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IN SRI LANKA



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2011



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Institute of Chemistry Ceylon

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Chemistry in Sri Lanka

ISSN 1012 - 8999

The Tri-Annual Publication of the Institute of Chemistry Ceylon

Founded in 1971, Incorporated by Act of Parliament No. 15 of 1972

Successor to the Chemical Society of Ceylon, founded on 25th January 1941

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January 2012

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Theme for the year -

“Role of Chemistry Research in National Development”

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Outline of our Institute

The Institute of Chemistry Ceylon is a professional body and a learned society founded in 1971 and incorporated by act of Parliament No. 15 of 1972. It is the successor to the Chemical Society of Ceylon which was founded in 1941. Over 50 years of existence in Sri Lanka makes it the oldest scientific body in the country.

The Institute has been established for the general advancement of the science and practice of Chemistry and for the enhancement of the status of the profession of Chemistry in Sri Lanka. The Institute represents all branches of the profession and its membership is accepted by the government of Sri Lanka (by establishment circular 234 of 9-3-77) for purposes of recruitment and promotion of chemists.

Corporate Membership

Full membership is referred to as corporate membership and consists of two grades: **Fellow (F.I.Chem.C.)** and **Member (M.I.Chem.C.)**

Application for non-corporate membership is entertained for four grades: **Associate (former Graduate) (A.I.Chem.C.)**, **Licentiate (L.I.Chem.C.)**, **Technician (Tech.I.Chem.C.)** and **Affiliate Member**.

Revision of Membership Regulation

All Special Degree Chemists can now apply directly to obtain **Associate (Graduate) Membership**. Three year B. Sc. Graduates (with an acceptable standard of Chemistry) can

- directly become **Licentiate**
- obtain corporate membership in a lesser number of years.

Tech.I.Chem.C.

Those who have passed the DLTC examination or LTCC examination or have obtained equivalent qualification and are engaged in the practice of Chemistry (or chemical sciences) acceptable to the Council are entitled to the designation **Tech.I.Chem.C.**

Members/Fellows are entitled to the designation of **Chartered Chemist (C.Chem.)** on establishment of a high level of competence and professionalism in the practice of chemistry and showing their commitment to maintain their expertise.

All corporate members (Members / Fellows) are entitled to vote and become Council/ Committee members whether Chartered Chemists or not.

Membership Applications

Any application for admission to the appropriate class of membership or for transfer should be made on the prescribed form available from the Institute Office.

Current Subscription Rates

Fees should be paid on 1st of July every year and will be in respect of the year commencing from 1st July to 30th June

Fellow	Rs. 1200
Member	Rs. 1200
Associate	Rs. 900
Licentiate	Rs. 750
Technician	Rs. 500
Affiliate	Rs. 500
Membership for Life	Rs. 10000

Entrance Fee

All the grades	Rs. 500
Processing Fees*	Rs. 200
Processing Fee for Chartered Chemist designation	Rs. 1000
Institutional Members	Rs. 2500

*per application for admission/transfer to any grade

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CHEMISTRY IN SRI LANKA

Chemistry in Sri Lanka is a tri-annual publication of the Institute of Chemistry Ceylon and is published in January, May and September of each year. It is circulated among the members of the Institute of Chemistry and students of the Graduateship/DLTC course and libraries. The publication has a wide circulation and more than 1500 copies are published. Award winning lectures, abstracts of communications to be presented at the annual sessions, review papers, activities of the institute, membership news are some of the items included in the magazine.

The editor invites from the membership the following items for publication in the next issue of the Chemistry in Sri Lanka which is due to be released in May 2012.

- Personal news of the members
- Brief articles of topical interests
- Forthcoming conferences, seminars and workshops
- Latest text books and monographs of interest to chemists

All publications will be subjected to approval of the 'Editorial and Publicity Committee' and the Council of the Institute of Chemistry Ceylon.

Further, prospective career opportunities for chemists, could be advertised in Chemistry in Sri Lanka at a nominal payment. The editor welcomes from the members suggestions for improvement of the publication.

Private Tertiary Education

Dr. R. D. Guneratne

Department of Chemistry, University of Colombo

Recently, the government of Sri Lanka withdrew a draft bill that was to have been presented in Parliament, which would have, among other things, set up a mechanism for establishing private universities. The proposed bill would have permitted such institutions to be set up as businesses under the Companies Act, and would have established a body to control and govern them.

This bill provoked considerable discourse within the academic community and opposition from student bodies, although the public reaction was muted. The overall reaction among academics was negative, but for a variety of reasons. Some are simply opposed to private tertiary education, period. Others support the concept of private universities, but were unhappy with the way the proposed Act would have implemented this concept, and also had grave reservations regarding other provisions of the bill, which would have stripped the universities of what little autonomy they still have.

I would like to take this opportunity to express my own views on the subject. Let me start by saying that I am firmly in the second group described above. Lest my views prove controversial, let me also add that they are strictly my own, and do not reflect any official position the Institute of Chemistry may or may not have on the subject, except by coincidence!

In most countries in the world, private education plays an important role. Sri Lanka is no exception. In the sphere of primary/secondary education, some of the oldest and most prestigious schools are private. These are set up as non-profit institutions or charitable trusts. Since independence, the establishment of new schools following this model has not been permitted. Nevertheless, the demand for quality education in this country has been enormous, and under-investment in all but the most prestigious public schools has been such that many public schools are shunned by middle-class parents. This has given rise to the phenomenon of the “international schools,” which are in fact profit-making businesses, whose owners pay themselves a dividend.

The above examples illustrate the two models which could be used to establish private universities – either non-profit charitable trusts run by boards of trustees, or profit-making businesses paying dividends to their shareholders. Superficially, there may not be too much difference between these two models. For example, both would probably charge whatever fees the market can bear. However, the distinction is very important, both philosophically and

practically. *A business exists to provide maximum profit for its shareholders. It would tend to provide the lowest-cost education that it could get away with. A non-profit, charitable institution would plough back into its programmes any excess of income over expenditure, and would tend to provide the best possible education in the most cost-effective manner.*

This is not, after all, a hypothetical scenario. It is the norm in our primary/secondary education system. The non-profit private schools do an excellent job of educating children. So do the best of the international schools, but at enormously higher fees.

Non-profit universities have other advantages. They are more likely to be seen by the public as genuine institutions of higher education, rather than “degree shops” selling paper qualifications to those who are unable or unwilling to earn them. They would be able to attract additional revenue and capital in the form of charitable donations. They would probably be more willing to invest in their Faculty, encouraging or even demanding research, scholarship, and professional activities, and creating a true community of scholars. These factors may not be important to policy-makers, but should be important to us, as academics. Some of the best universities in the world follow this model, including famous American universities such as Harvard, Yale, and Stanford. Even the Institute of Chemistry and other similar professional institutions, albeit not degree-granting institutions, follow this model for their professional qualifications.

Certain newspapers have portrayed academics as opposed to private universities. Recent trade union action was characterised as opposition to the draft bill. However, most academics I know, including myself, are strong supporters of establishing private universities. Our opposition to the bill was for other reasons, including the manner of implementation. It is better to be defined by what you are FOR, rather than what you are AGAINST. I would therefore like to repeat my strong support for establishing private **non-profit** universities, and to assert the following principles as a basis for establishing them in Sri Lanka.

1. While it may not be possible to exclude profit-making universities, the non-profit model should be the preferred one. Provision should be made for these to be set up as charitable trusts.
2. Such private universities should be accredited by an independent accreditation board, using

transparent criteria and procedures. Individual professional programmes offered by them may be separately accredited by the appropriate professional body.

3. Other than accreditation, such universities should be entirely independent and free of government control. They should be alternatives to, rather than extensions of, the state system.
4. Private universities should be free to structure themselves, academically and administratively, in any way they see fit, without having to conform to the state university models. Academic models could span the gamut, from American style liberal arts colleges to narrowly defined professional institutions. A diversity of models, degree structures, teaching and assessment methods, etc., should be encouraged.

5. Non-profit private universities should act with social responsibility, providing scholarships, tuition discounts, and other forms of financial aid to excellent but needy students, and diversifying its student body.

It must also be remembered that tertiary education is a *social good*, as defined by economists. The government should continue to fund public universities, to ensure that those who cannot afford private universities, or choose programmes not offered by them, can nonetheless read for degrees. The existence of private universities should never become an excuse for reducing investment in public ones. Given the current meager levels of investment, what is in fact needed is a dramatic increase in funding.

Graduateship Examinations in Chemistry, 2011

LEVEL 1 – AWARDS LIST

First prize and Nandawathie Jayaweera Memorial (Open) Scholarship	Ms. K C Dissanayake
Second prize and Charles Jayaweera Memorial (Open) Scholarship	Mr. H M G K E Herath
Third Prize and Prof. R S Ramakrishna Memorial Scholarship	Ms. P P D Jayapala
Fourth Prize and Dr. Dilanjan and Ms. Gowrie Soysa Scholarship	Mr. S H Seneviratne
Second Charles Jayaweera Memorial (Sourthen Province) Scholarship	Mr. M A T N Karunaratne

MERIT BURSARIES (*in order of merit*)

Mr. M A T N Karunaratne, Ms. A H T Y M Ariyasinghe & Ms. J A Vanlangenberg, Ms. W A I U Jayawickrama, Ms. F N Ariff Refaideen & Ms. N U Dharmaratne, Ms. A M G A Ranasinghe

SUBJECT PRIZES

Graduate Chemist Alumni prize for General & Inorganic Chemistry	Ms. R M I Bandara
Emerine Fernando Memorial prize for Principles of Physical Chemistry	Mr. H M G K E Herath
Bennet prize for Mathematics for Chemists	Ms. W A I U Jayawickrama
Somawathie Mathew Memorial prize for Biology for Chemists	Mr. S H Seneviratne
Prof & Mrs S Sotheeswaran Prize for Principles of Organic Chemistry	Ms. K C Dissanayake
Mr & Mrs J M Ranasinghe Banda for Application of Mathematics in Chemistry	Ms. K C Dissanayake
Henry Ashmore Pieris Memorial Prize for Management, Economics & Finance	Ms. K C Dissanayake & Ms. F S Shiham

Level 2 - Awards List

1 st Prize & W.F. Peiris Memorial Trust Scholarship	Ms H J Pereira
2 nd Prize & Professor W Pearllyn D Perera Commemoration Trust Scholarship	Ms R M I Bandara
3 rd Prize & Professor G.C.N. Jayasuriya Memorial Scholarship	Ms H M Thirimanne
4 th Prize & Family Leelarathna Scholarship	Mr H B U S Wimalasiri

MERIT BURSARIES (*in order of merit*)

Ms M R S L Bandara, Mr A M Casiechitty, Ms K Anoosheya, Ms M K S Jayalath & Ms D S Y Jayathilake, Mr J U Pothupitiya

SUBJECT PRIZES

Prof J.N. Oleap Fernando Prize for Physical Chemistry	Ms H J Pereira
Prof Samitha P. Deraniyagala Prize for Inorganic Chemistry	Ms H J Pereira & Ms R M I Bandara
Prof Siromi Samarasinghe Prize for Organic Chemistry	Ms H J Pereira
Yogarane and Family Prize for Analytical Chemistry	Ms H J Pereira
Jayantha Welihinda Prize for Biochemistry I	Ms H J Pereira
Rex Jayasinghe Prize for Electronics & Instrumentation	Ms H J Pereira & Ms R M I Bandara



International Year of Chemistry 2011 (IYC 2011)

Chemistry- Our life, Our future

The International Year of Chemistry 2011 was celebrated all over the world with great enthusiasm highlighting the achievements of Chemistry and its contributions to the wellbeing of humankind under the unifying theme, *Chemistry-Our life, Our future*. The year 2011 also coincided with the 100th anniversary of the award of the Nobel Prize in Chemistry to Marie Sklodowska Curie. This event also provided an opportunity to celebrate the contributions made by women to Chemistry.

The Institute of Chemistry Ceylon (ICChemC) joined the worldwide celebrations of the International Year of Chemistry 2011 (IYC 2011) by actively conducting many programmes through out the year to popularize Chemistry amongst the public especially among the young generations. This issue of Chemistry in Sri Lanka summarizes the activities conducted by the Institute of Chemistry Ceylon to celebrate the event.

