The Charles C. Reed Memorial Lecture

PUMPING ON THE PERIPHERY OF THE POND

Annette McCarthy
Dublin, Ireland

As the renowned British poet Alexander Pope once most eloquently stated in his poem "*An Essay on Criticism*,"

"A little learning is a dang'rous thing
Drink deep, or taste not the Pierian Spring
Their shallow Draughts intoxicate the Brain
And drinking largely sobers us again"

This quote from Pope is a fine example of his mastery of tense and epigrammatic expressions, but like many other quoted phrases, it contains but half the truth, for certainly all learning is valuable and its fruits may benefit many.

When I entered perfusion there was no education system in place in Ireland, no facilities existed where one could tap-in and follow a standard learning programme. At that time, just as in many other centres one was apprenticed into the role of a Perfusionist. I was left without the knowledge that young perfusion students acquire in the present educational system. I had an enormous hunger for knowledge, to discover the history of the early days of the gas exchange devices, and where it had all begun; but with no Internet access I was left to wonder for a while. My colleagues informed me that the only written word on perfusion was the "Red Book" of which we possessed one rather tattered copy, and this is how I was first introduced to the name and work of Charles C. Reed.

Charlie as he was known by his friends, was a man of many talents and many interests; as well as being a perfusionist, he was a poet, a naval pilot, a farmer and a great motivator. Charlie gained International acclaim for his writings on perfusion techniques as well as his poetic works.

The invitation to deliver this address is an honour, which I greatly appreciate, and I thank you for it. Also the opportunity to attend the annual meeting of the American Academy of Cardiovascular Perfusion is very welcome; it is a pleasure to share experiences and communication with colleagues on this side of the Atlantic Ocean. Together we can endeavour to resolve questions like, do we share the same or similar concerns? Is there a new role for the Perfusionist? Will the clinical Perfusionist become extinct in this globally volatile period of cardiac surgery, or should I say lack of it as more and more moves from the operating room to the catheter laboratory.

In the late nineteen fifties (1950s) cardiac surgery in Ireland was undertaken in many centres by general and vascular surgeons. No doubt each surgeon or group of surgeons gave their utmost focus and performance to each individual operation. Yet largely in those early days many of these surgeries were to a certain extent experimental, and even though there were survivors, they were not necessarily cures. It remained a continuation of trial and error, which had been practiced by contemporaries in other countries for a few decades, but intertwined with a huge desire to achieve, to learn and to conquer.

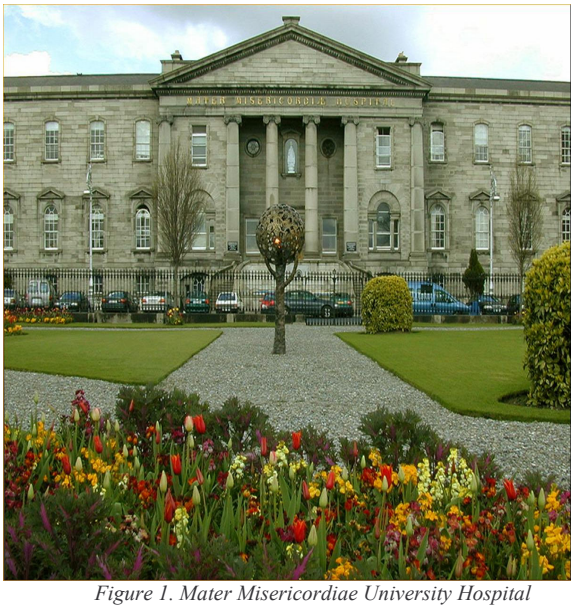


Figure 1. Mater Misericordiae University Hospital

Most of these operations were performed using the cold bath technique. The Mater Hospital in Dublin, run by a religious order was attempting to move ahead, but there was no support forthcoming from the State. (See Figure 1) A highly respected surgeon there gently persuaded the Sisters of Mercy about the importance of having a dedicated pump system, and thus the Melrose pump was acquired from private funding. (See Figures 2 & 3) A combined effort from surgeons and anaesthetists to

manage this alien equipment became a very laborious task, so technical expertise was sought, which ultimately led to a new predicament, as this was a hospital without such a department. Due to the huge usage of blood components, the laboratory staff were brought on board, even the household staff became "Perfusionists" because of the their involvement in filling cold bath water and the cleaning process of the disc oxygenator after each operation.

