. A paper describing these facts, the first paper describing chronic cardiac rejection, had been written by Prof. James Thompson[[1]](#footnote-1); later I would coauthor a paper where descriptions of the coronary arteries of 43 patients having a transplant were documented[[2]](#footnote-2). The native heart of Philip Blaiberg that was excised and which I studied in the pathology museum room featured in a widely distributed photograph of him holding his own heart. The caption describes him as being the first patient to hold his own heart in his hands.

The heart placed in Blaiberg, the one that he held in his hands, came from a 24-year-old colored man called Clive Haupt. The fact that a heart from a colored man was placed in a white person provided fodder to those journalists wishing to include the apartheid angle. Peter Younghusband’s story published in the London Daily Mail went along the following lines: ‘Clive Haupt’s body will be buried in a segregated cemetery, in the non-white section, but his family will draw consolence in that the heart will be buried in a white man’s grave, the closest that he will get to becoming a first-class citizen.’ The irony of the situation was that the heart in fact ended up in a formalin containing jar to be studied by generations of medical students.

Afternoon group rotations in pathology also involved histopathology, the examination of tissue samples under a microscope. Like the anatomy classes of histology, we had a box of about 100 numbered slides. We were taught to recognize the characteristics of common types of cancers and other pathologic processes.

Towards the second half of the year there were lectures in Forensic pathology and Medical ethics. We were taught the law with respect to referral of patients – there could be no suggestion of quid pro quo or fee splitting.

Medical jurisprudence in relation to South African law was carefully reviewed. The formulation of these laws was well-done. The intricacies of consent were discussed; consent could be obtained from a patient if the patient was a major (over 18 years). If younger, consent needed to be obtained from a parent. This rule did not apply to teenagers who married before 18 years – they were then considered as majors. If a person could not give consent this needed to be obtained from a close relative; if not able to be found, the medical superintendent of the hospital needed to be contacted to provide consent.

The Children’s Act also defined our actions if the parents refused consent in the circumstances where a procedure was necessary to save life or, if inpatient hospitalization was necessary. The Act was clear – we were to act in the child’s best interest and could detain in hospital or operate, after contacting the local magistrate, on a child without the parent’s consent.

The Anatomical Donations Act had been operative for some time and facilitated the first heart transplant by Chris Barnard. Other countries did not have these laws that stated that the patient was dead when a physician determined it (they avoided the issue of brain death, but this concept was acceptable in South Africa).

Dealing with medical evidence was elaborated upon. If a bullet or foreign body was removed and handed to an investigating officer, the object needed to be carefully defined, marked, if possible and then a chain of possession created of the transfer. The receiving officer needs to sign for the object and a copy of this document kept in the record. The same situation exists for blood alcohol specimens which need to be placed in special tubes containing potassium oxalate and sodium fluoride (to prevent metabolism of the alcohol within the blood). And, do not forget that in taking a blood alcohol specimen one cannot use an alcohol wipe or any preparation containing alcohol to clean the skin before doing the venipuncture.

We were taught how to examine and document a patient who had been raped. This was important as in rural areas of the country the medical doctor was often also the local district surgeon who did post-mortems when there was suspicion of unnatural death or had to examine people suspected of driving under the influence of alcohol, or who had alleged rape. Like most student’s, alcohol consumption, particularly at weekends was common. I remember that it was generally safe to take one drink an hour. Gruesome slides of murders illustrated the talks on homicides.

Rotation to the police mortuary in Salt River was an eye-opener. The mortuary was about a mile away from the Medical school. It was here that we saw the carnage and the dregs of Cape Town Society and where we saw the impact of apartheid. By this stage of our careers we had seen a fair number of postmortems, but these were of patients dying naturally; here were those who had died violent deaths or were found in circumstances where homicide was a possibility. There were two refrigerated rooms containing the bodies and we were told that on Mondays they were often overflowing with corpses. Sometimes when the carnage was particularly gruesome, refrigerated trucks, to cope with the excess of corpses, were brought in and parked in the courtyard. Within the dissection rooms were about 10 dissecting table and lying on each was a corpse. Some of the causes of death were obvious. I recall one corpse with portions of windshield lying within his open chest. Similarly, a bullet wound to the head was an obvious cause of death, but the direction of the bullet tract and whether powder burns were present were important to the investigating police. All these facts had to be carefully documented.

We were taught how to date the age of a fetus, which is important when considering whether the death would be termed a still birth versus an abortion. In South Africa the defining period was 28 weeks. The pathologist makes an incision across the heel of the foot and depending on the development of the foot bones an estimate of intrauterine age can be made. We had to be able to differentiate a still birth from a death occurring after birth – death after birth will be associated with air in the lungs; the still born will have no air in the lungs. The age of an adult was determined in a rough manner based on the calcification of costal cartilages. How to differentiate whether death was due to drowning and whether drowning occurred in salt or fresh water – in saltwater drowning the sodium and chloride levels in the right and left heart are widely different.

It was also important to determine the time of death. To make this determination, the temperature of the corpse, the degree of post-mortem lividity and rigidity were clues. Examination of the stomach could give clues to the contents of the last meal and how empty the stomach was.