Background of the IYC 2011*

The year 2011 marks the 100th anniversary of the founding of the International Association of Chemical Societies (IACS) which was succeeded by IUPAC few years later. IACS and IUPAC were established to address the needs for international scientific communication and cooperation among chemists. The year 2011 therefore would provide an opportunity to highlight the benefits of international scientific collaboration and the contributions to the benefit of the society at large during the past 100 years. The concept of IYC 2011 started with the recognition among IUPAC executive committee members to further the cause of Chemistry and to derive significant benefits by securing a designated international year from the United Nations pertaining to Chemistry. The idea of holding a year of chemistry was first discussed in 2006, during the April meeting of the IUPAC executive committee. At its General Assembly on August 11-12, 2007, the IUPAC Council endorsed the plan to obtain the United Nations approval of 2011 as an International Year of Chemistry. The Union invited all Adhering Organizations, Associated Organizations and other Chemical Societies to assist with a designation that would create a strategic opportunity to communicate the central importance of Chemistry in every facet of modern life. As a follow up to the IUPAC Council, the Federation of African Chemical Societies, through

Ethiopia brought a resolution to the UNESCO Executive Board at its meeting in April 2008 supporting the IUPAC decision with the help of nearly 25 countries. Following the meeting a task group was formed to secure the designation by UNESCO of an International Year of Chemistry. The Executive Board of the UNESCO endorsed the proposal for proclamation by the United Nations of 2011 as the International Year of Chemistry.

Meanwhile IUPAC proceeded to establish a management committee to coordinate the initiative. This group included IUPAC officers and representatives of the major chemical federations from Europe, Africa, Asia and Latin America and representatives from industry and UNESCO.

In December 2008, the 63rd General Assembly of the United Nations adopted the resolution proclaiming 2011 as the International Year of Chemistry, placing UNESCO and IUPAC at the helm of the event.

Aims and Objectives of the IYC 2011*

The main objectives of IYC as identified by the committee appointed by the UNESCO and IUPAC were as follows.

1. Increase the public appreciation of chemistry in meeting world needs: Chemistry, appropriately called the *Central Science*, is both a deeply philosophical inquiry and an applied scientific endeavour. The science of chemistry is fundamental to humanity's understanding of the world and the cosmos. Molecular transformations are central to the production of food stuffs, medicines, fuels, metals, i.e., virtually all manufactured and extracted products. Through IYC the chemical community will publicly celebrate the art and science of chemistry, its key contributions to developing human knowledge, advancing economic progress and fostering a wholesome environment.

2. Increase interest of young people in Chemistry: In order to ensure that first-rate minds continue to be attracted and challenged by the central science, IYC will underscore the role of chemistry in managing natural resources sustainably. In partnership with the United Nations, the International Year of Chemistry will make a strong educational contribution towards the goals of the United Nations Decade of Education

***Official IYC Web site <http://www.chemistry2011.org>**

for Sustainable Development, particularly in the key areas of health and environment. National and international activities carried out during the International Year will emphasize the importance of Chemistry in helping to sustain the natural resource base for life.

3. Generate enthusiasm for the creative future of chemistry: Humanity's understanding of the world is grounded in our developing knowledge of chemistry. Creative opportunities to discover exciting new principles and applications continually appear as our understanding of molecular properties grows. Chemists will inevitably play a key role in overcoming the challenges facing today's world, for example in helping to address the United Nations Millennium goals. A deep understanding of the science is essential for developing molecular medicine, for creating new materials and sustainable sources of food and energy.

4. Celebrate the 100th anniversary of the award of Noble Prize in Chemistry to Marie Curie: and the 100th anniversary of the founding of the International Associations of Chemical Societies: The year 2011 marks the one-hundredth anniversary of the Nobel Prize in Chemistry awarded to Marie Skłodowska Curie, recognizing her discovery of the elements radium and polonium. Marie Curie's achievements continue to inspire students, especially women to pursue careers in chemistry. The year 2011 also marks the one-hundredth anniversary of the founding in Paris of the International Association of chemical Societies to address the needs for international cooperation among chemists and international standardization of nomenclature, atomic weights, physical constants and scientific communication.

Goals of the IYC 2011*

1. Improve the understanding and appreciation of chemistry by the public
2. Enhance international cooperation by serving as a focal point or information source for activities by national chemical societies, educational institutions, industry, governmental and nongovernmental organizations
3. Promote the role of chemistry in contributing to solutions to global challenges
4. Build capacity by engaging young people with scientific disciplines, especially the scientific method of analysis developed by hypothesis, experiment, analysis and conclusions

National Adhering Organization of Sri Lanka for IYC 2011

The National Adhering Organization for Sri Lanka is

***Official IYC Web site** <http://www.chemistry2011.org>

the Institute of Chemistry Ceylon. The Institute established a secretariat at the Headquarters, at Admantane House and organized a series of events with a view to achieving the objectives and goals of the IYC 2011 with the cooperation of related organizations.

Initiation of IYC 2011 activities in Sri Lanka

IYC activities were initiated in Sri Lanka with the appointment of a Steering Committee in 2009/2010 by the Council headed by Professor S P Deraniyagala, the then President of the IChemC. The Council then appointed Mr. N M S Hettigedara as the Chairman of the IYC Steering Committee. The IYC 2011 activities were commenced in the month of July 2009.

Members of the IYC 2011 Steering Committee

Mr. N M S Hettigedara (*Hony Treasurer /IChemC*)
(Chairman)

Ms. D Attanayake (*Secretary*)

Prof. M D P De Costa (*President /IChemC*)

Prof. J N O Fernando (*Hony Dean /CCS*)

Prof. S Sotheeswaran (*President Elect*)

Ms M N K D S Goonetilleke (*Hony Sceretary /IChemC*)

Prof. S P Deraniyagala (*Immediate Past President*)

Dr. (Mrs) L S R Arambewela (*Hony. Asst. Treasurer /IChemC*)

Prof. (Mrs) S Hewage (*Editor /IChemC*)

Prof. (Mrs) S I Samarasinghe (*Secretary International Relations*)

Mr. K R Dayananda (*Council Member*)

Dr. (Mrs) Nandani Ediriweera (*Council Member*)

Dr. A A P Keerthi (*Council Member*)

Prof. (Mrs) J Liyanage (*Council Member*)

Dr. U S K Welwegamage (*Senior Lecturer*)

Mr. N I N S Nadarasa (*Registrar /CCS*)

Mr. J M Ranasinghe Banda (*Deputy Registrar /CCS*)

Ms. Midha Masood (*Adm. Assistant /IChemC*)

As for the support staff, Mr. A.M. Jayasekara, (former Director General of the National Aquaculture Development Authority, Consultant Capacity Building, Ministry of Nation Building & Estate Infrastructure Development, Specialist on Food Security Programme FAO/UN) joined the IYC 2011 programme in January 2011.



Establishment of the National Secretariat

Since the appointment to the position of

Chairman of the Steering Committee IYC 2011, Mr. N M S Hettigedara approached the Presidential Secretariat of Sri Lanka for the establishment of the National Secretariat. The Secretary to the President of Sri Lanka and the Assistant Secretary gave their blessings and support which facilitated the coordination with other government institutions. This paved the way for the smooth implementation of the IYC activities with other relevant organizations.

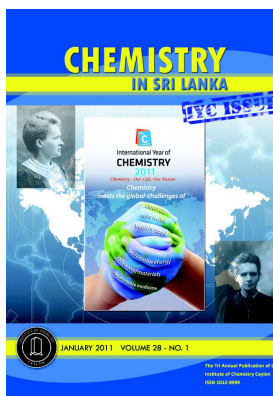
Activities planned for IYC 2011

The Steering Committee deliberated in depth and the following activities contributing to the objectives of IYC were agreed upon to implement.

1. Official Inauguration of IYC 2011
2. CHEMEX 2011 Exhibition and trade fair
3. Issue of a commemoration stamp
4. Training seminars and workshops for industry and the students
5. News releases and publication of articles and supplements
6. Publication of IYC special issues : 'Chemistry in Sri Lanka'
7. Public Awareness programmes / cultural programmes/chemistry magic shows
8. Branding of IYC- production of IYC key tags, tea shirts and pens, caps etc.
9. Production and distribution of Home organizer, school children daily organizer specially designed for branding of IYC 2011 at domestic level
10. Production and distribution of School bags, tea shirts and a diary
11. Printing of IYC 2011 Calendar
12. Development of IChemC & industry interrelations
13. Conducting 'chemistry days' at schools
14. Conducting essay competitions
15. Establishment of IYC 2011 scholarships
16. Establishment of mobile laboratory units
17. Conducting art competitions
18. Increased coverage for all island interschool chemistry quiz programmes
19. 'Education for All'- increase of publicity for Diploma in Laboratory Technology course and Chemistry Graduateship programme
20. Participating in the feeding of information to the IYC website: www.chemistry2011.org
21. Publication of an IYC 2011 souvenir at the end of the year.

Activities Performed

Chemistry in Sri Lanka



January 2011 issue of Chemistry in Sri Lanka was dedicated to the IYC 2011. A number of articles were published covering the current topics relevant to Chemistry which were also highlighted in the international activities of IYC 2011. The topics included women in Chemistry, medicine, energy, water, environment, green

chemistry, materials and food. The pride of place was given to Marie Curie recognizing the hundredth anniversary of the award of the Nobel Prize in Chemistry to her and to highlight the women's contributions to chemistry. The articles were written by the Sri Lankan experts in their relevant fields.

IYC 2011 calendar

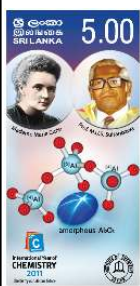
A calendar depicting important events in the history of chemistry and chemical sciences was printed. The pictures in the calendar were well chosen and the explanations given on them were of high educational value to the general public and school going children. This initiative would have created a considerable enthusiasm and awareness in chemistry.



Other IYC productions

The IYC 2011 fliers, envelopes and letter heads bearing the IYC logo were designed and printed to use during the year. The fliers were distributed along with other documents to various agencies including press and electronic media organizations as well as to the sponsors. A ball point marked IYC 2011 was produced and was distributed among students and professionals. It was one of the gift items presented to the students who took part in the games at CHEMEX 2011 exhibition and the trade fair. T-shirts and caps with IYC logo were produced and distributed.

IYC 2011 Commemoration Stamp



An IYC stamp and a first day cover were designed to commemorate the IYC 2011. The commemorative stamp was printed by the Sri Lanka Philatelic Bureau in collaboration with the Institute of Chemistry Ceylon. The stamp included the logos of IYC and IChemC. To commemorate the centenary of the award of the Nobel Prize in Chemistry to Marie Curie, her portrait was included in the stamp. In recognizing the contributions made by the late Professor M U S Sultanbawa, one of the most distinguished chemists produced by Sri Lanka was also included in the stamp. It also has the image of the world famous Sri Lankan national gem-the Blue Sapphire-together with the structure of one of the principle chemical constituents, aluminium oxide (Al_2O_3).

Ceremonial Inauguration of IYC 2011

In keeping with the official opening ceremony at UNESCO headquarters in Paris from January 27th-28th 2011, the IYC 2011 in Sri Lanka was ceremonially inaugurated at the Bandaranaike International Conference Hall (BMICH) in Colombo on 27th January 2011 by the Senior Minister of Scientific Affairs, Professor Tissa Vitarana by lighting the traditional oil



lamp in the presence of distinguished invited guests, scientists, IChemC members, industrialists and a large number of students.

The welcome address was delivered by the President of the Institute of Chemistry, Professor M D P De Costa followed by the address of the Chairman of



the IYC 2011 Steering Committee, Mr. N M S Hettigedara. The keynote address on “Chemical research in technology development” was delivered by Dr. A M Mubarak, Director, Industrial Technology Institute of Sri Lanka.

As the Chief Guest, the Honourable Minister delivered a valuable speech highlighting the importance of chemistry in the national development. This was followed by the address of the guest of honour, Professor J N O Fernando, Hony. Dean, College of Chemical Sciences. Concluding remarks were given by the President elect of the IChemC, Prof. Sotheeswaran.