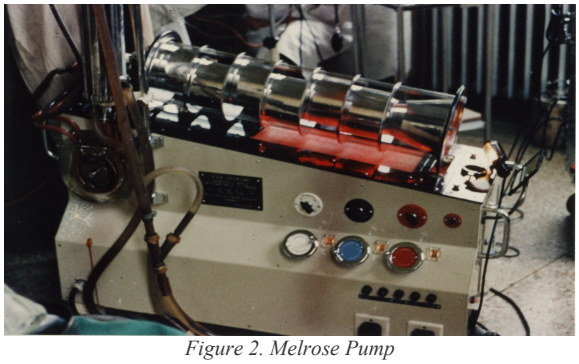


Figure 2. Melrose Pump

In the enthusiasm to cleanse and sterilise, industrial alcohol was used, unfortunately resulting in some deleterious effects. Eventually, the first clinical operation in Ireland using Cardio-pulmonary Bypass (CPB), took place in March 1961in the Mater Hospital. Two of our Dublin surgeons, namely Eoin O'Malley and Keith Shaw who were both performing adult cardiac surgery in two different hospitals, began to communicate and negotiate working towards a common goal of a cardiac surgery centre. These men then began to assist one-another in each hospital. They again sought the assistance of the laboratory personnel, this time asking if they would take an interest in extracorporeal circulation technology, a move that led to Cliff Dawson, a laboratory technician in the Royal City of Dublin Hospital becoming the first perfusionist in Ireland. Cliff was a large enthusiastic man with a great sense of humor, a big heart and a big spirit.

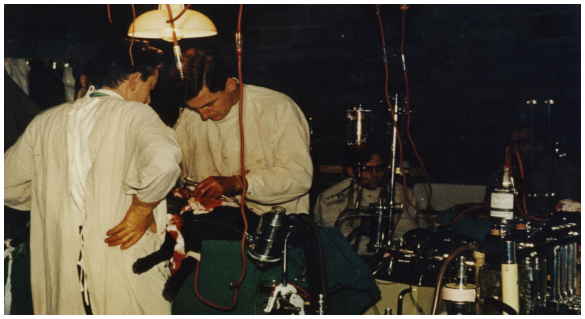


Figure 3. Experimental surgery on a canine model (MMUH)

Surgery continued in this manner for some time, with each surgeon working in a separate hospital, and Cliff used to load the Mater Hospital's newly acquired roller pumps into his Renault 4 car, and traverse town between hospitals, even picking up some medical students on the way who knowingly awaited him by Trinity College. Eventually sense prevailed and O'Malley and Shaw came to a decision to operate in one specialised centre. A few more meetings and political decisions led to a small contribution from the State, giving the Mater Hospital the specialty cardiac surgery centre. Cliff went back to his laboratory colleagues to seek help and it is rumoured that as he demonstrated his new skills, one person fainted, so he chose the other, a lady called Mary Slevin who subsequently became Ireland's second Perfusionist. Sadly, Mary passed away just two months ago, still in her fifth decade, a great loss to her children and family.

