The Formative Years of Nuclear Medicine in Victoria

John T. Andrews

Nuclear medicine is defined, and its development as a specialty in Victoria from the 1940s to the 1990s recorded, with the developing use of radioisotopes in investigations and treatment. The combined efforts of medical, scientific, and technical personnel is emphasised, together with the advances in instrumentation and radiopharmacy. The formation of the Australian and New Zealand Society for Nuclear Medicine is outlined, together with the training of medical and technical personnel, and some of the political issues in the establishment of the specialty.

This paper presents the development in Victoria of a medical specialty that was new to Australia. Similar developments were occurring in other states and New Zealand, with Sydney an early leader. Nuclear medicine was already well established in the United States but less so elsewhere except for some units in the United Kingdom and Europe. The interest of medicine in the new field arose from the ease with which physiological measurements could be made with radioisotopes, and to the fact that images could be made with non-invasive techniques. Some lesions could also be localised more easily and targeted with radioisotopes, if necessary.

Nuclear medicine uses radiations emitted from radionuclides administered as unsealed sources to assess function, to image specific organs, and to treat certain diseases. Procedures include routine clinical diagnosis and treatment, as well as research techniques. The nuclear medicine department thus undertakes the major clinical uses of radionuclides, with medical, nursing, technical, and scientific staff.

An important principle is the use of as little radionuclide (the minimum amount of radiation) as is necessary to obtain

the maximum amount of information. In contrast, therapeutic doses direct a high dose of radiation from a source to the lesion. In either case, the dose is related to the type and energy of the emission and the half-life of the radionuclide.

Sealed radioisotopes had been used in treatment for many years before nuclear medicine developed as a specialty, for example: radium isotopes sealed in needles, plaques or seeds in carcinoma of the cervix. This contrasts with unsealed sources given orally, intravenously or by inhalation in nuclear medicine, which was first used in the 1930s.

The Beginnings

The discovery of ^{131}Iodine (^{131}I) and ^{32}Phosphorus (^{32}P) in the late 1930s was important in the development of radioisotopes in medicine but World War II delayed their introduction and availability until late in the 1940s. An exception was the use of ^{32}P supplied by an American scientist from the US Army in 1944 for nineteen patients in Queensland. During the 1940s ^{131}I and ^{32}P were used in diagnosis and treatment. The Geiger counter was the main monitor. Radioisotopes became generally available in the 1950s and advances occurred with the introduction of scintillation detectors, the tagging with radionuclides (^{60}Cobalt-labeled vitamin B12), labeled red cells in blood disorders, and manual organ scanning techniques introduced in Australian hospitals to localise lesions. Further major imaging advances were developed in the United States; Veall and Vetter wrote in 1958: 'the progress in radioactive instrumentation is so rapid nowadays that one can always feel sure that something a little better is going to be available in a few months' time.'[1] This has been borne out by the steady advances in instrumentation and radiopharmaceuticals such as: the first automatic rectilinear scanner (B. Cassen, University of California, 1951), the first gamma camera (A. Anger, University of California, Berkeley, 1964), and the introduction of ^{99m}Technetium (^{99m}Tc) into clinical practice (Harper, 1964). The adoption of these advances led to nuclear medicine becoming established as a medical specialty.

The Early Period in Victoria

Far-sighted clinicians used radioisotopes for many years before nuclear medicine became a distinct discipline. Radiotherapists treated thyroid cancer and polycythaemia, endocrinologists diagnosed and treated thyrotoxicosis, haematologists performed red blood cell studies, and medical and biological research workers used the new techniques. Work was done at major hospitals and also the Baker Institute.

At The Royal Melbourne Hospital R. Kaye Scott, a long established radiotherapist, pioneered the use of radioiodine in diagnosing and treating thyroid disease in 1948. Referring physicians were K. Fairley and W. King,[2] and Kaye Scott was assisted by physicist T. H. Oddie initially, and later by K. Clarke. The radiographer was Miss J. Milne. The team later moved to the Peter MacCallum Clinic, and their work at these hospitals was influential in the adoption of radioisotope techniques both in Victoria and elsewhere.

