

5th Emeritus Professor J.N.O. Fernando Memorial Oration

Memorial Oration

**Past, Present and Future challenges to Chemistry Education
at the Institute of Chemistry Ceylon**

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In the 1960's, the government and the university system in Sri Lanka were faced with the challenge of providing university entrance to all Advanced Level qualified students to pursue their tertiary education, owing to the lack of resources and space at that time. It was at this time that a group of determined university lecturers took on the courageous task of commencing the Graduateship in Chemistry (GIC) course for students who, despite successfully getting through their A/Ls, do not gain access to state universities due to the aforementioned reasons. Among them was the late Prof. J N O Fernando who took it on his shoulders to ensure the success of the GIC programme from when it began in 1979 to today. Prof. Fernando was a man of principles who stood strong against unethical practices and was firm and brave when it came to overcoming opposition. He silenced his opponents with logical discussions and outstanding ideas, was firm in his ideas and never gave up. In short, he was a hero of our times.

As much as he was tough when it came to work, he was an extremely kind hearted human being who never hesitated to extend his support, be it towards the students or his colleagues, in their times of need. He headed the establishment of several scholarships and awards in order to provide financial assistance towards students and set up Benevolent Funds and donations to assist the members of the Institute through periods of hardship. This was all possible due to his clear cut, strong policies and great vision.

My close association with Prof. Fernando dates back to 1992 when I became a Council Member of the Institute of Chemistry Ceylon. However, I had known him as a lecturer since my undergraduate years at the University of Colombo in 1980s. Within a short period of time, I was fortunate enough to become a member of the Academic Board in 1991. Thereafter, I held positions such as that of the Assistant Treasurer and the Secretary before being inducted as the President of the Institute in 2011. The

reason behind my successful journey in such a short period of time is the remarkable ability of Prof. Fernando to identify the most suitable person for a particular task or position. Among the persons of high caliber that I have encountered in my life, he is one of the best. I owe him immensely for the guidance and the encouragement he provided me in performing my tasks at the Institute, especially in the development of the GIC programme.

When it came to meetings where important decisions had to be taken, he would always listen to what everyone had to say and ultimately, make his own decision which we would also later realize was the correct decision. There have been numerous times where I have had heated arguments and disagreements with him during meetings. However, he never carried any bitterness with him after the meeting. That showcases, how true a professional he was. The knowledge and experience on good governance, financial practices and procedures that I acquired from him assisted me in handling several problems in his absence.

With Prof. J N O Fernando's sudden demise, came the challenging task of achieving the goals set out by him and fulfilling his dream of making the Institute and the College, that he loved so much, leading institutions in the country or perhaps, even in the world. This was not at all an easy task for me. Fortunately, there were many Council members, members and seniors from whom the required support and guidance could be obtained in handling matters related to the Institute and the College after Prof. Fernando's demise. As such, the vacuum created by his demise was so vast that we needed several people to fill it. Time has come for the new generation, as the experts in the field now require their support in the journey ahead. However, the young generation must always remember to seek the advice and experience of their seniors in order to overcome the challenges that lie ahead.

With that I come to the second half of my talk, which is on the “Past, Present and Future Challenges to Chemistry Education at the Institute of Chemistry Ceylon.” In 1970’s, the Chemical Society of Ceylon, as the Institute was called prior to its inception in 1971, felt the necessity of recruiting trained, middle-level technicians in chemistry at institutions such as research institutions and industries. Accordingly, the Laboratory Technician Training Course (LTTC) was commenced by the Chemical Society as a training programme for technicians and Dr. Senthe Shanmuganathan was appointed as its first coordinator. The syllabus of the course was approved by the Council in 1973 and with the Government Grant that was received by the Institute, the course was commenced with its first batch consisting of 36 students at Aquinas College. The students who registered for the course were mainly from laboratory staff of scientific and technical institutions.

Soon after the founding of the Institute of Chemistry Ceylon in 1971, the Council began considering the possibility of offering a course in Chemistry equivalent to a four year degree in Chemistry. The Graduateship in Chemistry course conducted by the Royal Society of Chemistry (RSC) was studied by a committee appointed for the task. The syllabus for the course, after going through multiple revisions over a period of two years, was finally approved in 1972. However, the Graduateship course did not officially start right after that. As per the practice followed by the RSC at that time, the draft syllabus was made available to anyone wishing to take the Graduateship examination and they could sit for the exam by studying based on the syllabus provided. In December 1978, the first Graduateship examination was held where three out of the seven external candidates emerged successful in Part I. In 1979, the Council decided to start the Graduateship course and with 72 selected students out of 175 applicants, the course was inaugurated on May 16, 1979 at Aquinas College.