Cardiac operations adult and paediatric performed by the general surgeons gradually did cease, and in March 1974 paediatric cardiac surgery was re-commenced in Our Lady's Hospital for Sick Children Crumlin (OLHSC), in the care of the French Sisters of Charity. The religious sisters were very instrumental in setting up the cardiac surgery programme. Sr. Attracta from the Mater and Sr. Agustin from Crumlin went to England to study Intensive Care Nursing and returned to set up Intensive Care Units in each hospital. Also Sr. Eugene set up Ireland's first Intensive Care Course in the Mater Hospital in conjunction with the Irish Nursing Board, and it was launched by Eoin O'Malley on January 1st 1970. A dedicated cardiac surgeon with paediatric training Maurice Neligan and his team, anaesthetist and Perfusionists all commuted from the Mater to operate on the children in the children's hospital using Cardio-Pulmonary Bypass (CPB). The combination of the adult and paediatric surgery by the same team firmly established the National Cardiac Surgery Unit based in the Mater Misericordiae University Hospital (MMUH).

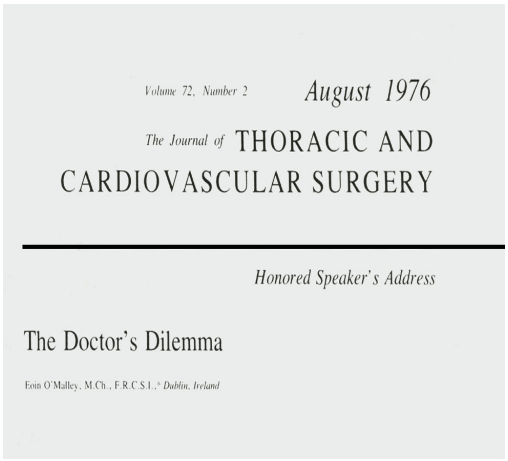
Figure 4. Unveiling of the plaque

In recent years it was re-named The Eoin O' Malley National Centre for Cardio-Thoracic Surgery in

recognition of his pioneering work and his long and dedicated service. (See Figures 4 & 5)

Figure 5. Professor O'Malley and colleaugues

" The Doctor's Dilemma" was a talk given by Professor O'Malley at The American Association for Thoracic Surgery in 1976. (See Figure 6)



Volume 72, Number 2 August 1976

The Journal of THORACIC AND CARDIOVASCULAR SURGERY

Honored Speaker's Address

The Doctor's Dilemma

Eoin O'Malley, M.Ch., F.R.C.S.I.,* Dublin, Ireland

Figure 6. The Doctor's Dilemma

Those early pioneering Perfusionists were not content in island isolation, and formed bridges of communication with colleagues in Great Britain and beyond mainly through the company representatives who provided extracorporeal circulation hardware. There was a surgeon in the Mater who incessantly complained that Cliff Dawson called America or the UK whenever he needed to know something or wanted something, yet he a surgeon, could not get anything. (See Figure 7) The Irish and British Perfusionists talked of establishing a formal organisation, but the old salient question persisted, who was to do the work? Cliff Dawson availed of the help of his son, who worked for a travel agent in Dublin; he arranged the transport and accommodation at affordable costing for the poor Perfusionists, facilitating the inaugural meeting, which was held in the Mater, (MMH) Dublin in 1974.

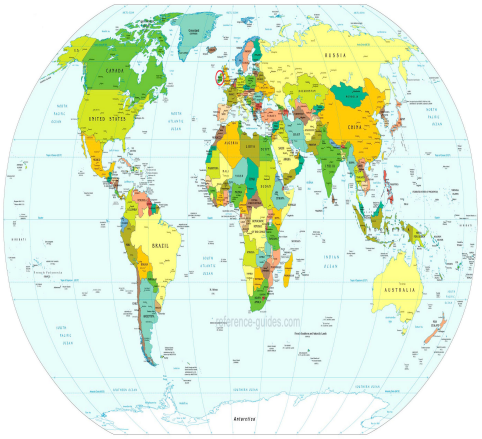


Figure 7. The globe

Many important decisions were made at this meeting including the one to form the Society of Perfusionists of Great Britain and Ireland (SOPGBI) and who the officers were to be. (See Figure 8)