R. Kaye Scott was aware of the potential of radium as he

Image 1: R. Kaye Scott. (Courtesy of the Peter MacCallum Cancer Centre.)

was the son of a Melbourne doctor who used it to treat skin lesions including cancers. In 1928 he became the first full-time radium officer at the Melbourne and St. Vincent's Hospitals. He travelled extensively in the pursuit of further knowledge, and developed radiotherapeutic techniques. He was widely regarded as a fine clinician and teacher, and was also an accomplished musician. He was a founding member of the Royal Australasian (now Australian and New Zealand) College of Radiologists, serving as its president and also as warden. Thus he became the founding director[3] in 1951 of the new central cancer hospital—the Peter MacCallum Clinic (PMC), named after the distinguished professor of pathology at Melbourne University.

The PMC used ^{131}I in thyroid cancer, ^{32}P in polycythaemia, radiogold (^{198}Au) in malignant effusions, and radiostrontium (^{85}Sr) later to localise bone metastases by surface counting (before automatic scanning equipment was available). The second director, W. P. Holman expanded the radioisotope unit

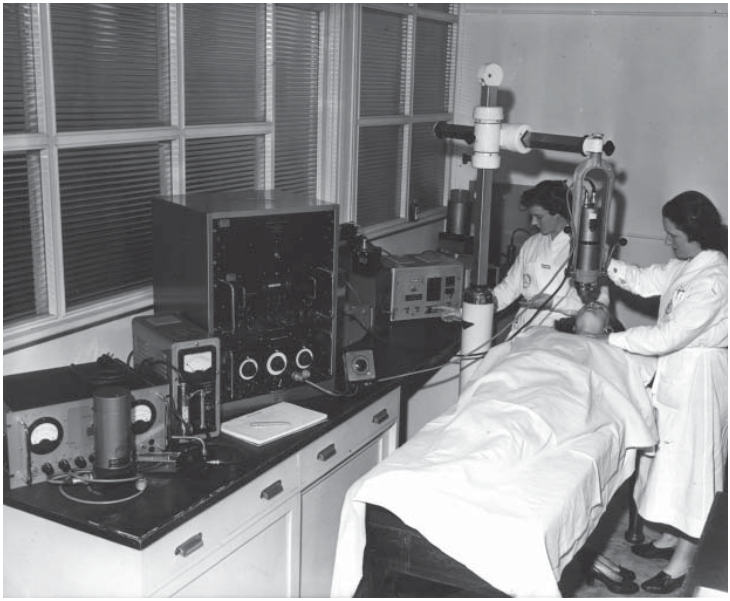

Image 2: Jean Milne with a thyroid probe at PMC. (Courtesy of the Peter MacCalum Cancer Centre.)

with the aid of the physicists and technologists led by J. Milne. Later R. N. McCartney undertook the technical development of the unit.

In 1966 the first rectilinear scanner from the UK started operating at PMC and the American 'Picker' scanner at RMH. Similar equipment and several brands of scanning equipment later became available and were installed in other departments. Static organ imaging became an important addition to medical diagnosis and the use of nuclear medicine became established. Similar developments were occurring elsewhere in Australia and New Zealand. Of particular importance was work done in

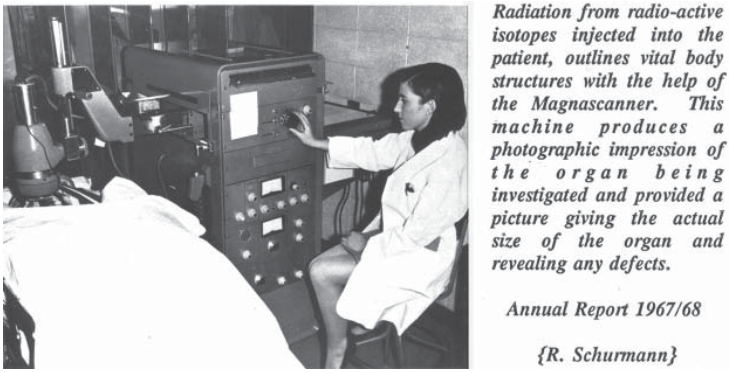

Image 3: Picker scanner and technologist R. Schurmann. (Courtesy of The Royal Melbourne Hospital.)