The efforts of the Council in gaining recognition for the Institute (IChemC) Membership became successful when it was made official, that, by the Establishment Circular 234 of 09.03.1977, the Sri Lankan Government accepts IChemC Fellowship, Associateship (now referred to as Membership) and Graduateship (now referred to as Associateship) as equivalent to corresponding grades of the Royal Society of Chemistry, UK (FRSC, MRSC,

GRSC) for the purpose of recruitment / promotion of Chemists.

The third Graduateship Examination was held in 1980 where the first batch of our own students sat for the exam and 11 out of the 44 candidates, were successful in Part I. Thereafter, the Institute was faced with the humungous challenge of finding a suitable venue to conduct the course, as unfortunately, the Aquinas College rejected the proposal made by the Institute to conduct Part II and a Practical course. However, with the involvement of Prof. Fernando and the help of Government Analyst Mr. G A C Sirimanne, the Institute was able to obtain permission from the Governors of St. Thomas’ College, Mt. Lavinia to conduct lectures and the practical course of the GIC programme at the College premises. In order to manage the course, an Education Committee was appointed in 1981 of which Prof. Fernando was the first Secretary.

LTTC course which was revised from time to time after its commencement in 1973 underwent a major revision in 1987 which also resulted in the change of its name to LTCC – Laboratory Technicians Certificate Course. On the other hand, the Graduateship course was shifted to the New Science Laboratory premises of St. Thomas’ and revisions were made in Part II of the course with the inclusion of more industrial and applied subjects. First Part II (Theory) and First Part II (Practical) were inaugurated in 1981. This was followed by the commencement of the Second Part I course at Mt. Lavinia in May 1982, with the registration of 70 students selected from a group of 300 applicants.

In 1981, the Council took an important policy decision regarding the management of the surplus of money the Institute was in possession of, by conducting the LTTC and GIC courses. As per this policy, “Educational Funds in general and Graduateship Course money in particular (including interest) must be utilized as decided by the Educational Committee.” This vital decision which allowed the Institute to manage its funds wisely originated from the visionary Secretary of the Committee, Prof. J N O Fernando, and was well supported by some key members of the Council at that time.

The Council also took several important decisions with the view of providing benefits to the students and the member of the Institute. The office of the Institute of

Chemistry Ceylon was declared open in April, 1981 at Vidya Mandiraya and the Institute library was opened in Sumanarama Road, Mt. Lavinia with the collection of books received from the UK. In 1982, the Education Committee decided to start a series of monographs which would be of great use to the members and the first of the series, "Textile Fibres", was published in 1986. Further, a Council decision was taken to provide a 25% tuition fee waiver for children of the members studying at the Institute. However, this has now been increased to a full tuition fee waiver.

In 1984, the first batch of graduates consisting of four Graduate Chemists passed out and they were felicitated at a function held in Vidya Mandiraya. In his Presidential Address at the 14th Annual Sessions held in 1985, Prof. J N O Fernando suggested considering the establishment of a Sri Lanka College of Chemistry and also to consider applying to the University Grants Commission (UGC) for approval as a degree awarding Institute. He initiated this task himself, by writing to various institutions which he believed would be able to assist in gaining recognition for the GIC course. As a fruitful outcome to his unwavering efforts, in 1986 the Ministry of Higher Education issued a letter to the Ministry of Industries and Scientific affairs saying that, GIC can be considered as an alternative qualification to a degree with Chemistry as a subject. Further, confirmation was received from the RSC that those who successfully completed Parts I and II of the GIC course are eligible for Associate membership.

Successful completion of the GIC course opens up a myriad of opportunities for IChemC graduates in the industrial sector as well as in the academics. They are employed in diverse research institutions and many universities, both local and foreign, accept GIC graduates to follow their postgraduate degrees. Mr. S J Sarath Kumara, one of our first four Graduate Chemists, was the first to register for a postgraduate degree upon completion of the GIC course. He obtained his M.Phil. from the University of Kelaniya in 1987. Mr. K A Eustace from the second batch of Graduate Chemists (1985) obtained his M.Sc. from the University of London in 1988. In 1988, the Part I course was inaugurated at the University of Peradeniya for the first time. Owing to the high demand for the GIC course, in 1990, the Council decided to offer the Part I Course every year in Colombo. The Council granted approval for the academic dress for

Graduate Chemists in 1990 and in the following year, the graduates joined the ceremonial procession for the first time at the Annual Sessions in the newly approved academic dress.