Figure 8. Inaugural meeting of the SOPGBI

This picture was taken at that first meeting in the Mater, showing Cliff Dawson in the front row on the extreme left. I am told that Charles Reed was one of the advisors to the group at that time and subsequently honoured us with his attendance at the 1987 and 1988 congress. The group met again later in 1974 in Leeds, England, where Cliff Dawson was inaugurated as President and the other officers were formally instated. Regrettably Cliff was not in great health, and he died while still a young man. He is commemorated at the annual congress of the Society by the presentation of the Cliff Dawson Perpetual Memorial Salver and Travel Award. It is awarded to a Society member, who in the opinion of the adjudicators presented the best paper at a scientific session at the annual congress. I'm in no doubt Cliff would be happy to know it has been awarded to a

Mater Hospital Perfusionist on three occasions that I recall. (See Figure 9)

Figure 9. Rob Regan receives the Silver Salver Award

The SOPGBI

In 1979 I was a really new recruit in perfusion when the Society's 5th anniversary congress was again held in Dublin, which enabled me to attend. It was an eye opener, a steep learning curve and a crash course in what I should know in perfusion, also a lot of fun I must admit. I had to sit at table at the gala dinner on Saturday night with nine male colleagues, and received another crash course on more diverse subjects than perfusion. By the time of this meeting, the Society's Education and Training sub-committee had been working to formulate a plan for a school of perfusion. The aim then for final qualification was a certificate in Clinical Perfusion Sciences and the duration of the course at the school was to be over a two-year period with a series of one-week block releases. It was agreed in 1979 to establish a Board of Clinical Perfusion Sciences, and that the organisation of the course and maintenance of its academic standards were to be the responsibility of the Board. An Examining Board was also to be set up to maintain course standards. Subsequently in 1985 the School of Perfusion enrolled its first student. Work continued to progress the development of formal perfusion education, with the hope that the founding of the school would be the first step in the ultimate bid for State Registration.

By 1990 a Postgraduate Diploma (PG Dip) in Clinical Perfusion Sciences was set up in England for Perfusionists seeking to raise their educational standards and also to keep abreast of the rapid advances in Medical technology. The first students were enrolled that October. Ironically there was some interest from students graduating from the Texas Heart School of Perfusion, who were keen to undertake a postgraduate course. It was a nice change to have America looking east (even briefly) at perfusion education. Also in 1990 the first Accreditation Examinations of the Society were held at the time and venue of the Annual Congress on Perfusion.

In 1991, a three week block release course for Perfusionists, based on the syllabus of the Society's accreditation examination was set–up at the City of Westminster College, London in conjunction with the Society of Perfusionists. Trainee Perfusionists had the option of attending this course, which certainly eased the route to success in the written examination. The Education and Training Executive committee members continued to work diligently to advance and ameliorate perfusion education standards. After much negotiation and searching for a suitable university or college, a degree course eventually became operational in 1997. This was a BSc Honours degree entitled "Clinical Science (Perfusion)". It was a four-year part-time degree course, run on a one-week block-release basis, with ten blocks annually, while clinical perfusion practice was taught, practiced and supervised in the home hospital of the student. Perfusion students who already had a relevant science degree or similar higher qualification could gain direct entry to year three of the course.

In 1998 the School of Clinical Perfusion Sciences was replaced with the "College of Clinical Perfusionists of Great Britain and Ireland". The first task of the College was to form the Register of Accredited Perfusionists.

In 1999 in an effort to regulate Perfusionists, the Department of Health in England in conjunction with the Society and the College decided to form a National Advisory panel to guide employers to restrict the employment of Perfusionists to those who were accredited, and who were listed on a definite register. This register was completed by the year 2002 and the College was then able to concentrate on Accreditation of Training centres, and re-accreditation of Registered Perfusionists.