NSW at Royal Prince Alfred Hospital and Sydney University, initiated by Professor C. R. B. Blackburn and directed by J. McRae and his successor J. Morris.

The Role of Government Departments

The supply of radioisotopes was essential for development to continue, and this was provided *gratis* by government departments until 1978. The Australian Atomic Energy Commission (AAEC) and Commonwealth X-Ray and Radium Laboratory (CXRL) played major roles by producing radionuclides. CXRL (founded in 1929 as the Commonwealth Radium Laboratory and later named the Australian Radiation Laboratory) was responsible

Image 4: Staff preparing radionuclides at CXRL. (Courtesy of Australian Radiation Protection and Nuclear Safety Agency: ARPANSA.)

for the distribution of radionuclides. The Council for Scientific and Industrial Research (CSIR) was also involved until 1951, but CXRL then became the sole authority for producing and distributing nuclides until 1961.[4]

From 1948, the CXRL provided physics expertise with the ground work by T. H. Oddie. It acted as a consultant with practical assistance and equipment for the RMH, the University of Melbourne, St. Vincent's Hospital and the Baker Institute.[5]

In 1958 the new reactor HIFAR started at Lucas Heights, NSW, and the AAEC became part of the development of nuclear medicine. In 1966 the PMC used ^{99m}Technetium (^{99m}Tc) for the first time.[6] CXRL started a daily delivery of ^{99m}Tc in Melbourne, and scanning further increased. D. Stevens, director of CXRL, and his assistant D. Keam played major roles, and the latter became increasingly involved, becoming an office bearer, and later president, of the ANZSNM.

From 1968 R. Boyd (a radiopharmacist and later president of ANZSNM) and his team at the AAEC began producing ^{99m}Tc radiopharmaceuticals that were available nationally and were

used in 80 percent of NM procedures because of the almost ideal characteristics of ^{99m}Tc.[7] Despite many other advances ^{99m}Tc remained the major radionuclide in clinical use, being produced as required from a ^{99}Molybdenum (^{99}Mo) generator supplied weekly from the AAEC or an overseas commercial source.

In 1968 the AAEC assisted in instigating a visit of importance by H. Wagner and D. Kuhl from the United States. They toured widely, lecturing and advising on nuclear medicine, greatly helping the NM departments, and educating others less familiar with the techniques available. In turn, many Australians visited their departments in the United States, especially H. Wagner at Johns Hopkins Hospital in Baltimore; and the relationship with NM specialists in the United States became very strong. Similar visiting lecturers came later from the United Kingdom and Europe.

Nuclear Medicine as a Medical Specialty

With the introduction of radioisotope imaging the medical use of radionuclides grew steadily despite some interruptions. The major advances followed the development of new radiopharmaceuticals with special physical and chemical properties, new imaging equipment and the introduction of computers. Imaging has therefore been a key factor in the development of the specialty, and the technical advances have reflected those occurring in other imaging areas: x-ray computed tomography, ultrasound and magnetic resonance imaging (MRI).

The demand for NM work fell when radionuclide brain and liver-spleen scans were replaced in some cases by x-ray computed tomography (CT). The first CT scanner was introduced at RMH in 1975. Other studies such as placentography were replaced by ultrasound. This fall was offset by newer NM investigations, especially cardiac and tumour localisation techniques, and the diagnostic area expanded constantly with NM techniques complementing rather than competing with radiology and ultrasound. Examples are chest x-ray and lung scans in pulmonary embolism, with ultrasound studies in deep venous thrombosis. The best combination can be selected for the problem, and NM is valuable with its non-invasive techniques

and often lower radiation dose. NM has the unique features of being non-invasive and functional in nature: 'The basis of uptake of the [radionuclide] tracer in a system or organ of interest is the physiological response of the body to the molecule containing the radioactive atom.'[8]