In 1991, on the occasion of the Golden Jubilee of the Institute (the Chemical Society of Ceylon was founded in 1941), a grand seminar was organized on "50 years of Tertiary Chemical Education in Sri Lanka" by the Education Committee and a one rupee commemorative stamp was issued. In his Presidential Address, Prof. E R Jansz accurately identified five challenges that lied ahead of us, most of which we have been able to successfully overcome. In 1993, following the practice adopted by the RSC for its Graduateship Examination, the Institute adopted a new performance criterion which enabled the awarding of classes to our graduates. In the same year, the Institute established its own library for Graduateship students at Mt. Lavinia.

In 1997, the Australian National Chemistry Quiz (ANCQ) commenced in Sri Lanka based on an idea forwarded by Prof. Fernando upon his return from a visit to Australia. ANCQ which is a very popular competition particularly among A/L students in Sri Lanka is conducted by the Institute every year and the candidates who manage to answer all 30 questions correctly are awarded scholarships to follow the GIC course. With major expansion in the course content of LTCC, it was upgraded to a diploma, DLTC – Diploma in Laboratory Technology in Chemistry, in the Silver Jubilee year of the Institute (1998).

In 2000, Prof. R P Gunawardena, the Chief Guest at the 29th Annual Session of the Institute suggested the establishment of a College of Chemical Sciences. Consequently, in 2001, the College of Chemical Sciences (CCS) was established during the Diamond Jubilee Ceremony of the Institute by unveiling a commemorative plaque. The Academic Board of the College was introduced in the same year as a more autonomous statutory Board, replacing the Education Committee that prevailed previously. Prof. J N O Fernando was appointed as the first (Honorary) Dean of the CCS and Mr. N I N S Nadarasa was appointed as the first Registrar. The logo of the College of Chemical Sciences was unveiled by the President, Prof. W. S. Fernando, at the first Convocation held in 2004, where 33 graduate chemists passed out in the Silver Jubilee year of the GIC course. Ms. B C J

Cooray, the daughter of Mr. B A Cooray who followed the first GIC programme in 1979, successfully completed the programme and became a Graduate Chemist.

The foundation stone for the Headquarters Building in Rajagiriya was laid on June 27th, 2002. This land was acquired thanks to the untiring efforts of Prof. Upali Samarajeewa of the University of Peradeniya who left no stone unturned in the process. The total cost of the building project was around 25 million rupees which was just over half of the money we had including the refundable deposits of the current students at that time. After much discussion on the management of the available funds, it was decided, based on an idea forwarded by me, that the construction would take place in one half of the land thereby requiring half of the estimated cost. The project was in very capable hands under the supervision of Mr. Mevan Peiris (President, 2007) and the construction work was completed by early 2005. The ceremonial opening of the building took place on February 25th 2005. This was followed by the winding up of operations at St. Thomas' College by May 2006. The opening of the Instrument Center on Level 3 in 2006 provided better facilities for students carrying out research in fulfillment of Part C optional course which was included in the GIC programme thanks to Prof. H D Gunawardhana who constantly highlighted the importance of research.

Immediately after shifting operations completely to the Rajagiriya premises in 2006, we were faced with the problem of acute shortage of lecture hall space during weekends, despite the availability of a total floor area of 11127 sq. ft. in the newly constructed Headquarters building. This was due to the increased number of students in both GIC and DLTC course which totaled up to around 700. As a solution for this limitation of space, plans for the second half of the building commenced. However, due to the lack of funds it was not possible to start the actual construction work immediately.

In 2007, some students were granted permission to carry out a research project in lieu of a written paper, which was later introduced to the GIC curriculum in 2008. At the Annual General Meeting (AGM) held in June, 2007 it was discussed to appoint a committee to look in to financial and management matters of the Institute. This, I would describe as one of the gloomiest incidents to take place in the history of the Institute which

disturbed Prof. Fernando so much that, for the first time, he attended the Annual Dinner that year without his wife. As per the discussion at the AGM, a committee on making recommendations to the Council on reforming and restructuring of financial, management and related matters was appointed by the Council.