The corpses that had been found days after death were especially difficult to examine and record. The smell associated with these corpses was often horrific and many of these postmortems were done outside in the open courtyard.

All Medical students found forensic medicine fascinating. We were being directly exposed to a world previously only found in detective novels. The greatest impact that these visits had however was the unwrapping of apartheid. To be frank my upbringing and many of my colleagues was very protected. We had been brainwashed by the current government to accept that ‘separate, but equal’ was acceptable. The University of Cape Town was regarded as being one of the most liberal universities in South Africa and most of us believed that our thinking was liberal. I had even taken part in demonstrations, but it was largely a case of being involved with one's peers.

The visits to the police mortuary in Salt River brought home the horrors of apartheid. Why? The simple obvious fact on visiting this institution was not the stimulation afforded by the large numbers of cases of interesting forensic pathology, but the overwhelming fact that 90% or more of the corpses were black. Most of the trauma that resulted in death was due to violence amongst the blacks themselves; but it was the social circumstances forced onto their lives that resulted in the violence.

It was also very apparent to me, based on the large numbers of corpses that many of the deaths would not be investigated in depth, and that many murderers would escape justice and could possibly murder again, simply because of the sheer volume of cases. The attitude of black on black violence being a feature of black society, because of the frequency of trauma and death, pervaded the thinking of those supposed to investigate and deal with the crimes committed. The policemen, directly exposed to the carnage described, tended to denigrate black society because of the violence that they saw. Unfortunately, they participated in and perpetuated the underlying societal problem of apartheid. It is no wonder that the police force was reviled during apartheid.

Chemical pathology lectures were largely given by Professor Kench. The course was very comprehensive and concentrated on the biochemical changes that took place with certain hereditary and congenital biochemical conditions – called inborn errors of metabolism. About 20% of the course dealt with diabetes and its effects. It was only later when aware how common diabetes is that we realized why there was this emphasis.

These lectures were largely didactic, but over time we could draw a steroid ring and could tell which missing enzyme was responsible for which illness.

Microbiology involved the study of organisms causing disease. We were taught about DNA and RNA viruses; diseases cause by Rickettsia (tick bites) and protozoa. Hepatitis C had not been defined; for us it was termed non-A, non-B hepatitis. We were taught the lifecycle of malaria, amebiasis, different helminthic diseases (worms) and schistosomiasis (Bilharzia). Tuberculosis was common and appropriate emphasis was placed on this disease.

In the laboratory our first experiment was taking a throat swab form each other and smearing the swab over a slide and then agar in a petri dish. To my horror on looking under the microscope I noted diplococci staining Gram negative. These characteristics are seen with *Neisseria gonorrhoeae*. I could not imagine having gonorrhea. When the organism had been grown on the petri dish and analysis of the response to exposure of the organism to different sugars etc. had been done, I was relieved that what had grown was a commensal mouth organism of the Neisseria family, *Neisseria catarrhalis*.

During our laboratory experience we were exposed to basic laboratory procedures, of how to grow organisms, identify them and to determine the sensitivity to different antibiotics. This entailed growing the organism on agar plates and then placing antibiotic impregnated disks on the surface. A zone of inhibition of growth indicated sensitivity; the larger the zone, the more sensitive the organism was to that antibiotic. It was fascinating to plate an agar plate and then the next day visualize varied colonies of organisms growing. Tuberculous organisms were slow-growing organisms and were grown on Lowenstein Jensen medium which was colored malachite green; the malachite-green inhibited growth of other organisms. We were taught how to differentiate streptococcal strains. Streptococci species are broadly grouped into alpha and beta hemolytic organisms (there are now further subgroups), depending on the changes the growing organism makes to a blood agar culture plate. The beta hemolytic streptococci for example cause hemolysis, or rupture in the red blood cells surrounding the growing colonies, resulting in a clear area surrounding the colonies. The alpha hemolytic streptococci cause oxidization of iron in hemoglobin molecules within red blood cells, giving it a greenish color on blood agar. The disease most caused by an alpha hemolytic streptococcus is community acquired pneumonia; that from a beta hemolytic streptococcus is a sore throat. Similarly, the gram stain differentiates two large groups of bacteria, into gram positive staining purple and gram-negative staining pink. The difference on a quick stain can give a rough idea of the type of organism and help in planning appropriate antibiotic therapy.

One lecturer, Arden Forder was extremely popular. His lectures were extremely humorous. He gave descriptions of where failure of basic cleanliness in restaurants and even hospitals resulted in epidemics of infectious illnesses.

1. Thompson JG. [Atheroma in a transplanted heart.](https://www.ncbi.nlm.nih.gov/pubmed/4187996) Lancet. 1969;2(7633):1297. [↑](#footnote-ref-1)
2. Rose AG, Viviers L, Odell JA. [Pathology of chronic cardiac rejection: An analysis of the epicardial and intramyocardial coronary arteries and myocardial alterations in 43 human allografts.](https://www.ncbi.nlm.nih.gov/pubmed/25990519) Cardiovasc Pathol. 1993;2(1):7-19.  [↑](#footnote-ref-2)