Imaging was of course not the only activity of the NM department but it was the one in which rapid changes occurred. Other tasks included ^{51}Chromium studies in bowel cancer screening, the ^{14}Carbon urea breath test for Helicobacter Pylori in peptic ulceration and ^{131}Iodine treatment for thyrotoxicosis and thyroid cancer. Therapeutic developments increased but played a lesser role in NM than imaging. In addition research was undertaken early and has continued in many areas, supported by grants such as those from the National Health and Medical Research Council and universities.

Nuclear Medicine Departments and Staff

The development of NM followed the establishment of dedicated departments headed by medical specialists who were supported by technical and scientific staff, similar to the United States. Some centres in New Zealand and the United Kingdom differed in that physicists were leaders. Some departments were allied with radiology, but most, like those at the Royal Melbourne and Royal Prince Alfred Hospitals, were autonomous. The first integrated department was at the RMH under J. T. Andrews, a medical graduate from the UK who trained at PMC. The Alfred Hospital (AH) followed, with J. M. Dugdale, a radiologist from New Zealand, in charge from 1968 to 1978. Dugdale later was director of diagnostic imaging at Queen Victoria Hospital and Monash Medical Centre, and co-authored a book on clinical imaging.[9]

Image 5 records the founding staff at RMH: J. T. Andrews, director, R. Pope, physicist, and M. Watson and J. Vincent, technologists. Later staff were R. McGennisken who has continued as senior technologist to the present, L. Steven as physicist, the present physicist N. Salehi, and M. Lichtenstein who trained in the department as physician and is the present director.[10]

In L. Dugdale's department at the Alfred Hospital B. Koce was senior technologist, and B. Van Every became physicist

Image 5: The NM team at RMH. 'The all-England atomic team. They're expert in Nuclear Medicine.' (The Sun, 6 May 1966, courtesy of the Herald and Weekly Times Ltd.)

Image 6: The late Dr. L. M. Dugdale. (Courtesy of Mrs Dugdale.)

in 1977. Dugdale exploited the use of the computer, using a Hewlett Packard machine and writing his own programs to run in association with the gamma camera. M. Kelly joined the department in 1980 and is the current director.

The RMH department was soon involved in the training of NM specialists who then staffed further NM departments: L. B. Arkles (Repatriation General Hospital), R. Chmiel (St. Vincent's Hospital), and W. J. McKay (Austin Hospital founding director 1977). The AH department trained D. Feiglin (Prince Henry's Hospital and later Canada), and C. Wong (also Prince Henry's). The early training was greatly aided by E. Wilder (Victorian Health Department) who helped instigate training programs before the involvement of the Royal Colleges. The encouragement of senior medical staff was important in the acceptance of the new specialty: particularly J. L. Frew at RMH and H. Dudley at AH. Exceptions to the local training program were G. Klempfner (Queen Victoria Hospital) who trained in Philadelphia, and J. Martin who became director of the combined NM and radiology department at PMC. By the late 1960s training was well established in Victoria and NSW (St. George and Royal Prince Alfred Hospitals). In charge of some Australian and New Zealand centres were NM specialists who trained overseas, but New Zealand suffered a shortage of trained personnel.

Other hospitals followed later: the Royal Children's (D. Cooke) and country centres. In 1987 a new department was started at Monash Medical Centre following the amalgamation of Queen Victoria and Prince Henry's Hospitals. In 1995 the departments at Repatriation General and Austin Hospitals were amalgamated, with C. Rowe as current director since 2000.[11] Larger private hospitals also developed departments (Cabrini and St. John of God, Ballarat, being examples) and some private clinics provided NM services in association with radiology, supervised by radiologists. Another development was a mobile NM imaging service organised by G. Klempfner who was subsequently a President of the RANZCR.