2008, the GIC programme received recognition of the Northumbria University, UK. In February and October of the same year, the first and second research sessions of the Institute were held. At the AGM of June, 2008, it was noted that the committee appointed to give recommendations to the Council on financial and management matters had not given any recommendations, and the President thanked Prof. Fernando for his valuable contribution towards the development of the Institute. Hence, things returned to normalcy once again! In 2008, Prof. S P Deraniyagala was recruited as a fulltime Visiting Professor at the Institute and he became the first Head of Faculty. The establishment of the Dr. Sudath Kumarasinghe Memorial Fund also took place in 2008, which proved to be extremely useful in awarding scholarships.

In 2009, I joined as a fulltime visiting professor. In the following year, the groundwork of IYC 2011 – International Year of Chemistry began under the skilled leadership of Mr. N M S Hettigedara, the Chairman of the IYC Steering Committee. In my opinion, IYC 2011 is the highest impact programme that we have conducted in the history of the Institute. The Steering Committee planned several activities to be implemented in contributing to the objectives of the IYC. One such activity was the CHEMEX-1 Exhibition and Trade Fair which was held over a period of four days from 27th to 30th January at the BMICH. The staff and the students of the College played a magnificent role in CHEMEX-1 by actively involving in many activities related to the organization of the event and in the presentation of numerous topics in stalls. The activities of the Institute and the College gained a big boost due to this event where the popularization of the GIC programme, in addition to promoting Chemistry as a subject, was made possible. A stamp and a first day cover were also designed in commemoration of the IYC 2011. The stamp included the portraits of Nobel Laureate Marie Curie and the late Professor M U S Sultanbawa, one of the most distinguished chemists produced by Sri Lanka.

In my year as the President (2011), I strongly put forth the idea that a change should be made in the administrative structure of the CCS so that post of the Dean would be a fulltime one. However, the then Dean, Prof. Fernando, was not willing to become a fulltime academic at the Institute. Hence, the new post of Honorary Rector (part time) was created and Prof. Fernando was appointed as the first Honorary Rector. The amendment to the post of Dean as a fulltime recruitment and the post of the Honorary Rector became effective from July 2011.

In 2012, CCS received accreditation from the RSC. The expansion of the Adamantane House utilizing the remaining half of the land, making available another 8500 sq. ft. of space was also commenced under the supervision of Prof. Gunawadena, who was the Head of this project which had an estimated cost of around 60 million rupees.

By the 2014 Convocation, we had produced a total of 946 DLTC diplomates and 969 GIC graduates, nearing a milestone. Prof. Fernando was elated with this result. His happiness grew several times fold upon the election of one of our alumni, Mr. K.R. Dayananda, as the Vice President of the Institute and Prof. J N O was very happy to include this in his speech at the Convocation.

By the 11th Convocation in 2015, Prof. Fernando was unwell. However, the happiness that filled his heart of having produced a total of more than 1000 diplomates and 1000 graduate chemists made him organize the event in a grand manner. He was unable to be present at the venue to attend to all the arrangements as often as he usually did due to his health condition. I recall, how he visited the place with Mandrupa on the day before the Convocation to make sure everything was in place. All this while, never did he show a sign of sickness. Probably, due to the humungous amount of happiness that occupied his heart at that time.

On 19th February, 2015 at his Convocation Speech as the Rector, he said "We have the pleasure that, from amongst our alumni three Graduate Chemists have functioned as Heads of the Chemistry Departments with one as a Dean of a Science Faculty. None of us who were involved with our education programme ever expected, even a few years ago, that our alumni might occupy such positions of distinctions and importance in our State Universities. We are confident that more of

our alumni will follow suit in the years to come." This was his last Convocation Address and in 2015 March, he was no more. What is CCS, the Institute, and the country without him...

Upon the demise of Prof. J N O Fernando, Prof. S.P. Deraniyagala was appointed as the Honorary Rector of the Institute. He was well-supported by the Academic Board and the Council. I believe my little support as the Treasurer was a strength to him. In late 2015, Prof. S Hewage was appointed as the Honorary Rector. In 2016, the Council approval was granted for the Academic Dress for DLTC Diplomates. In July 2018, changes were made in the administrative structure of the Education Programme when the Academic Board decided to start the new B.Sc. Degree Programme. Necessary documents were submitted to the Ministry of Higher Education (MOHE) in order to obtain the degree awarding status. We decided to keep the GIC course also as a professional qualification and to continue the programme without a break. We were successful in the Institutional Review by the MOHE and received the degree awarding status in 2018. In the same year, the degree programme was submitted to the MOHE and we were able to obtain accreditation for the B.Sc. Programme. The DLTC course received approval by the Sri Lanka Medical Council (SLMC) in 2019. The DLTC Director, Mr. E G Somapala worked tirelessly towards that end.