CHEMEX 2011 Educational Exhibition Trade Fair

CHEMEX 2011 Educational Exhibition and Trade Fair was ceremonially inaugurated on the 27th January 2011 by the Honourable Minister of Scientific Affairs. CHEMEX 2011 was organized by the IYC National Secretariat of the Institute of Chemistry Ceylon as a part of the IYC activities to celebrate the achievement of chemistry and chemical sciences.



First day programme (27th January 2011)

The theme for the first day of the CHEMEX 2011 was “Chemical Research and Technology Development”. The first day inauguration of CHEMEX 2011 was held together with the Inauguration of IYC 2011 at the BMICH. The exhibition was opened by the Honorable Senior Minister of Scientific Affairs.

Second day programme (28th January 2011)

The theme for the second day was “Chemistry in day to day life”. The inauguration was held at the Sirimavo Bandaranaike Memorial Exhibition Centre. The welcome address was delivered by Professor M D P De Costa, President of the Institute of Chemistry. The keynote address on “Chemistry in day to day life” was delivered by Professor S Sotheeswaran, President Elect of the Institute of Chemistry Ceylon. Mr. R P Perera, Secretary General, Sri Lanka National Commission for UNESCO who graced the occasion as the chief guest opened the exhibition and addressed

the gathering explaining the role of the UNESCO and its commitment in assisting the IYC 2011 events. Thereafter the guest of honour, Professor H D Gunawardhana, Senior Professor of the College of Chemical Sciences addressed the gathering. The concluding remarks were made by Professor S I Samarasinghe, Secretary, International Relations, IChemC.



Third day programme (29th January 2011)

The theme for the third day was “Chemistry for Industry”. The inauguration of the 3rd day was also held at the Sirimavo Bandaranaike Memorial Exhibition Centre. The welcome address was delivered by Mr. M R M Haniffa, Secretary, IChemC. The keynote address on “Chemistry for Industry” was delivered by Mr. Rajitha Kariyawasan, Managing Director, Haycarb



PLC. The chief guest, Mr. A G H R Samaraweera, Chairman, Maliban Biscuit Manufacturers Ltd opened the exhibition and addressed the gathering followed by the guest of honour Mr. Asanga Ranasinghe, Director, Unilever Sri Lanka (Pvt) Ltd. The concluding remarks were made by Dr. Sujatha Hewage, Editor of the IChemC.

Fourth day programme (30th January 2011)

The theme for the final day was “Chemical Education for the wellbeing of society”. The welcome address was delivered by Ms. M N K D S Goonetilleke, Secretary, IChemC. The keynote address on “Professional chemical education for the wellbeing of society for the knowledge based era” was delivered by

Professor J N O Fernando. The chief guest Professor M D P De Costa opened the exhibition and addressed the gathering. Addresses were delivered by four guests of honour, Dr. R O B Wijesekera, Professor E R Janz, Mr. T Kandasamy, H S M Pieris, Past Presidents of the Institute of Chemistry Ceylon representing different



eras of the Institute. Mr. K R Dayananda read the address of Professor Janz in his absence. The concluding remarks were made by Mr. N M S Hettigedara, Chairman of the Steering Committee, IYC 2011.

The IYC Stamp and the First Day Cover were ceremonially cancelled with the participation of the Director, Sri Lanka Philatelic Bureau, Dean, College of Chemical Sciences, President, Institute of Chemistry Ceylon, invited guests and students. The



family members of Professor M U S Sultanbawa (whose portrait appears on the stamp) were among the distinguished guests. The First Day Covers were presented to the distinguished invitees by Mr. N M S Hettigedera, Chairman, IYC National Secretariat, Professor M D P De Costa, President, Institute of Chemistry Ceylon and Professor J N O Fernando, Honorary Dean, College of Chemical Sciences.

Other activities at CHEMEX 2011

Inter-university debates

Interuniversity debate competitions were held on the fourth day (30th April) on various topics. The topics debated were: Development of tertiary educational

opportunities outside the state sector is essential for Sri Lanka; Study of Chemistry at special degree level require an adequate contribution of physics; Analytical chemistry is the central science; Far too many taught postgraduate courses in the chemical science are offered in Sri Lanka; Sri Lanka's development cannot take place unless there is an adequate budgetary contribution to science and technology; Profession of Chemistry is more important to general public compared to medicine; Chemical testing of food stuffs sold at market should be made compulsory; Use of Bio pesticides to farmers should be made compulsory. The students from Colombo, Peradeniya, Sri Jayawardenepura, Kelaniya, Ruhuna, Jaffna universities and the College of Chemical Sciences participated. The winning debating team was from the University of Colombo and the University of Sri



University of Colombo Team

Jayawardenepura came second and the Institute of Chemistry was third.

Public lectures

Well organized public lectures were held by eminent chemists at the CHEMEX 2011 venue with a view to



increasing awareness of the importance of chemistry in industrial development as well as in the day to day life, thus contributing to the fulfillment of IYC 2011 objectives. A large number of people attended these lectures.

The topics covered and the lecturers were:

1. *'Toxic Substances and Prevention of Toxicity'* by Dr. R P Perera, Senior Lecturer, University of Colombo

2. *'Sri Lanka Raw Materials for Industry'* by Dr. S Mohandas, Consultant to Greentech
3. *'Tea and Health'* by Dr. Nimal Punyasiri, Senior Research Officer, Tea Research Institute
4. *'Opportunities for Chemistry Graduates'* by Dr. S Weliwegamage, Senior Lecturer, Institute of Chemistry Ceylon.
5. *'Healthy Food Habit for Prevention of Disease'* by Mr. N M S Hettigedara, Consultant Dietitian, and Nutritionist,
6. *'Water and Life'* by Mr. S. Perasiriyan, Retired Chief Chemist, Ceylon Electricity Board.

All Island Interschool Chemistry Quiz Contest-2010/2011

Final round of the above competition involving 4 schools selected at the second round was conducted on 27th January 2011 during the CHEMEX 2011 exhibition and trade fair.

A total number of 124 schools applied for the first round. The preliminary written test of the chemistry quiz competition was held on 13th November 2010 at 21 examination centres island wide. Eighteen (18) schools were selected for the second round of the competition which was held at the Adamantane House on 21st January 2011. Four (4) schools were selected for the final round which was conducted on 27th January at BMICH during CHEMEX 2011 Exhibition and Trade Fair. Winners were Royal College, Colombo, Ananda College, Colombo (1st runner up) Trinity College, Kandy (2nd runner up) and Holy Family Convent, Bambalapitiya (3rd runner up). Free copies of Chemistry in Sri Lanka, a publication of the Institute of Chemistry were sent to all the schools which participated at the Inter School chemistry Quiz.

Australian National Chemistry Quiz programme

Above examination was held on 31st July 2010 in various parts of the country. 15463 students from 140 schools from both the Junior Division (Year 11) and the Senior Division (Year 12) participated in the examination. This examination was held for the 14th time in Sri Lanka.



The Fourteenth Award Ceremony of the Australian National Chemistry Quiz Competition was held on 27th January 2011 as a special IYC activity at the Bandaranaike Memorial International Conference Hall (BMICH) with the participation of a large number of students, general public and industrialists. Introductory speech was delivered by Prof. J N O Fernando, Dean of the College of Chemical Sciences. Prof. Tuley de Silva, retired Special Technical Adviser, Chemical Industries Branch, UNIDO, Vienna, Austria, who had been the former Professor of Chemistry and the Dean of the Faculty of Applied Science, University of Sri Jayewardenepura, Sri Lanka, graced the occasion as the Chief Guest. Prizes and Awards were presented to the winning students by him. In the Senior Division there were three best performers who answered 29 out of 30 questions correctly. They were Sonali Mendis (Colombo International School, Mithun Shanmukaratnam (Colombo International School) and Chelvaniththilan Sivapalan (St. Patricks College, Jaffna). There was one Best performer, Thimira Subasingha (Royal College) in the Junior Division who answered 30 out of 30 questions correctly.

Science Day Drama Competition

A series of drama competitions were held earlier among the secondary school students under the sponsorship of the National Science Foundation of Sri Lanka and in collaboration with the Institute of Chemistry Ceylon. Opportunities were provided to those students who were successful to stage their dramas at the CHEMEX 2011 Exhibition site.



The dramas attracted a large number of audiences contributing to the goals of the IYC 2011. The dramas oriented towards chemistry education imparted a good knowledge to the audience on the use of chemistry in day to day life.

CHEMEX 2011 achievements

CHEMEX 2011 exhibition was unique in that, it consisted of multifarious activities such as seminars, debates, chemistry magic shows, dramas and

chemistry demonstrations, as well as kiddies play, musical programmes, dances and many other entertainments. Chemistry magic shows as well as traditional magic shows, orchestra and traditional dances etc., provided much entertainment to the visitors. Therefore, CHEMEX 2011 was indeed very much more than a mere exhibition.

Over 100 exhibition stalls depicted various aspects of chemistry and chemical industrial products. A large number of students congregated around the stalls to see the chemical demonstrations conducted by the College of Chemical Sciences and the principal Universities in Sri Lanka and listen to key note addresses and guest speeches delivered by eminent chemists and industrialists in Sri Lanka. The theme of the IYC 2011, 'Chemistry- Our Life Our future' had no doubt deeply penetrated into the minds of younger generation and the general public through the exhibition. Judgment on the best stall of each category was also made by an expert panel of judges appointed by the Steering Committee.

The stall presented by the students of the **Department of Chemistry, University of Kelaniya** was selected as the **best effort in reflection of the theme**, chemistry based on three (3) aspects namely, education, teaching and demonstration. The **Labmasters Pvt Ltd** presented the **best attractive stall based on its creativity and aesthetic value**. The **best student presentation stall belonged** to the **Royal College, Colombo**. Among the stall presented by the students of the College of Chemical Sciences, stall no. 70, 71, 78 & 79 were selected as the **best industrial chemistry stalls**, stalls no. 18, 74 & 75 were selected as the **best environmental chemistry stalls** and stalls no. 88, 89 & 90 were selected as the **best pharmaceutical chemistry stalls**. Hybrid Technologies was selected as the Best Commercial Advertising stall.



The Exhibition and Trade Fair was successfully concluded on 30th January 2011 accruing much benefit, especially to the younger generation of the country. It has been estimated that a good cross section of the society, around 200,000 people

consisting of school children, university students, businessmen, industrialists, academics and the general public from all the three communities have visited the CHEMEX 2011. Participation of teachers and school children from the areas of North and East such as Jaffna, Mullaitivu, Akkaraipattu and Batticaloa too at this event was of special significance.



In addition to displaying various industrial products and services to a broader cross section of the society, the Exhibition & Trade Fair contributed much to the achievement of three major goals of the International Year of Chemistry (IYC 2011) namely, increase of public appreciation of chemistry in meeting world needs, increase of interest in chemistry among young people and generate enthusiasm for the creative future of chemistry. The principle target group, the younger generation and the students as well as teachers were able to accrue maximum benefits. The feedback received from the general public, industrial sector, academic institutions and students from schools clearly indicates that the exhibition was very fruitful to them and the achievements are considerable and that, they are eagerly looking for such opportunities in the future too.

Raffle Draw

The Dean, College of Chemical Sciences organized the IYC Raffle draw which became very popular and it provided attractive prizes to the winners. The first three winners were Mr. Sujeewa Liyanrathne, Ms. U S K Manike and Mr. D Bandaranayake.



Award of Certificates

Ceremony to distribute the Certificates of Appreciation to those who contributed to the success of CHEMEX 2011 was held on 26th February 2011 at the P. P. G. L. Siriwardene Auditorium of the Institute of Chemistry Ceylon. The occasion was graced by Prof. M. D. P. De Costa, President Institute of Chemistry Ceylon, Prof. J. N. O. Fernando, Hony. Dean, College of Chemical Sciences and Mr. N. M. S. Hettigedara, Chairman, Steering Committee, National Secretariat (Sri Lanka) IYC 2011.