The Royal Australasian College of Radiologists: RACR (later the Australian and New Zealand College: RANZCR)

In 1966 William S. C. Hare, professor of radiology of the University of Melbourne at RMH, proposed that the college form a section of NM under the umbrella of radiology, making three sections: diagnostic radiology, radiation oncology, and NM.[12] But other branches of medicine were also interested, and in 1967 the Royal Australasian College of Physicians (RACP), the College of Pathologists and representatives from Melbourne and Sydney Universities opposed the formation of a diploma in NM to be granted by the RACR alone. In 1968 they proposed a joint diploma from the RACP and RACR, but this did not proceed. Both RACP and RACR were very supportive of NM, and J. T. Andrews (who was a fellow of both colleges) received a study grant in 1968 from the RACP to attend a course at the AAEC in Lucas Heights, and in 1989 a Baker Fellowship from the RACR to study overseas. Hence the colleges were individually supportive of the emerging specialty, but it was some years before a combined approach developed.

The Society of Nuclear Medicine

The Society of Nuclear Medicine was formed in 1969 at the first national seminar on NM in Adelaide. H. Lander of Adelaide was chairman and later president, and wrote the first newsletter. He was instrumental in launching NM in Adelaide, and acquired the new gamma cameras at an early stage. Membership of the society, as with the Society of Nuclear Medicine in the United States, was open to medical, technical and scientific personnel. In 1970 the society became the Australian and New Zealand Society of Nuclear Medicine (ANZSNM), and NM was becoming established as a medical specialty. Victoria was well represented in the administration, early presidents including D. Keam, J. T. Andrews, W. J. McKay and V. Kalff.

A feature of the first meeting was a debate about which college the society should affiliate with for training of NM specialists. A minority favoured radiology, but the majority (mainly NSW) were involved in internal medicine and preferred

the RACP. Failing support for a combined diploma, NM training thus became a sub-specialty of internal medicine.

Training of Medical Personnel

The decision reached above led to NM becoming a subspecialty of the RACP, together with fields such as cardiology and neurology. It was examined in part II of the college certificate of fellowship. There were some political implications of this alliance, as there were continuing pressures for NM to become nuclear radiology. The RANZCR history records, 'the College considered that it should be integrated with radiology.'[13] Ultimately a joint Specialist Advisory Committee in NM was established by the RACP and RANZCR to supervise and assess training for both physicians and radiologists.

Formal training and qualification in NM in Australasia was an international first, though some early NM practitioners also qualified for the certificate of the new American Board of Nuclear Medicine which was initiated in 1972. Although most NM specialists trained locally, some in Australia and New Zealand trained overseas in the United States or United Kingdom. An important early arrival was I. P. C. Murray from the United Kingdom, who led the NM unit at Prince of Wales Hospital, NSW. He was later president of the World Federation of NM and Biology, was awarded the medal of Member in the Order of Australia for his work, and was co-editor of a major international two-volume text on NM.[14]

Australian and New Zealand Association of Physicians in Nuclear Medicine (ANZAPNM)

This body was formed in 1970. It was founded by NM specialists who regularly gathered together, and they launched the association at a restaurant (the Hungry Horse) in Paddington in Sydney.[15] It became very sophisticated, concerned with all aspects of the practice of physicians in NM. Its members, numbering over two hundred, are NM practitioners qualified mainly by the RACP or RANZCR. It is an active association, and L. B. Arkles from Victoria was president from 1978 to

1980. Australia has been generally well served in NM, but New Zealand less so, leading to a shortage of training positions in the latter.