In 2019, we forgot something! That is, the Ruby Jubilee of the Graduateship Programme. Prof. Fernando, had he been here, would have ensured that this occasion was not forgotten. But let's not forget the Golden Jubilee of the Institute and the 80th Anniversary of the Chemical Society of Ceylon, both of which are due in 2021. One of the major challenges that lies ahead of us right now is to get the necessary building space to commence the B. Sc. Programme in 2021. I believe this should be done either by obtaining a suitable place on rent or by completing the proposed project at Malabe. A further challenge we have to overcome in future is to ensure that the B. Sc. Programme is sustainable. I also suggest the commencement of the new BMs Programme by 2023 in celebration of the Golden Jubilee of the DLT course. It is now time for the new generation to take the challenge and move forward. In future, I will be happy to get involved only with teaching as long as the students need me.

In concluding my talk, I would like to specially thank the Council and Mr. Dayananda for giving me the opportunity of delivering the commemoration oration at the 76th Birth Anniversary and 5th Death Anniversary of Prof. J N O Fernando. I would also like to extend my sincere thanks Prof. Ramanee Wijesekera, Prof. Sujatha Hewage, Mr. Sahan, Jayasingha, Mr. N. I. N. S. Nadarasa

and the library staff for helping me in the preparation of this talk. I am also thankful to the CCS students for making my teaching at CCS wonderful and to all the senior members of the Institute for giving their fullest support during my career. Last but not the least, I thank you all who are in the audience for listening to my talk.

Guest Editorial

Role of a Chemist in a Pandemic Situation

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The entire world is severely and adversely affected by the newly emerged Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) infection which was first discovered in the Wuhan Province of China in December 2019. The virus strain causes the disease which now called the coronavirus disease-2019 (COVID-19) that is contagious in humans where human-to-human transmission of SARS-CoV-2 was confirmed on January 20, 2020. The World Health Organization (WHO) has identified it as an ongoing pandemic. The total number of infected persons has now exceeded 3 million (3,083,453) with over 200,000 (212,498) deaths, as of today, 27th April, 2020, and both curves are still increasing exponentially (<https://www.worldometers.info/coronavirus/>). The respiratory droplets from coughs and sneezes of an infected person carry the virus and the virus is transmitted to another individual who is at a distance where these droplets usually travel in the air. This distance is usually about 1.8 m and hence keeping at least such a distance between people, avoiding crowded gatherings (social distancing), and wearing protective gear would be a way of controlling the transmission of the disease. A recent study published in the New England Journal of Medicine states that SARS-CoV-2 is viable for up to 72 h on plastics, 48 h on stainless steel, 24 h on cardboard, and 4 h on copper and 3 h in the air. However, the main mode of transmission of SARS-CoV-2 is through direct contact of respiratory particles of a patient in air. However, if a person touches a surface that has the

virus on it and then touches nose, mouth or eyes, then he or she can pick the virus up and get infected. These surfaces can be disinfected using a suitable disinfectant or by washing with soap. In this scenario, chemist has a huge role to play in recommending most effective disinfectants, suitable usable concentrations, frequency of disinfection application, and their health effects. A simple disinfectant such as a mixture of ethanol (62-71%), hydrogen peroxide (0.5%) or sodium hypochlorite (0.1%) and water can break the delicate envelop that surrounds the virion. The use of soap to disable the virus is effective as it dismantles the lipid outer coating of the virus particles. In order to recommend such a simple yet effective way of destroying the virus, knowledge of the chemical structure and the 3-D arrangement of chemical components of the virus are required. Such a structural elucidation is a task of a chemist in collaboration with a biologist and the recommendation to use soap to disrupt the lipid outer coating is none other than simple chemistry of action of soap.

Since the virus can remain on various surfaces for hours to days, the surfaces of hospital COVID-19 wards where patients are treated require suitable disinfection mechanisms. An antiviral paint coating on walls and floors of such wards would drastically reduce the risk of virus spreading out of the wards and would give some protection for the hospital staff who are working in such wards. In controlling the spreading of the virus, silver nanoparticle containing surface paint coating was used in the Wuhan Province hospitals. Silver nanoparticles are known antiviral agents as they are coordinated by S, O, N atoms found in viral enzymes and thereby deactivate the biochemical pathway catalyzed by the enzymes. Ag⁺