The services of the staff of the Institute of Chemistry Ceylon and the teachers and students of the College of Chemical Sciences who worked day and night for the successful conclusion of the IYC inauguration ceremony and 'CHEMEX 2011' Exhibition and Trade Fair (which were held at BMICH Sri Lanka from 26-30th January 2011) were appreciated and certificates were awarded for their performances. It was attended by more than 400 students and staff members of the Institute of Chemistry Ceylon/ College of Chemical Sciences.

A special speech on 'Supporting the Global Chemistry Community' was delivered by **Dr. Neville V Reed, Managing Director, Science Education and Industry, Royal Society of Chemistry UK.** His interesting speech was centered on practical aspects of Chemical Sciences. Because of his unique way of presentation as well as its very useful content, it attracted many commendations and cheers from the audience.

Prof. J.N.O.Fernando Dean, College of Chemical Sciences, thanked the IYC Chairman, Mr. N. M. S. Hettigedara, for his dedication, enthusiasm and hard work. Mr. Hettigedara in his speech thanked Prof. J. N. O. Fernando for his guidance and advice in IYC activities. He thanked the staff and students and requested them to extend the same support for the rest of the IYC activities too which are lined up for the year, the next immediate activity being IYC cultural programme- celebration of Sinhala and Tamil New Year, which was scheduled for the 3rd of April 2011.

Avurudu Asiriya - IYC 2011 Cultural Programme

This unique cultural programme was held on the 3rd of April 2011 from 9.00 am to 8.00 pm at *Janakala Kendraya*, Pelewatte, Battaramulla with the participation of more than 600 persons including members of the Institute of Chemistry Ceylon, visitors, family members, students and children. Being a joint effort of the Steering Committee of the National Secretariat (IYC 2011) Sri Lanka and the Social Affairs Committee of the Institute of Chemistry

Ceylon, *Janakala Kendraya* of the Ministry of National Heritage was selected as it was an ideal venue



for the event. Several buildings and the premises (provided free of charge by the Secretary, Ministry of National Heritage) full of greenery and garden benches were available for the programme. It provided a good atmosphere for the enthusiastic crowd to enjoy together. Additional facilities such as Laksala, Batik shops and other tourist shops as well as a sales centre for Sri Lankan products such as traditional herbal drinks, *kitul jiggery*, *kitul* treacle were available. Maliban Milk Products Ltd., provided milk products at a concessional price.



Avurudu Asiriya' Cultural Programme was ceremonially opened at 9.00 am by the President of the Institute of Chemistry and the members of the Council, President of the National Steering Committee IYC 2011 and the Chairman and members of the Social Affairs Committee of the Institute of Chemistry Ceylon by lighting the traditional oil lamp. Among the guests attended were the Secretary General of the Sri Lanka National Commission for UNESCO and the Additional Secretary to the Ministry of National Heritage. Several staff members of the Ministry of Technology and Research and the members of the media associations and several members of the Bar Association were also present. A Japanese Professor and his family who have been in Sri Lanka for over 10 years as well as a few tourists were among those who visited the event. The Sri Lanka Tourism Bureau facilitated communication with the tourist agencies and the leading hotels in Colombo to attract tourists for

the event. The management of the Galle Face Hotel undertook to exhibit the leaflets at their reception counter.

The students of the College of Chemical Sciences guided by the staff actively took part in the events conducted throughout the day. A special feature was the establishment of two models of Sinhala and Tamil traditional village homes. The well decorated Sinhala 'home' was made very attractive with a model Sinhala 'family' dressed in traditional attire and with traditional Sinhala sweetmeats as well as a traditional oil lamp and betel leaves. The well decorated Tamil traditional 'home' had a model Tamil 'family' dressed in traditional costumes. Traditional Hindu foods were available. It also had a traditional oil lamp and decorations with cadjan leaves and a *Kolam*. The Sinhala *Avurudu* rituals included a ceremony of anointing oil (traditional *Avurudu* ritual of application of herbal medicinal oils on the head by an elderly person in the family) a special feature, which was organized by the IYC Chairman himself.



Most of the students, especially female students of the College of Chemical Sciences were dressed in colourful village dresses (eg. flower printed coloured frocks) and male students (*Avurudu* sarongs) specially suited for the occasion, which enhanced traditional village atmosphere throughout the day. The contestants for *Avurudu Kumari* (New Year Princess) and *Avurudu Kumaraya* (New Year Prince) were in attractive costumes. The music consisted of traditional *Jana gee* (folk songs) and special *Avurudu* songs providing much more diverse entertainment to the cheerful



crowd.

The grand cultural show conducted by the *Sahan Ranwala Cultural Foundation* included very colorful



traditional dances, songs and music. The dialogues gave a message to the young generation on patriotism and that they should not forget their valuable cultural traditions even if they are living in a foreign country. The staff, students, members of the Institute and their family members enjoyed the cultural show very much. The students of the Institute of Chemistry Ceylon, guided by the Social Affairs Committee organized a



variety of entertainment activities. 'Breaking of the clay pots', 'Catching of eggs', 'Filling of bottles with water' by student groups, 'Blowing of balloons',



'Eating of buns', 'Kotta pora competition', 'Swinging Onchilla', searching for the hidden stranger and entertainment interviews etc. were some of the fascinating events conducted amid cheers of the crowd. The *Raban* entertainment programme was conducted by the cultural team of the Sri Lanka Police. The most attractive and colourful event was the

selection of *Avurudu Kumari* (princess of the New Year) and *Avurudu Kumaraya* (Prince of the New Year). The contesting students of the College, well prepared for the event with colorful special costumes participated at the contest before a panel of judges. The contestants had to undertake various performances which were carried out amidst unending cheers of the crowd.

Plenty of *Avurudu* sweetmeats including, traditional *kiribath*, *kevum*, *kokis*, *aluwa*, *aasmi*, and plantains were available for the participants. Lunch and beverages were available for sale. *Maliban Milk Foods Ltd* undertook a mobile sales promotion programme by selling *Maliban* products at a cheaper rate.

As a result of this cultural event, the students and the staff gained another ideal opportunity to work together in a team spirit and enjoy the variety of events organized by the Institute. In view of the high degree of support gained from the members of the Council and the members of the staff, the entire programme was a tremendous success. It was indeed



an opportunity for all the staff members, Sinhala, Tamil and Muslim students and their family members to come, relax and enjoy together. The excellent experience gained by the students through team work will brighten their future social life. The New Year traditions such as demonstration of traditional



avurudu rituals in the model Sinhala and Tamil homes have no doubt increased the awareness of our age old traditional cultural values leading to enhancement of strong bonds and harmony among our younger generation. There were ample opportunities for interaction among chemistry professionals and the members of other professional bodies.

As for our publicity programmes, a colourful leaflet on 'Avurudu Asiriya' celebration was printed and made available to over 45 professional associations in Sri Lanka, several media organizations and a few tourist hotels (through the arrangements made with Sri Lanka Tourism). The 'Avurudu Asiriya' Sinhala and Tamil New Year Programmes were telecasted by the HERITAGE TV and TNL on the arrangements made by the Ministry of National Heritage. Press releases were sent to various media organizations. The Sri Lanka Tourism made special arrangements to publish the event through the Ministry of Information on their web site. The details of the 'Avurudu Asiriya' programme along with pictures from a book written by Prof. G. B. Dissanayaka were published on IYC web site, www.Chemistry2011.org, which has been already enriched with IYC activities so far undertaken in Sri Lanka, thus bringing much reputation to the profession of chemistry, Institute of Chemistry Ceylon, College of Chemical Sciences and the Graduate Chemists and students while contributing to the achievements of IYC 2011 objectives as laid down by the UN.

The generous support extended by the Secretary General of the Sri Lanka National Commission for UNESCO, Secretary and the Additional Secretary of the Ministry of National Heritage and the Ministry of Information, the staff of the Sri Lanka Tourism Promotion Bureau and Janakala Kendraya, was invaluable in making the event successful. The Maliban Milk Products Ltd, National Heritage TV, Independent Television Networks Ltd. and Sahan Ranwala Arts Foundation extended their support and cooperation towards the successful conclusion of *Avurudu Asiriya- IYC 2011* cultural programme.

IYC 2011 celebration in the Northern Province

The International Year of Chemistry 2011 was celebrated on a grand scale by the Zonal Education Department of Vadamarachch in the north on 24th June 2011 at J/Methodist Girls School, Point Pedro. Vadamarachch Education Zone was the first to organize IYC -2011 celebrations in the Northern Province of Sri Lanka.

All the science (chemistry) teachers and A/L science students (chemistry) of the school attended the function. The number of participants was more than 300. Even people from the adjoining areas who are

interested in chemistry attended the function. Deputy Director of Education Mr. S. Udayakumar represented the Zonal Director of Education and Mr. V. Selvarajah graced the occasion as the Chief Guest. The function was presided over by Mrs. Rohini Karuneswaran (Asst Director of Education, Science). Dr. S. Mangaleswaran (General Medical Practitioner from Kandy), Dr. N. Sivapalan, (Department of Chemistry, University of Jaffna), Mr.K.Natanasabapathy (Institute of Chemistry Ceylon), Manager Hatton National Bank (Nelliady) and Manager Hatton National Bank (Point Pedro) were the guest speakers. Dr. Sisira Weliwegamage, Senior. Lecturer, Institute of Chemistry Ceylon delivered a lecture titled, 'Water and Life'.

Collaboration with other Agencies

The following organizations have been involved in IYC activities in various forms such as providing advice and guidance, cooperation and collaboration, sponsoring, providing donations, providing stalls etc.

State Organizations:

Presidential Secretariat
Ministry of Technology and Research
Ministry of National Heritage
Ministry of Information
Ministry of Posts and Telecommunication

International Organizations

Sri Lanka National Commission for UNESCO

Academic Institutions

Institute of Chemistry Ceylon
College of Chemical Sciences
Leading Universities of Sri Lanka

Government Statutory Organizations

National Science Foundation
National Aquaculture Development Authority
Sri Lanka Tourism Promotion Bureau
Bandaranaike International Conference Hall (BMICH)
Philatelic Bureau of Sri Lanka
Sri Lanka Tourism
Sri Lanka Exhibition and Convention Bureau

Private Sector Industrialists

Unilevers (Sri Lanka),
Maliban Biscuit Manufactories Ltd,
Maliban Milk Products ltd,
Sevenses UK, Abbot Diagnostics

Media Organizations

Independent Television Networks,
Sirasa TV,
Swarnawahini TV,
Associated Newspapers Ceylon Ltd.(Lake House),
Lakhanda Broadcasting Service,
Nelus Advertising Agency

Official IYC Web site:

The IYC 2011 web site, <http://www.chemistry2011.org> provides all the information on IYC activities conducted by the countries which are taking part in the celebrations. The National Secretariat IYC 2011 (Sri Lanka) has taken steps to feed information and update this website pertaining to the IYC activities of Sri Lanka regularly. The information given was supported by descriptive photographs. The details of colorful and informative IYC stamps that have been printed by several countries including Sri Lanka are also available on this website.

Interaction with other international agencies on IYC matters:

Sri Lanka National Commission for UNESCO (UNESCO is one of the global partners) is the principal international organization which supported IYC activities in Sri Lanka. The National Secretariat (Sri Lanka) IYC 2011 made linkages with other agencies which were contributing to the global IYC activities. Following are two messages received from two such agencies:

1. *"Thank you so much for contributing Sri Lanka's stamps for my article on IYC stamps in Chemical & Engineering News. The article appears in today's issue of the magazine"*
<http://pubs.acs.org/cen/newscrip/89/8911newscrip.html?featured=1>
Linda Wang, Associate Editor, Chemical & Engineering News, 202-872-4579, l_wang@acs.org, www.cen-online.org
2. *"I have carried a post on M.U.S Sultanbawa On My website <http://www.collectindianstamps.com/2011/03/sri-lankan-stamp-on-international-year.html> Please feel to share them among Chemistry Community*
Kumar K Nair, Trivandrum, India

Note from the Chairman Steering Committee

A significant undertaking such as CHEMEX 2011 must require a significant support and inspiration as well, to succeed. I wish to place on record with deep appreciation that, CHEMEX 2011 was given every encouragement by Prof. J N O Fernando, Dean, College of Chemical Sciences, Prof. M D P de Costa, President, Institute of Chemistry Ceylon and Prof. S Sotheeswaran, President elect, IChemC. The members of the Council provided support and guidance to the Steering Committee and personally helped me in many of the activities. All the academic and non academic staff and the students of the College of Chemical Sciences provided a valuable service.