By 2004 the Pg Dip / MSc course replaced the Science degree in perfusion. It was a fitting and timely development to have our education system on a par with the best system in the world for the 30th anniversary of our Society. This course is now the basic route to Accreditation. You will note all the didactic programmes were and still are centred in or near London. This is because of the ease of access, the Irish numbers are so small, and there are so many cardiac surgery centres in the London area. The trainees commute from all over Ireland, England, Scotland and Wales to the one college, which also helps to regulate and maintain the high educational standard.

If we compare our education progress with other countries we might seem to have been moving very

slowly, in the USA for example, in 1975 the American Board of Cardiovascular Perfusion (ABCP), an independent and autonomous body took over the certification of Perfusionists which AMSECT had adopted in 1972, it also took over the Accreditation of Training programmes at that time, prior to complete re-structuring at a later date. Accordingly if we focus on the history of Perfusion in Holland one sees that the first national registration of Clinical Perfusionists was completed in 1984.

The European Board of Cardiovascular Perfusion (EBCP) became a reality in 1991 after a few aborted attempts and help and advice from many sources including the experience of members of the American Academy. Today it continues to embrace more and more Eastern European Countries in the effort to establish and maintain equality of standards in Education, Training and Examinations for Perfusionists, particularly those in Eastern Areas. The task is difficult and complicated as some countries have an existing education programme, while others have none at all. However, the Board is now making good progress with visits for re-accreditation of training units.

Reflection on Change

From 1974 onwards, with the children's unit operational and Coronary Artery Bypass Grafts (CABG) surgery had become so frequent and successful our CPB numbers grew rapidly, and the waiting lists far outgrew the National Unit. Some of our paediatric cardiac patients were being transferred to our neighbouring larger island, England for surgery. Yet, with over 1,200 open-heart surgery cases incorporating adult and paediatric work in 1985 and 1986, it was clear our little island population of 3.25million needed more cardiac –surgery facilities. Ireland at this time was recovering from a very depressed economy, but the Department of Health remained cash starved. Two new private hospitals had been built and opened in Dublin in 1985, both offering an adult cardiac surgery facility that greatly relieved the adult waiting lists. Today Ireland has six open-heart surgery centres, with yet another private hospital to open later this year to cater for a population of 4 million. Our Department of Health and Children is still cash starved today, Figure 10 is a newspaper headline the day after out most recent budget in December last.

Also in 1985 cardiac transplantation became a reality in the MMUH and from 1993 our group has provided a perfusion service for the liver transplant programme in St Vincent's Hospital in Dublin. Liver transplant patients have increased in number each year since, from 18 in 1993 to 57 in 2005.


Thursday, December 8, 2005

Budget 'failed health service'

Figure 10. Budget failed health service, December 2005

In recent years as we have an increase in our consultant cardiac surgery team, especially with paediatric specialty training, all our complex congenital heart disease (CCHD) children are being operated on by the home team. One of our surgeons has been taking a group of children to John Hopkins Hospital, Baltimore, for surgery where he practiced prior to his return to his native Ireland. This facility used at regular intervals over the last few years has brought all waiting lists to within a three-month period for paediatric cardiac surgery.

The profile of our workload has changed also. Certainly the overall numbers have decreased, even though the paediatric workload has increased, giving a total of 850 CPB cases in 2005. Our adult patient population presenting for surgery seem to have increasingly more advanced and critical disease, many in end–stage cardiac failure, many for re-do sternotomy and multiple co morbidities. Others have had previous intervention with stents, or other catheter laboratory procedures. Also some of the earlier congenital repairs are returning for further intervention. These factors have made a demand for ECMO, and Ventricular Assist Devices. Our newer paediatric cardiac surgeons feel a real need for post Cardiotomy ECMO in the paediatric hospital, a facility they have had available to them during their specialty finishing training here in America. Over the years we have established links with Toronto Sick Kids, The Cleveland Clinic, UCSF Paediatrics and the Mayo Clinic as well as John Hopkins, mainly through surgical advanced training. In fact we have always maintained a good relationship with hospitals in the United States, with Gerald Rainer from Denver and Norman Shumway of Stanford being regular visitors to the Mater Hospital in the past.