Training of Technologists

K. Clarke and J. Milne at PMC conducted training of qualified radiographers in radioisotope techniques, with additional subjects provided by the Royal Melbourne Institute of Technology (RMIT). As the use of radioisotopes increased the need for specifically trained technologists led to the preparation of a separate course from that for the therapy radiographer, and in 1964 a three year course in parallel with the two existing radiography courses commenced at RMIT, leading to the first qualification in nuclear medicine technology.[16] J. Milne and J. T. Andrews later co-authored a text on Nuclear Medicine Technology based on their lectures developed for the RMIT.[17]

The course was expanded to a full three year Diploma in Nuclear Medicine Technology in 1973, the first of its kind in the world, and then to the degree of Bachelor of Applied Science in Medical Radiations (NM). This is now the standard for university programs for NM technology. RMIT also provided a correspondence diploma course for non-Victorian technologists until the conversion to the degree course occurred. RMIT University thus played a key role in training NM technologists.[18] Fourteen graduated in 2006 and eighteen in 2007, and the program has expanded to provide honours, masters and a doctorate. Victoria is fortunate that the state government funds internships for the graduates. The total number in the radiodiagnostic, radiotherapy, ultrasound and NM courses is regularly about one hundred annually. Graduates are keenly sought both in Australia and New Zealand. States other than Victoria also followed RMIT's example, leading to a national provision of NM technology.

ANZSNM Aims and Objectives

These are to promote clinical practice, public education, co-operation with other organisations and training of persons in all facets of NM. There are three standing committees: the accreditation board, the technical standards committee and the

research grant committee.

The ANZ Nuclear Medicine Journal is published quarterly. Special credit is due to G. Lowenthal of the AAEC who served as editor for several years. Regular scientific meetings are held in various regions, and an annual scientific meeting in different cities on a rotating basis.

The Accreditation Board was established in 1975 to define a standard of excellence and ensuing accreditation for NM technologists, ensuring their competence in both in-vivo and in-vitro procedures using unsealed radioactive sources.[19] The board's role has further expanded to accreditation of courses and applicants from overseas, and approval of hospital departments for training. It has also provided a special examination for those precluded by distance from attending a standard course, and in this way has assisted would-be NM technologists to obtain accreditation from Australia, New Zealand and elsewhere.

Special interest groups include technologists, physicists, radiopharmacists and nurses. The Society of Nuclear Medicine Technologists is the largest and is very active. The parent society has been strengthened greatly by the contributions of these groups.

Radiation Advisory Committee (RAC)

This was established in Victoria in 1984 under the *Health Act 1958*. Prior to this the Consultative Council on Radiation Safety had issued licenses in areas such as haematology and endocrinology.

The RAC responsibilities included:

- the promotion of radiation safety procedures and practices
- recommending the criteria for the licensing of persons and the qualifications, training and experience required for licensing
- recommending the criteria for the registration of radiation apparatus and sealed radiation sources
- recommending the nature, extent and frequency of periodic safety assessments of radiation apparatus and sealed radioactive sources

- codes of practice with respect to particular radioactive substances and uses of ionizing and non-ionizing radiation
- any matter which the minister agrees the committee should consider and report on.[20]

The RAC was also active in discussions on NM in Victoria. Prior to 1993 W. S. C. Hare was chairman and J. T. Andrews from NM at RMH was a member. The committee reviewed the specialist recognition in NM granted by the National Specialist Qualification Advisory Committee and instigated the license to

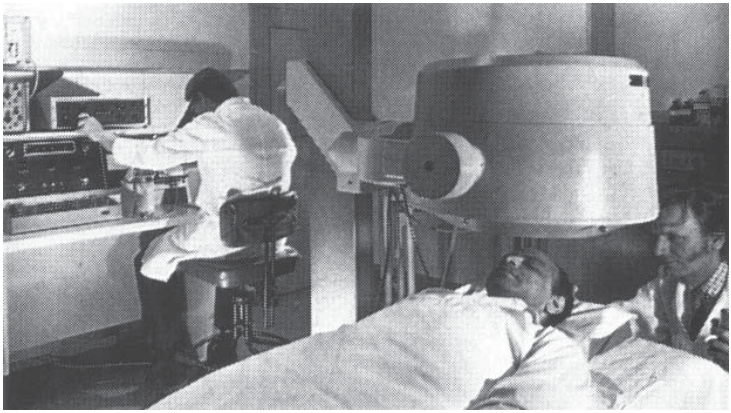

Image 7: Gamma camera at the RMH: L. Steven at the console, R. Chmiel positioning the patient. (Courtesy of the Royal Melbourne Hospital.)

practice NM (with a grandfather clause for selected individuals of long standing in NM). Hence the RAC was influential in NM in Victoria. The Medical Radiation Technologists Registration Board was also established.