The IYC Steering Committee headed by me, wishes to

place on record with deep appreciation and gratitude that, the success of the Exhibition and Trade Fair was due to the combined effort of staff of the College of Chemical Sciences and the Institute of Chemistry Ceylon. President's and the Council's right choice of selecting Ms. Dulanjalee Attanayake one of our own graduates to serve as the Secretary to the Steering Committee greatly facilitated IYC activities. Appointment of Mr. A. M. Jayasekara, former Director General of the National Aquaculture Development Authority (NAQDA) who had also been a Consultant to FAO/UN, by the President of IChemC and the Dean of CCS, expedited our work. The preparatory activities which were lagging behind and progressing only at a very slower phase could be accelerated due to his efforts. Contributions from Ms. Attanayaka and Mr. Jayasekara to the success of IYC 2011 are greatly appreciated.

Further, I wish to study the strengths and weaknesses if any, in organizing the Exhibition and Trade Fair which was in fact, the first of its kind to be held in Sri Lanka. The lessons learnt in such a study will be of immense importance in the implementation of similar activities in the future.

Institute of Chemistry Ceylon Gold Medal Award

For the first time in its history, the Institute of Chemistry Ceylon (IChemC), awarded a Gold Medal to a relatively young Chemist, Mr. N.M.S.Hettigedara for his dedicated honorary services to the Institute.

A graduate of the Institute of Chemistry Ceylon, he obtained a MSc degree in Food and Nutrition Chemistry in 1996 from the University of Keleniya. He was registered as a qualified Nutritionist in 1997 by the Sri Lanka Medical Council and became the first person to register and practice nutrition and dietetics in Sri Lanka.

While rendering his services to the State Pharmaceutical Corporation, he was mobilized to the Police Department as a Nutritionist & R/ASP in 2001. He also serves as a Consultant Nutritionist to the Army Medical Services and a visiting Dietitian to the Cardiac Rehabilitation Programme of the Institute of Cardiology, National Hospital of Sri Lanka. He is a consultant to the Presidential Security Division and serves as a Nutritionist / Nutritional Chemist.

Apart from his academic achievements, Mr. Hettigedara's services to the IChemC have been considerable. He is an elected member of the Council of IChemC since 1994. Mr. Hettigedara's services as the Joint Secretary since 2004 and as the Hony Treasurer since 2008 are commendable. As the Chairman of the Steering Committee, International Year of Chemistry (IYC 2011) he organized the highly

successful Exhibition and Trade Fair 'CHEMEX 2011'.



Mr. N.M.S.Hettigedara has brought much identity, honour and reputation to IChemC both nationally and internationally through IYC programmes. His initiative and innovativeness in taking charge of IYC activities with great vigour and enthusiasm and providing honorary services to the Institute are highly commendable. He is indeed an example and a role model for all Graduate Chemists to emulate by not forgetting one's academic parent. Mr. Hettigedara was conferred with IChemC Gold Medal at the Annual Sessions of the Institute which were held on 16th June 2011 at the Sri Lanka Foundation Institute, Colombo, Sri Lanka.

Annual Sessions 2011

The Institute of Chemistry Ceylon celebrated its 70th Anniversary simultaneously with its 40th Annual Sessions on 16th-17th June 2011 at the Sri Lanka Foundation Institute, Colombo. This important occasion was graced by the eminent Chemist, Professor J. A. Pincock from Dalhousie University Canada as the Chief Guest.



The Inaugural ceremony was held on 16th June at the Sri Lanka Foundation Institute. The theme for the year was 'Chemistry for the Wellbeing of Society'. Professor M D P De Costa delivered the Presidential address titled, "Chemistry and Society". The Chief Guest, Professor J A Pincock addressed the gathering on the theme, "Better living through Chemistry". Invited speech was delivered by Professor C B

Dissanayake, Director, Institute of Fundamental Studies on, 'From rocks to community health-Tracing the pathway of an element'. The vote of thanks was delivered by Professor S. Sotheeswaran, President Elect.



Interschool Chemistry Quiz Awards, College of Chemical Sciences Student Awards, Merit Scholarships and Distinguished Service Award, IChemC gold Medal and Long Service Award were presented at the opening ceremony. About 250 scientists and students participated at the Opening Ceremony. Annual General meeting was held at the same venue.



The Theme Seminar and the Annual Dinner were held on the 17th of June 2011. Technical Sessions were held on 16th and 18th June. 17 research papers were presented by the researchers in the areas of chemical sciences.



The theme seminar on 'Photochemistry for the wellbeing of society' was held on 17th June 2011 at the Sri Lanka Foundation Institute, Colombo. The

presentations were made by the eminent scientists who are experts in their relevant fields.



Welcome Address and **Introduction to Photochemistry**: Prof. M D P De Costa, (President, Institute of Chemistry Ceylon), **Organic Photochemistry, a Personal History**: Professor J A Pincock (Department of Chemistry, Dalhousie University, Canada), **Photochemistry for Solar Cells**: Professor O A Ileperuma (Department of Chemistry, University of Peradeniya), **Photochemical Sensors**: Dr. R. Senthilnithy (Senior Lecturer, Southeastern University), **Industrial Photochemistry**: Professor Pradeep Jayaweera (Department of Chemistry, University of Sri Jayawardenepura), **Photochemistry in Medicine**: Dr. Ranil de Silva (Department of Anatomy, University of Sri Jayawardenepura), **Photochemistry in Nanotechnology**: Professor K M Nalin de Silva (Department of Chemistry, University of Colombo), **Photochemistry in the Atmosphere**: Professor K.R.R. Mahanama (Head, Department of Chemistry, University of Colombo). There was a lively discussion at the end of the seminar.

International Conference

An International Conference on Chemical Sciences will be held on 20th - 22nd June 2012 in Colombo, organized by the Institute of Chemistry Ceylon. The theme of the conference is “**Role of Chemistry Research in National Development**”.

The major aim of the conference will be to discuss how chemistry meets the global challenges of clean air, safe water, healthy food, dependable medicine from plants, and how the chemical education imparted to our students achieve the UN Millennium development goals. The conference will therefore, bring together chemists, environmentalists, food scientists, educationists and other scientists on a common platform to exchange ideas and discuss the role of chemistry research in national development. Topics to be covered include: Natural Products Chemistry, Food Sciences, Environment Chemistry, Chemical Education and New technological developments and

industrial research.

Training Seminars conducted

1. Packaging for food, pharmaceutical and cosmetic industries

Training seminar on Packaging, for Food, Pharmaceutical and cosmetic industries was held on 6th May 2011 from 8.00 am to 5.00 pm at Adamantane House, Rajagiriya.

Welcome address was delivered by Professor M D P De Costa, President of IChemC and the following topics were covered at the seminar.

Food Packaging and its Role, Regulations and Safety: Mrs. Malini Malawarachie (Food Technologist, Food Advisory Committee, Ministry of Health), **Glass Packaging for Beverages**: Mr. D.A.M.Aresakularatne (Quality Assurance, R&D Manager, Ceylon Cold Stores), **Flexible Packaging in Food**: Mr. Abhaya Senevirathne (Packaging Consultant, Tetra Pak packaging) & Mr. Migara Dunuwila, (Business Development Manager, Tetra Pak packaging), **Food Labelling and Advertising Regulations 2005**: Mrs. Malini Malawarachie (Food Technologist, Food Advisory Committee, Ministry of Health), **Cosmetics and Packaging Interactions**: Mr. Abhaya Senevirathne (Packaging Consultant), **Pharmaceutical Packaging**: Mr. Upali Bandara (General Manager, Production Operations, Astron Ltd).

2. Nanotechnology and its Applications

A Training Seminar on Nanotechnology and its application was held on 30 September 2011 at the Institute of Chemistry Ceylon with the participation of over 100 industrial representatives and graduate students. The Chairman of the organizing Committee was Dr. Sisira Weliwegamage, Senior Lecturer, College of Chemical Sciences.

The Chief Guest Hon. Tissa Vitarana, Senior Minister of Scientific Affairs was pleased with the achievements made by the Institute of Chemistry Ceylon over the years and he thanked the Institute for



organizing this important seminar.

Addresses were delivered by Prof. S. Sotheeswaran, the President of the Institute of Chemistry Ceylon and Prof. J.N.O.Fernando, Hony. Rector of the College of Chemical Sciences and Mr. N.M.S.Hettigedara, Chairman of the Steering Committee IYC 2011(Sri Lanka). Mr. Hettigedera explained the **progress made by the National Secretariat towards achieving the goals of IYC 2011**. Therefore, this seminar gave an opportunity to create awareness of the IYC 2011 activities among a good cross section of scientists.

Keynote address on '**Nanotechnology towards basic human needs**' was delivered by Prof. RMG Rajapakshe, Senior Professor in Chemistry, University of Peradeniya and visiting Professor, Research Institute of Electronics, Schizuoka University Japan.

Following presentations were made:



Principles and historical background: Dr. M N S Kottegoda (Senior Lecturer, University of Sri Jayawardenepura and Senior Scientist, Sri Lanka Institute of Nanotechnology), **Nanotechnology towards new materials development:** Dr. Jeewantha Premaratne (Senior Lecturer, University of Kelaniya and Senior Scientist, Sri Lanka Institute of Nanotechnology), **Nanotechnology in energy production and storage:** Dr. A R Kumarasinghe, Senior Lecturer, Uva Wellasa University of Sri Lanka and Senior Scientist, Sri Lanka Institute of Nanotechnology), **Nanotechnology: Liquid Crystals:** Prof. A D L C Perera (Professor in Chemistry, University of Peradeniya), **Nanotechnology research at University of Peradeniya: Medical industrial and other applications:** Prof. R M G Rajapakshe (Senior Professor in Chemistry, Visiting professor, Research Institute of Electronics, Shizuoka University Japan), **Carbon nanotubes and their applications:** Dr. Varuni Seneviratne (Senior Lecturer, Department of Physics, University of Peradeniya), **Instrumentation in Nanotechnology:** Mr. C H Manoratne (Research Officer, Industrial Technology Institute), **Nanotechnology and Environment:** Dr. U S K Weliwegamage (Senior Lecturer, College of Chemical Sciences, Institute of Chemistry Ceylon).

3. Sustainable Development in Quality, Safety and Health Aspects of Tea

A training seminar on the above topic was held on 2nd November 2011 from 8.15 am to 4.00 pm at the Adamantane House, Rajagiriya.

Welcome address was delivered by Prof. S. Sotheeswaran (President, IChem C) and presentations were made on the following Topics.



Applications of good agricultural practices (GAP) in plantations: Dr. K M Mohotti (Head, Entomology Division, Tea Research Institute), **Post harvest management of tea:** Dr. M A Wijeratne (Officer in charge, TRI, Low Country Station), **Processing, value addition and product development:** Mr. G A A R Perera, (Research Officer, TRI), **Constituents of tea, their taste and health promoting properties:** Dr. Tissa Amarakoon (University of Kelaniya), **Application of packaging technology to sustain quality and safety of tea:** Mr. Abhaya Seneviratne (Consultant), **Quality Assurance of Tea:** Dr. P A N Punayasisiri (Senior Research Officer, Biochemistry Division, TRI), **Role of professional chemists in tea industry:** Dr. L S K Hettiarachchi (Deputy Director, Research, TRI).

4. Toxicology: Clinical, Industrial and Environmental Applications

A training seminar on Toxicology was held on 20th January 2012 from 8.30 to 5.00 pm at the Adamantane House, Institute of Chemistry, Rajagiriya. **Chief Guest** at the event was the **Hon. Pavithra Wanniarachchi**, Minister of Technology and Research. There were about 100 participants at the seminar. Professor S Sotheeswaran delivered the welcome address which was followed by the Minister's address. The **Keynote address** was delivered by Dr. Rohan P Perera (Senior lecturer, Department of Chemistry, University of Colombo & Director, National Authority for the Implementation of Chemical Weapons).

Following Presentations were made by the experts in the relevant fields.