Our perfusion group are kept clinically very active in providing a service, including on-call to three hospitals, perfusing our routine adult and paediatric work, heart and liver transplants as well as our input to some new procedures mainly over the last 6-8 months, eleven ECMO cases, two Thoratec

VADs as a bridge to cardiac transplantation and five lung transplants. (See Figures 11 & 12)

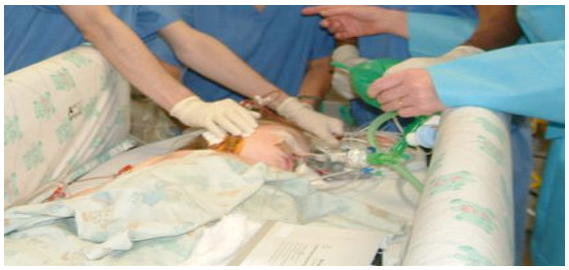


Figure 11. Transporting child on ECMO (November 2005)

Figure 12. Patient on Thoratec VAD

From 1994-1999 OPCAB surgery became quite fashionable and took up to 12% of our CABG patients. This trend has reversed completely, possibly because that patient group are being treated in the Catheter-Laboratory and those presenting to surgery have an increasingly complex profile. Yet, we cannot become complacent, as we know too well how volatile the role of the perfusionists can be. Just in December last we had endovascular stenting commence in our catheter room and several have been completed successfully since then.

Figure 13. AATS logo

The Mater cardiac surgery unit has always been known as a very busy clinical area, but with little to show in terms of research. However we are trying to improve on this image and two of our present surgical trainees are completing their Ph.D. Both have presented at either the AATS or the EACTS and their work is available on the hospital website; www.mater.ie (See Figures 13 & 14)

Figure 14. EACTS logo

On a personal note, I am happy to have served on the Executive Committee in the Society of Clinical Perfusionists of Great Britain and Ireland during the 1990s where I was involved predominantly with Education and Training, as well as organisation of the annual congress. I must confess I drew on my experience as an Examiner with the American Board of Cardiovascular Perfusion (ABCP) when we (the Society) first held training sessions in Examiners Workshops. These workshops benefit those who are to examine the practical aspect of the exam and the viva voce. I now serve as a College council member, where at present our principal capacity is as visitors to hospitals for re Accreditation of training units. A visit takes a full day with many questions, interviews, talk and observations to be solicited and recorded. It is a meticulously structured task, but for me the travelling to England and formalising of reports makes it a test of endurance. However I do feel it is important and an exciting privilege to give a little back to the profession whenever possible.

"You must give some time to your fellow men.
Even if it is a little thing do something for others – something
For which you get no pay but the privilege of doing it"

Albert Schweitzer

I have also gained much from the FECECT organisation, the European group who work diligently to provide a bi-annual high quality scientific International Congress. I have been on the committee of this group for many years now and presently act as secretary to the scientific committee.

In the embryonic days of my career much of my perfusion knowledge was gained from my colleagues when I attended the scientific sessions at conferences and by reading their research articles in perfusion journals. This is still true in the modern world of perfusion education, as it is vital for the advancement of perfusion learning that we share with one another our experiences and knowledge. It not only enables us to keep acquainted with colleagues but also to

keep up to pace with events and global changes in perfusion. It is wise to remember this saying:

"Learning is not attained by chance, it must be Sought with ardour and attended to with diligence"
Abigail Adams

Finally, on behalf of my perfusion colleagues at home in the Mater I would like to thank the many Perfusionists and Doctors who have contributed perhaps unknowingly, to our learning process and continue to be a support if we seek assistance. Thank you the audience for listening, and the American Academy Council Members for your kind Invitation.

Scenes from Ireland