Changing Techniques

Gamma cameras became available in the late 1960s, enabling dynamic as well as static imaging to be done. Automatic scanners were thus being displaced, and computers were also

introduced.

NM studies rapidly increased until the advent of x-ray computed tomography (CT scan) and ultrasound. However in the 1970s and 1980s single photon emission computed tomography (SPECT) brought tomography into NM practice and reintroduced the brain scan in a different functional format. The evaluation of cardiac function with the cardiac gated blood pool scanning and the myocardial stress test with SPECT became the next major demand for NM studies, with technetium-analogues in place of the earlier thallium studies. The demand for these studies has led to a special gamma camera design. Other advancing areas have been the localisation of tumours using monoclonal antibodies and localising infection with labeled white blood cells.[21]

The next development was combining CT with SPECT in one machine, the present state of the art. In the 1990s the experimentally established positron emission tomography (PET) became clinically available. It requires a complex ring of detectors and a cyclotron to produce the positron emitting radioisotope by 511 kev annihilation.

Great interest in the use of cyclotrons for the production of radioisotopes goes as far back as the efforts of J. McCrae at the University of Sydney and others in the 1960s, but clinical adoption occurred very slowly. The Australian Government decided in 1996 to establish a national cyclotron in Royal Prince Alfred Hospital (RPA), Sydney, operated by the Australian Nuclear Science and Technology Association (ANSTO, previously AAEC) and the hospital. The RPA had played a leading role in NM, and the PET centre there was opened by the Governor General Bill Hayden in March 1992.[22] The clinical use of the cyclotron was a significant advance for ANSTO in radionuclide production, a task it shared with the Lucas Heights reactor. However, 'for the vast majority of radioisotopes, including all those used medically, the cyclotron complements the reactor—it does not replace it.'[23]

Considerable interest in recent years has been expressed in the use of the cyclotron to produce ^{99m}Tc, which is used in over 80 percent of NM studies, instead of production in the reactor.[24] The new reactor which replaced the aging HIFAR machine at Lucas Heights, NSW, intensified this interest. It is however still standard NM practice to obtain ^{99m}Tc from a longer half-

life ^{99}Mo generator (t1/2 66 hours as opposed to 6 hours for ^{99m}Tc) currently produced in a reactor and, in general, delivered weekly to NM departments. This requires local production or importation, with ensuing problems of radioactive waste and ultimate decommissioning of the reactors. In contrast, with the cyclotron technique minimal radioactive waste occurs. At the time of writing cyclotron production is still not available commercially, and NM departments still have to produce their ^{99m}Tc from ^{99}Mo generators.

The Austin Hospital, Melbourne, PET centre opened in 1992, with an associated cyclotron and radiochemistry laboratory.

^{67}Gallium for tumour localisation and ^{201}Thallium for cardiac studies became available and cyclotrons producing further radionuclides such as ^{11}Carbon, ^{15}Oxygen and ^{18}Fluorine for PET studies, but many have short half-lives, making their use impractical at a distance. Victoria is fortunate to have accessible cyclotron facilities for the PET centres, particularly at the Austin and Repatriation Medical Centre with C. Rowe and A. Scott supported by scientists and technicians, and PMC with R. Hicks supported by D. Binns and others. Government support for PET is well established in Australia.

The PET camera gives high resolution. Radionuclides enable it to detect metabolic changes in brain and heart, and to localise lesions. Its importance continually increases in oncology, neurology and cardiology. With combined use of PET and CT, as with SPECT and CT, NM and radiological imaging are drawn closer together.