Toxicology of pesticides and other agrochemicals: Dr. U S K Weliwegamage (Senior Lecturer, college of Chemical Sciences, IChemC);, **Plant toxins and their**

health effects Prof. S Sotheeswarn (Senior Professor, College of Chemical Sciences, Institute of Chemistry, Ceylon), **Molecular toxicology and its applications:** Prof. R S Dassanayake (Department of Chemistry, University of Colombo), **Forensic toxicology:** Prof. Ravindra Fernando (Senior Professor, Faculty of Medicine, University of Colombo), **Natural and synthetic toxins in food:** Mr. E G Somapala (Rtd. Government Analyst), **Industrial Pollution and toxic effects:** (Dr. U S K Weliwegamage, Senior Lecturer, College of Chemical Sciences, Institute of Chemistry Ceylon), **Animal toxins:** Dr. Sivajini Bieshman (Senior Registrar, Colombo South Teaching Hospital Kalubowila), **Mineral toxins: Heavy metals, Arsenic and other environmental toxins,** Dr. Ananda Samarasekera (Judicial Medical Officer, Colombo), **Occupational toxic exposures and prevention:** Dr. Eranjan Karunanayake (Faculty of Medicine, University of Kelaniya), **Pharmaceutical toxicology:** Dr. Priyadarshani Galapaththi (Head, Department of Pharmacology, Faculty of Medicine, University of Colombo).



Workshop conducted

Workshop on Science Education Outreach

A workshop on 'Science Education Outreach' was held on 13th October 2011 from 9 to 5 pm at the Adamantane House, Rajagiriya, with academic collaboration of National Science Foundation (NSF), National Academy of Science Sri Lanka (NASSL), National Institute of Education (NIE) and Ministry of Education.



The event was partially sponsored by NSF. This is the first ever such event in recent history where all parties related to science came in to one forum to discuss

issues related to science education and its improvement for better tomorrow.

“Role of National Academy of Science Sri Lanka on promoting science education” was discussed by Prof. Sunethra Athukorala; **“Major Challenges faced in developing teaching methodologies & implementing”** were discussed by Mr. Anthony; Director Science Education NIE. **“Role of Ministry on Exemplary science education”** was discussed by an officer from the Ministry of Education and Prof. Sunethra Karunaratne, a senior educationalist spoke regarding the **“Science Education Outreach for better tomorrow”**. Other speakers included Prof. M D P De Costa, Prof. Veranja Karunaratne. The workshop was co-ordinated by Dr. Vinitha M Thadhani, who is currently the group leader for science education of Global young academy and she spoke on **“Role of young academics on Science Education Outreach”**.

Directory of Graduate Chemists

Action is being taken by the Hon. Rector, College of Chemical Sciences to publish a Directory of Graduate Chemists in Sri Lanka during the International Year of Chemistry (IYC 2011).

The directory will enable the Graduate Chemists to have continuous contact and correspondence and publicize the activities Graduate Chemists are involved in.

The Directory will carry information about the current qualifications, employment and contact details of Graduate Chemists.

The Directory will be of very much importance in net working, exchange of scientific information, collaboration in research, industrial relation and to form a strong body of IChemC graduate chemists serving in Sri Lanka as well as abroad.

Dr. M A V Devanathan Memorial Lecture

Dr. M A V Devanathan Memorial Lecture was held on Friday the 9th September 2011 at 5 pm in the P P G L Siriwardene Auditorium at the Headquarters of the Institute of Chemistry Ceylon. The memorial lecture



was delivered by Dr. Samson Hettiarachchi, a former student of Dr. Davanathan who worked very closely with him. Dr. Hettiarachchi is presently working as a Consultant for the Electrical Power Research Institute in the USA and Advanced Nuclear Technology International in Sweden.

Dr. Michael Angelo Vincent Devanathan was a world renowned scientist that Sri Lanka has ever produced. Dr. Devanathan graduated with a B.Sc (First Class Honours) in Chemistry from the University of Ceylon in 1947. He obtained his Ph.D. from the University of London in 1951 for his contributions to the electrical double layer theory. He returned to the University of Ceylon in 1952 and continued his research in the field of Physical Chemistry. His research led to the refinement of the electrical double layer theory to the Devanathan triple layer theory. He produced 3 M.Sc.s and 10 Ph.D.s through his research.



He published about 80 research papers, majority of which were in prestigious international journals. For his authoritative contributions to the Physical Chemistry of Electrified Interfaces, Dr. Devanathan was awarded the D.Sc (cum laude) by the University of London in 1964.

Launching of the New IChemC Web site

The new IChem C website was also launched by Professor J N O Fernando, C.Chem, Hon. Rector/College of Chemical Sciences, IChemC, on 2nd September 2011, before the Devanathan memorial lecture.



Unveiling of Portraits

The portraits of two Distinguished Service Awardees, Dr. Lakshmi Arambewela and Professor Siromi Samarasinghe were unveiled by Dr. A M Mubarak,



Director, Industrial Technology Institute and Professor Sudantha Liyanage, Dean Faculty of Applied Sciences, University of Sri Jayawardenepura University respectively in the Council room of the Institute of Chemistry Ceylon on 2nd September 2011 at the conclusion of the Dr. Devanathan memorial lecture.



Fourth Inaugural Professorial Lecture

The Fourth Inaugural Professorial lecture on “**Chemistry for Sustainable Utilization of Material Resources of Sri Lanka**” was held by Prof. H. D. Gunawardhana, Chartered Chemist on 14th March 2011 at P P G L Siriwardene, Auditorium of the Institute of Chemistry Ceylon.



In his lecture he elaborated on sustainability of natural resources using the available technology. The concept of 'sustainability' implies the meeting of current human needs while preserving the environmental and natural resources needed by future generations. Technology is used in industry, value addition to material resources, water management etc. Technology can be considered as the out put of scientific theories giving the final product needed for economic growth. The survival and the sustainability of a particular technology are dependent on the applications of the associated sciences. Basic sciences such as chemistry play a vital role in the value addition to material resources, water management and many industries to achieve sustainability and the continual improvement which is one of the eight principles in the management standards of ISO 9001:2005.

Prof. Gunawardhana drew the attention to the underutilization of some of the industrial mineral resources in Sri Lanka and the necessity to take adequate measures to prevent salt danger caused by increased utilization of irrigation water resources.

CHEMEX 2 (Open Day Exhibition)

Chemex 2 was held on 24th to 26th November 2011 at the Institute of Chemistry Ceylon. Among the major goals of IYC 2011 are to increase public appreciation of chemistry in meeting world needs, increase the interest of young people in chemistry and generate enthusiasm for the creative future of chemistry. A series of activities have been undertaken by the Institute of Chemistry Ceylon, to achieve these goals.



Mr. Errol Fernando,
Chief Guest at CHEMEX 2

Creation of awareness on Chemistry is one of the important goals of the International Year of Chemistry (IYC 2011). The CHEMEX 2011 Exhibition and Trade Fair conducted by this Institute at BMICH from 27th to 30th January 2011 brought much benefits, especially to the younger generation of the country, especially in the increase of interest and enthusiasm in chemistry. As a result a considerable demand has been created thus more and more schools requesting for continuation of such activities. In response to these requests Institute of Chemistry and College of Chemical Sciences organized the open day exhibition.

Open Day Exhibition



The Open Day Exhibition involved the display of exhibits of academic nature mainly in Chemistry, Magic Shows in Chemistry, Seminars etc. Over 2000 A/L students from many schools visited the exhibition along with their teachers. The exhibition was of immense benefit to the students who study Chemistry as a subject and would create interest in Chemistry among the other students. Exhibition covered the areas such as; Environmental chemistry, Food Chemistry, Health Science, Industrial chemistry. The students were entertained by conducting chemistry magic shows. Several onsite demonstrations were also held to illustrate some aspects of chemical sciences.



Chemistry Magic Show



The advanced level practical stall demonstrated the importance and necessity of incorporating chemistry practical sessions into the curriculum in a more appealing manner. Students, especially those from outstation schools found the exhibits absorbing and the knowledge given to them in terms of practical point of view was appreciated by them and brought credit to the institute. At a time when the practical component is minimal to none, Institute took the lead

in presenting the importance and the impact of **practical in learning** chemistry. The exhibition



marked another milestone in terms of service done by the institute for the growth and development of chemistry in Sri Lanka. Considering the comments made by the school teachers with respect to the A/L Chemistry stall, it was a great success. All areas of chemistry were covered and both the laboratories at the institute were full of banners displaying the theory behind each experiment which help the students most. The banners provided them with knowledge which was hitherto unknown to them. Students were allowed to have hands on experience on certain practical such as functional group analysis and in certain experiments they were shown how theory is applied in the form of a practical. The most appealing of all was the demonstration of correct titration techniques which took effect every fifteen minutes. Altogether there were fifteen different practical demonstrations and efforts made by the institute students in particular to make the event a success tell much about their training at the institute.

Interschool Titration competition

An Interschool Titration Competition was conducted as a part of the above IYC 2011 activities. The main objective of the competition was to assess abilities achieved by the students with respect to laboratory skills of conducting titrations, proper recording of the results, and correlation of the results with the theory of the GCE (A/L) syllabus.

A total of 164 students from 42 schools participated at the titration competition. Among the Colombo

Schools, Devi Balika Vidyalaya scored the highest mark of 318. The 4 students participated from the school were; T.Wathmi Gunathilake, S Yasoda Weerasinghe, Deshanee Wickramarachchi, Dulani K I Liyanage. Central College, Kuliyapitiya scored the highest mark of 217 among the outstations schools. The 4 students participated from the school were; PPM C Kaushalya Pathiraja, R M I Rathnayaka, R P Gayan Madusankha, AAK Tharindu Adhikari.



Prize winners with Chief Guest and Officials

A booklet on “Solutions to questions given at the Inaugural National Titration Competition” is available at the office of the Institute of Chemistry. A copy can be purchased for Rs. 100 on request.

School Packs for Global Water Experiment IYC 2011.

On behalf of the UNESCO, RADMASTE Centre at the University of Witwatersrand sent five School Packs and five sets of printed materials valued at South African Rands (ZAR) 8894.90 (LKR 120,768.00) to IChemC in order for schools in Sri Lanka to take part in the Global Water Experiment of the International Year of Chemistry 2011. National Secretariat has been identified by UNESCO as the Focal Point for collection and distribution of the kits in Sri Lanka.

The School Packs and printed resources are a gift from the International Union of Pure and Applied Chemistry (IUPAC) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). The School Packs contain 10 x student kits and 1 x teacher kit for the purpose of allowing school children to carry out the four activities that form part of the Global Water Experiment. More information can be found about these activities on the website: water.chemistry2011.org/web/iyc.

IUPAC and UNESCO have developed a set of activities to entice students around the world to learn about how chemistry contributes to one of the most important resources in their daily lives, water. This global experiment, “Water: A Chemical Solution”, explores the chemistry of water and the role of water in society and the environment.

The Global Chemistry Experiment consists of four component activities. Each can be carried out by children of all ages in schools around the world. The activities are adaptable to the skills and interests of

students of various ages and use equipment that is widely available. The activities provide students with an appreciation of chemical investigation and data collection and validation. By the middle of 2012, the results will be displayed on an IYC data collection website as an interactive global data map demonstrating the value of international cooperation in science. The activities have been carefully selected in order to ensure they are suitable for implementation in schools across the world; they have been tested to ensure workability, especially in developing countries. Kits are available providing the equipment and materials required for the experiment.

The four activities in the Global Experiment on measurement of water quality are:

1. **pH:** students collect data measuring the pH of a water body, using indicator solutions.
2. **Salinity:** students explore the salinity of their local water body.
3. **Water purification:** using filtration and disinfection students will learn how chemistry is used to help in providing safe drinking water.
4. **Desalination:** Students will construct a solar still from household materials to desalinate water.

The school kits were distributed **free of charge** to five (5) schools selected at Provincial level, from among those who performed best at the Inter school Titration Competition held from 15th-21st November 2011 by this Institute. The schools qualified were: Devi Balika Vidyalaya, Colombo 8; Kuliapitiya Central College, Kuliapitiya; Vidyananda College, Mulliyawalai; Wesley High School, Kalmunai and Vijitha Central College, Dickwella. Arrangements were also made to demonstrate the said experiments on 27th **January 2012** at IChemC for the benefit of the teachers and students of the above schools.

Continuation of IYC Activities

1. Broadening the Scope of the National Secretariat

The present National Secretariat established for the implementation of IYC 2011 activities will be reorganized and strengthened to plan and implement programmes for the promotion of chemistry and chemical sciences in Sri Lanka. The National Secretariat has the task of reviewing the present legislation in regard to various other Acts and formulating a Chemists Act. It will also involve in the administration of the said Act after it comes to operation. The National Secretariat will be housed in the same building of the Institute of Chemistry Ceylon. The staff will consist of Chairman

(Specialist), Hony. Secretary and a Programme Specialist.

A Steering committee consisting of the Chairman, IYC Steering Committee, President IChemC, the Rector of the CCS, Hony Secretary, Hony Treasurer, Secretary for International Relations of IChemC and Chairman A&EP Committee will be established. The Secretariat will be strengthened to carry out coordination with the relevant government agencies, law enforcement authorities and the industry as well as educational institutions. While administering the provisions of Chemists Act it will identify, plan, and implement programmes for the promotion of chemistry and chemical sciences, in the country.

2. Development of legal provisions for Chemists Act /Amendments to present Act.

At present there are no legally empowered chemistry professionals to be responsible to certify the quality of raw material, finished products, consumer products or any other industrial products. Proper use and disposal of chemicals need the authority and this has to be done by chemists who should work according to prescribed regulations laid by the Government. In the field of education too chemistry subjects are taught at secondary and higher levels. There should be authorized persons to issue certificates to confirm specifications and also to comply with the specified regulations. Thus the services of chemists are required in education, manufacturing industry, import and export, distribution, storage and transport of chemicals. Therefore action should be taken to regulate the chemical industry through establishment of appropriate provisions in the present legislations. There is an urgent need to have a group of national level professionals with necessary legal authority to handle the present issues in regard to chemicals.

Empowering Chemists to provide them with legal authority to handle the present issues in regard to chemicals and chemical industry will greatly benefit the industry as well as the public. Therefore, this activity has been identified as one of the priority areas. Action will be taken to provide legal recognition to chemistry profession and thereby recognize the chemist designation as the authority to sign and seal or stamp chemistry documents for a study, estimate and design or analyze. Thus the chemical industry will be regulated through establishment of appropriate provisions in the present legislations.

The proposed process requires thorough study of the present legal provisions in other relevant Acts such as Control of Pesticides Act, Food Control Act, and Industrial Acts including Labour and Occupational Hygiene, Health Regulations and ISO 18000 etc.



Cooperation and support of other relevant agencies is extensively required in this exercise. Therefore, consultations and awareness meetings will be organized with various other agencies presently responsible for manufacture, import and export, quality control of chemicals and drugs etc. and legal aspects.

3. Training workshops on specific subjects related to the Industry

Provisions of the proposed Act will be extensively discussed at the meetings with relevant agencies, before and after its enactment to ensure its beneficial effects to the industry. Training workshops for personnel engaged in manufacture, import and export of chemicals, food control, health, industries such as tea, rubber, plastics and minerals etc. to enhance their knowledge in appropriate fields of chemical industry will be organized.

4. Chemistry Days, School Essay/Art/Poster competition

In view of the importance of chemistry and chemical sciences in the national development, high priority has been accorded to promote Chemistry among school children and the general public. Action will be taken by the National Secretariat to continue awareness programmes and educational programmes with a view to creating enthusiasm and interest in chemistry among the students. Accordingly, essay/arts/poster competitions will be conducted at each Educational Division level with the assistance of the Zonal education Offices of the Ministry of Education. Three best contestants from each Zonal Education Area will

be selected for the Provincial Level contests. Three best contestants from each Province will then be selected for the national level competition. The National Level Competition will be held with collaboration of the Ministry of Education/National Science Foundation. Chemistry Days will be conducted in selected schools. The objective of the Chemistry Day programme is to create awareness of the importance of chemistry in the daily life, contribution of chemistry to the well being of the society, enhancing the interest in chemistry among school children, improvement of knowledge in chemistry, and its importance in the national development. The school arts, essay and poster competitions and chemistry days will also enrich school children's knowledge in chemistry to help them at school level studies, encourage young people to get interested in chemistry and generate enthusiasm for chemistry activities, increase the student's appreciation and understanding of chemistry and its role in everyday of life. It is expected to select one school from District and each such school will invite neighboring schools for the Chemistry Day.

5. Publications

Action will be taken to publish articles, news paper advertisements, workshop proceedings, leaflets and pamphlets, proceedings of the workshops etc. to strengthen the above activities and to disseminate information among the chemical societies, universities, educational institutions, and government organizations etc.

Cover Page

The Cover page carries photographs depicting the educational and cultural activities conducted by the Institute of Chemistry Ceylon for IYC 2011; school children waiting in line to view the CHEMEX I exhibition; Chemistry magic show by the students of the College of Chemical Sciences (CCS) for school children at CHEMEX II open day exhibition; rituals in a Tamil home on Avurudu Asiriya day.

Highlights of International Year of Chemistry

CHEMEX 1 - 27th - 30th January 2011 at BMICH

Ceremonial Inauguration of CHEMEX 1 on 27th January



All Island Interschool Chemistry Quiz Contest



Orchestra by CCS Students



Drama by CCS Students



Practical demonstration



CHEMEX 2 - 24th - 26th November 2011 at Adamantane House



At the Entrance



School Children at the Chemistry Magic Show, one of the most popular events.



Practical demonstration



Practical demonstration

Chemistry in everyday life

Professor S Sotheeswaran

Institute of Chemistry Ceylon, Rajagiriya

Chemists are the victims of bad publicity. We are held responsible for dangerous chemicals in foods, fertilizers, medicines, detergents, toiletries etc. In other words, chemists are responsible, among other things, for ill health, environmental pollution and the slow strangulation of bio-diversity. In brief, we are the cause of many ills on this planet.

I wish to:

- (a) defend chemists against some of the wrongdoings we are unjustly accused of and
- (b) write in praise of chemists.

We chemists have the right to be extremely proud of the fact that the year 2011 was declared as the International Year of Chemistry (IYC) by the United Nations. Chemists all over the world are determined to celebrate IYC 2011, and enthusiasm gathered momentum in Sri Lanka with the involvement of the Institute of Chemistry Ceylon, which organized the exhibition "CHEMEX 2011" at the BMICH in Colombo from 27-2-2011 to 30-2-2011. Sri Lankan chemists came out of their smelly laboratories and invited the Sri Lankan public, especially schoolchildren, to join in the celebration dedicated to Chemistry. "CHEMEX 2011" received overwhelming support from the public and was a resounding success.

When did Chemistry begin? I would say the moment the universe began. Eminent cosmologists and astro-physicists tell us that during the moments after the big bang, energy was converted to matter in the form of minute particles that have been given exotic names. In due course, these particles coalesced to form the lightest elements, and these in turn were cooked in stars to form heavier and heavier elements; elements then combined in numerous and various ways to form compounds of increasing complexity; and then humans appeared on this planet. Humans are a bundle of chemicals. We are not biological entities—we are chemicals engaged in doing physics.

Who was the first Chemist? It is anybody's guess. But I like to think that it was the man who first made glass serendipitously when he cooked his food in a hearth on the seashore. We now know that high heat and silicon dioxide, or silica, from sea sand are necessary to make glass. Or it may have been the wife of that man by the sea who did the cooking—in which case the first chemist was a woman.

The history of Chemistry is full of serendipitous discoveries. It is also full of inspired intuitions, guesswork, hard-work, luck, controversy and heartbreak.

If chemistry appeared on this planet at the

beginning of time, when will it end? I think it will prevail till the end of time.

Now let me stop wandering to the beginning of time and hurtling to the end of time and bring you back to the present. All I want to tell you is that you may hate chemistry, but you cannot escape it.

Chemistry is all around you. It is in the kitchen; it is in the market place; it is in the food you eat; it is in the medicine you take; it is in the clothes you wear; it is in the shelter in which you seek refuge. It is everywhere. IT IS IN YOUR DAY TO DAY LIFE.

About Water

The very water you drink is a chemical; it is a compound of hydrogen and oxygen in the atomic proportion of 2:1. Chemistry has come a long way since the time scientists agreed that water is a chemical with the chemical formula H_2O .

There is now an explosion of knowledge in the field of Chemistry. But certain procedures remain the same. The discoverer of the structure of water had to supply experimental proof for the notion that water is H_2O . His peers were satisfied and accepted his idea. Proof is necessary even today when a new hypothesis is put forward.

We all know the importance of water in human lives. Without water there would be no human life. About two-thirds of the weight of an adult human consists of water. About two-thirds of this water is located within our biochemical cells, while the remaining third consists of extracellular water, mostly in the blood plasma and in the interstitial fluid that bathes the cells. The water in the blood plasma serves as a supporting fluid for the blood cells; water acts as a vehicle for transporting chemicals between cells; it also helps to eliminate waste chemicals from the body to the external environment. The water in blood plasma contains salt (NaCl)—another chemical—as well as other inorganic salts, protein and a variety of trace substances.

How does the body get water? Drinking water constitutes only one source of water; many foods, especially fruits and vegetables, are an important secondary source. Even the driest nut or biscuit contributes some water. In addition, a considerable amount of water (350-400 mL/day) is produced *metabolically*—from the biochemical oxidation of glucose in our bodies.

The quantity of water exchanged within various parts of our bodies is surprisingly large. The kidneys process about 180 L/day; most of this processed water is returned to the blood stream.

DNA(Deoxyribonucleic acid)

I am sure there are very few people who have not heard of DNA—the genetic material that controls heredity. The great structural chemist Linus Pauling proposed a structure for DNA that was not accepted by his peers. It was Watson and Crick who put forward the now famous double helical structure of DNA. It was acceptable because it concurred with all the known data about DNA.

Water is an inorganic compound with a simple structure whereas DNA is a complex organic compound with a novel structure. Water and DNA are chemicals that exist in nature. Chemistry does not stop with investigating natural chemicals such as these.

Designer Chemicals

Today, chemists are capable of delivering designer chemicals, designer therapeutic drugs and designer genes.

Benzodiazepines are good examples of designer therapeutic drugs. They are used as tranquillizers, hypnotics, anticonvulsants and centrally acting muscle relaxants and rank among the most frequently prescribed therapeutic drugs.

In 1960, the first benzodiazepine, chlordiazepoxide, was introduced. To date, more than 50 benzodiazepines have been marketed in over 100 different preparations. They are sold mainly as capsules and tablets; however, some are marketed in other forms such as injectable solutions or as powders.

In the illicit drug market diazepam, temazepam and flunitrazepam are used as drugs of abuse, often in combination with alcohol, and as additives in other drugs of abuse. Virtually all of the benzodiazepines in the illicit market come from diversion from legitimate sources and there is no evidence of clandestine manufacture.

Methaqualone is another designer therapeutic drug; it was first synthesised in 1951 and introduced in 1956 as a new medicine that produced sedation and sleep.

Methaqualone had been initially designed to counter the nervous damage caused by long-term drug abuse and to reduce the possible risk of dependency on barbiturates, which were therapeutically used as sedatives. This plan did not succeed.

Interest in methaqualone rose dramatically in recent years. Its popularity was due to its undeserved reputation as an 'aphrodisiac' often in combination with diphenhydramine. Because of its strong habit-forming properties the drug was placed on the list of controlled substances and the legal manufacturer stopped its production and removed it from the market in 1984.

There are many more chemicals besides the few examples given above that have been synthesized by chemists, and these are examples of chemicals made to order.

Today, chemists have wonderful, sophisticated

and, it must be admitted, costly tools, and advanced techniques to analyze chemicals speedily and to synthesize and test novel chemicals.

But we chemists must jealously guard our image. If we are told that the word "synthetic" stinks, we must labour to point out that everything synthetic is not harmful per se. It is the misuse, overuse and abuse of synthetic chemicals that is harmful.