Conclusion

The ANZ Society of Nuclear Medicine, begun by a handful of enthusiasts, has over 1,000 members, with over 300 in Victoria and nearly 400 in NSW at the time of writing. In 1994 its silver jubilee was held in Brisbane, and the Sixth World Congress of the World Federation of Nuclear Medicine and Biology was held in Sydney—a significant double event. NM has been a major advance in clinical and laboratory medicine, and this paper presents features of its formative years and its emergence as a specialty in Victoria up to the 1990s. A further paper would be necessary to present current details of NM in both public and

private medical practice, and the details of medical, scientific and other staff involved. Briefly, in Australia there are now more than two hundred licensed NM departments, with one third in Victoria. New Zealand with a population similar to Victoria (about four million) has fewer departments.

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My Interest in Medical History

John T. Andrews

My interest in medical history developed from a general interest in history. Both interests have increased over time through personal contacts made and a fascintation with places and events of historical importance.

I grew up in Brighton in southern England, and later in Bath. Both were sites of important historical events, such as the Norman victory at nearby Hastings in 1066, and the closure of Battle Abbey with the Dissolution of the Monasteries under Henry VIII. Bath, a city of Georgian architecture, differs greatly from the regency style of Brighton, each being a reflection of their historical periods. Gothic style is also evident in Bath Abbey, which began construction in 1499. The city is also home to the beautifully preserved baths from the Roman occupation of Britain. The value of the spa known to the Romans, continues in the present day, with the treatment of rheumatic disorders in the city.

As a medical student, I was fortunate to study and later work at the (now Royal) London Hospital in Whitechapel. The hospital was founded at the Feathers Tavern in Cheapside in 1740. This was the hospital of Frederick Treeves and the Elephant Man, of Hughlings Jackson, Edith Cavell, and many other well known famous names. Whitechapel later became the site of the notorious murders of Jack the Ripper in 1888, with some of the mutilated corpses ending in the London Hospital mortuary, so history was forever present. As students the value and importance of medical history was stressed. The medical dean then was A. E. Clark-Kennedy who wrote The London: A Study in the Voluntary Hospital System, *published in two volumes in 1962–63. He and other distinguished physicians, such as Donald Hunter, frequently referred to medical predecessors in their teaching so my interest became well established in those student days.*

My first post after migration to Australia was at the Launceston General Hospital, and later I was privileged to spend a large part of my working life at the Royal Melbourne

Hospital, both hospitals with long, colourful, medical histories to draw upon. I also spent time at the newer Peter MacCallum Clinic learning about radioisotopes and radiotherapy, and the pioneers involved in these fields.

Much history, including medical history, relates to wars and my father, who had served with his brothers in World War I, made me aware of this. Later, my new father-in-law, who was in the British Army and wounded at Gallipoli, and subsequently served on the Western front, confirmed the importance of medical involvement in wartime. This was emphasised as a small child, seeing a line of blind ex-servicemen from St. Dunstans Institute being led along the sea front in Brighton. Travelling to Italy with my parents, in 1935 at the time of the Abyssinian war, the train to Rome was full of soldiers; a later visit was during the Spanish civil war. These were precursors of things to come, and by 1940 in southern England there was the battle of Britain overhead and the many air raid casualties. Later, as the war continued, came my own minor involvement through the British Merchant Navy. These events led to an interest in the preservation of human health by the prevention of war. In 1985 I attended the Nobel Peace Prize presentation to the International Physicians for the Prevention of Nuclear War as a representative of the Australian affiliate, the Medical Association for Prevention of War (Australia), an historic medical occasion and an honour to have been a participant.

On retirement, I studied Arts at Monash University, reading Italian subjects, and mediaeval and Renaissance European history. In these studies the Black Death was included, so indirectly medical history was not neglected; and in Dante's Inferno, it was intriguing to read the descriptions of a wide variety of diseases among the damned, showing Dante's interest in the medicine of his time.

Over the years therefore I have taken an interest in differing facets of history in general, and medical history in particular, leading to a permanent interest in the subject and the appreciation of why it is important to value past medical achievements in the development of the physician.