The public demands wonder drugs and then blames the chemists if there are side effects. It is our duty to tell the public that it has a right to demand new and efficacious drugs and also demand that the proper government and medical authorities test and monitor these drugs and regulate their use. It is not the fault of chemists that prescription drugs are freely available over the counter and that patients resort to self-medication. It is our duty to warn.

Natural Chemicals

Almost every chemical, be it natural or synthetic, is a potential poison. Chemists did not invent chemicals. No matter how many chemicals we synthesize we cannot match the number nature has synthesized in her laboratories—the leaves, flowers, stems and roots of plants, animals, the bowels of the earth, volcanoes, oceans, the atmosphere and so on. It is not merely a matter of numbers but also of endless variety and matchless complexity.

If we were to investigate the chemicals in the leaf of just one exotic plant, we will find dozens of chemicals—some already known but others new and unheard of. The discoverer even gets the privilege of naming the new chemicals.

Nature can vex chemists. She will vary some of the chemicals in that leaf, and their proportions, according to the season; the soil, the cultivar and so on.

The natural world is full of harmful chemicals, many of which are capable of causing cancer. We take in minute amounts of carcinogens every time we eat mushrooms and celery. We consume toxic chemicals every time we eat tomatoes and potatoes. There are an incredible number of carcinogens in nature and we get more of these carcinogens than carcinogens produced by the chemical industry.

We can not do much about natural carcinogens but we must be wary about the use of synthetic carcinogens and other toxic chemicals we produce for various purposes. Cigarette smoke contains more than 40 chemicals that are carcinogenic. These are inhaled by smokers and also by passive smokers.

Chemicals should be used wisely—not just synthetic chemicals but also natural chemicals that are a gift to us from nature. Morphine is a natural painkiller that comes from the poppy plant but it is also a dangerous habit-forming drug if used unwisely.

Morphine was the first biologically active alkaloid to be discovered and was extracted from the opium poppy plant in December 1804 by Friedrich Sertürner. The drug was first marketed to the general public by

Sertürner and Company in 1817 as an analgesic, and also as a treatment for opium and alcohol addiction. Commercial production began in Darmstadt, Germany in 1827 by the pharmacy that became the pharmaceutical company Merck; morphine sales contributed largely to its early growth.

Some natural chemicals are 100% poison with, at present, no known usefulness to humans. But believe me, they are useful to the plant or animal that produces them. The poison produced by poison ivy must have evolved to prevent enemies of poison ivy from munching it. In short, it is a chemical weapon. Nature produced chemical weapons long before chemists did. On second thoughts, I wonder whether chemists ever produced chemical weapons—they produced chemicals that have been used as weapons. Is the chemist culpable? Chemists can give the world their discoveries and the facts and possibilities about those discoveries. It is up to the world to choose what to do with the discoveries.

The most dangerous chemical weapons used during World War 2 were known as sarin and tabun. German chemists synthesized these chemicals. It was known that commercial pesticides are used in agriculture to kill pests and that these pesticides act as neuro-poisons—that is, these pesticides attack the functioning of the brain of the pests and eventually kill them. Sarin and tabun are neuro-poisons that were used as chemical weapons during World War 2 and many civilians were killed in addition to combatants. Chemical weapons can kill extensively and are known as weapons of mass destruction.

Food Flavours

If the manufacturers of instant soups and instant sauces and other packaged foods find it profitable and easy to use synthetic chemicals in their products, it is up to the public to demand that these be safe chemicals and it is up to the authorities to see that manufacturers conform to safety regulations. The

trouble is that chemists can not only synthesize novel compounds but can also make synthetic copies of those that exist in nature. This allows manufacturers to steer clear of the abominable words “synthetic chemicals or synthetic substitutes” and proclaim that the ingredients include “nature identical flavouring substances”. This euphemism for “synthetic chemicals” helps sell the product. It is up to the consumer to demand what is wanted and to help set standards.

Role of Chemists

Chemists can help people make informed personal choices when it comes to selecting chemical based products.

Chemists can help society make choices regarding the use of chemicals that will strike a balance between the use of chemicals and the quality of life.

Chemists can contribute to the recycling of natural resources thereby helping to preserve or restore the environment. They can persuade people to use chemicals sparingly in order to minimize pollution. They can campaign to popularize the use of vehicles that make the best use of the sources of energy required for transportation. They can encourage people to use energy sources frugally in order to conserve them and help in developing renewable sources of energy.

In the case of massive industrial accidents as happened in the Bhopal tragedy and in the Gulf of Mexico Petroleum leak, chemists can help in identifying the cause, help in cleaning up the environment and help in devising safety measures that will prevent such tragedies in the future.

I close with the slogan that chemists have adopted—“Chemistry is the Central Science”. I am sure it will continue to be so.

Graduateship Examinations in Chemistry, 2011

Level 3 Overall Awards List, 2011

First Prize & Mandrupa & Oleap Fernando Hall Opening Scholarship	Mr P U A I Fernando
Second Prize and Susila Jayaweera Memorial Scholarship	Mr R Sanjeevan
Third Prize & Graduateship Silver Jubilee Scholarship	Ms L P Egodawatta

Merit Bursaries (*in order of merit*)

Ms H C Weerarathna, Ms S D Gunasinghe, Ms M C D Cooray, Ms L A P Obeysekera, Ms N H P De Silva

Level 3 Prize List, 2011

Mrs Careen Manel Abeywardene Memorial Prize for Natural Products Chemistry	Mr A S Ghouse
Batch 2005 Prize for Information Technology	Mr H R Chinthana
P. Rohan K. Fernando Prize for Special Topics in Chemistry	Ms L A P Obeysekera
Egodawatte G. Somapala Prize for Food Chemistry & Technology	Ms N H P De Silva & Ms L P Egodawatte
Mr & Mrs N. I. N. S. Nadarasa Prize for Special Topics in Organic Chemistry	Mr R Sanjeevan

Chemistry for Industry

Rajitha Kariyawasan

Managing Director, Haycarb Plc and Director, Hayleys Plc

Economy and Sustainable Industrial Development:

Sri Lankan Economy has recovered, and is expected to record an accelerated growth rate close to 8% in 2010 and beyond. This is after a decline in the GDP since 2006 to 2009. There is a very positive economic outlook with the ending of 3 decades of war in the North & East, which has resulted in a strong political and economic outlook in the backdrop of the slow recovery of the global economy.

The Industrial sector contributes close to 29% of the total Sri Lankan economy with a growth rate above that of the GDP over the last 5-6 years.

It is essential that Sri Lanka looks forward to a Sustainable Industrial Development model, within the three key pillars of, the Government/Economic Policy framework, Private sector focused towards Triple Bottom line, and a conscious civic society playing their roles effectively for Sustainable Development process.

Significance of Research & Development (R & D)

The role of R&D in Chemistry in the industrial development is vital. Enhancement of effective R&D efforts and resultant new technologies help to enhance the value added products/services enabling to compete in developed and sophisticated markets. Whilst helping to build a knowledge workforce, its strength in brand building and providing a competitive advantage is very important to recognize. The R&D and new technology will assist in taking Sri Lanka economy from a factor driven one at present to an efficiency driven one in the future whilst setting targets for the ultimate reach to the Innovation Driven Economy. Can Sri Lanka have an Economic Plan reach to an Innovation Driven Economy by year 2030? Effective enhancements and developments in Chemistry will help to reach that status.

It is important to recognize the dynamic R&D spending and knowledge flow in the world. Today the USA, European block and Japan are key net R&D generators whilst China/India are key R&D net importers. Today Sri Lanka is estimated to spend less than 0.2% of its GDP on R&D where as countries like India and China spending over 1% of their GDP on R&D. This is significant considering their size of the economy. Therefore, it is essential to increase Sri Lanka's R&D spend to at least 1% of its GDP, if we are to have a sustainable and a rapid industrial growth.

On the other hand, out of the total global R&D spend estimated around US\$ 1 trillion, nearly 62% contributed by major Corporations and around 38% by Governments, nonprofit organizations and other

institutes. What is most striking is the fact that nearly 50% of world R&D spend (ie around US\$ 500 billion) is spent by 1000 Private Corporations named as Innovation 1000 Companies. This is a small population of corporate world that constitute the best innovation driven Companies. In the sectoral analysis, it is important to recognize that Healthcare, Computing & Electronics and Auto sectors being the leading segments of R&D spend. In that sense, Sri Lanka needs to have a FDI policy framework and economic policy that caters to attract such large and innovative driven Multi National Corporations if we are to increase our R&D spending, apart from looking at additional contributions from the State.

Role of Chemistry

Let us look at key challenges Sri Lanka faces for which Chemistry need to support effective solutions. They are Poverty Elevation, R&D spending and technology gap, influencing Government Policy, influencing the Corporate culture, finding solutions for Energy-Food crisis, health issues and climate change etc... the list goes on.

There is a gap in education system that is common to Chemistry field as well. At macro level Sri Lanka's spend on higher education is close to 0.5% of GDP (based on limited statistics available) that is much below USA, Europe and Japan; also well below China who spends around 1.5% of GDP that has increased by many folds during the last few years. Sri Lanka needs to increase the higher education spend between 1-1.5% of GDP, if we are to prepare the next generation for the 'future' industrial and economic growth. In this process the gaps in the higher education framework, infra structure/resources and Attitudes need urgent addressing.

It is vital that we realize the closeness of Chemistry in almost every product and activity in our day to day lives; Chemistry creates the building blocks of our daily used products/services and activities. From an industry angle, it is important to recognize that there are upstream, intermediary and downstream sectors of the Chemistry in industry. Also it is important to note the industry verticals and laterals if we take key industrial segments like food & beverages, textiles etc in our value adding industry segments.

These industries demand value addition, brand building/recognition, competitiveness through innovation and productivity, new technology, compliance to quality and environmental regulations to address the growing customer needs where Chemistry

should partner in finding solutions.

The following industry experiences can also be highlighted.

Positive Experiences	Negative Experiences
• Desire' to Value Add and build Strategies embracing Innovation and NPD • Enthusiastic and qualified talent pool • 'Desire' to be innovative • Resilience to Chaos and Respect for Sanity • Positive attitudes • Willingness to embrace change on new processes and technology	• Lack of Innovation platforms and NPD Strategies • Poor value addition and brand building • Vacuum in Industry Experts & Brain Drain • Disconnect Between R&D/Academic Community and Business Leaders • No vibrant PPP • Inadequate new technology platforms on new key applications for Chemistry • Inadequate Presence of Key Multi-National Corporations and Linkages to key Research/Testing Institutes • Internal Focus on industry needs in Projects – Not driven by Customer/Market needs

In conclusion, the role of Chemistry professional and Institutes should be geared to,

1. Focus on Value addition in the Economy & Industry – innovation , efficiency and productivity
2. Compel the State and Private Sector to invest on R&D – minimum threshold on 1% of GDP and Companies at 1% Turnover (Incentivize)
3. Acquire Expert Knowledge – Expand the horizon through higher studies, import & impart 'knowledge and competencies'
4. Build effective Private Public Partnership
5. Continually evolve Chemistry Curriculum to meet the needs of Industry (of New Sri Lanka)
6. Be good at right things; not at everything
7. Market/customer orientation
8. Entrepreneurial Spirit
9. Prepare to be future leaders – Private and Public Sector – CTO/COO/CEO roles

Innovation is the key for all this success. This is practically shown many times by Corporations who are innovation leaders and drivers through their leadership position in the industry segments. These Companies have excelled in both top and bottom line with exponential growth over many years.

As Apple CEO Mr. Steve Jobs ones said, "Innovation distinguishes between a leader and a follower".

This is further strengthened by the inscription of the Nobel Prize for Chemistry & Physics which says, Inventions enhance life beautified through art; synchronizes ideally with the theme of the CHEMEX 2011, Chemistry – Our Life, Our Future.

Membership News

The following persons have been either transferred or admitted to the categories of membership and designation between July 2011 to January 2012.

Transfer to Fellow

Mrs. S Elakaduwa
Ms. K P Chandrani Ukwatta

Transfer to Member

Ms. T B R N Jayatissa
Ms. B S Lankage
Ms. I S Perera
Ms. S H U I De Silva

Admission as Member

Mr. R B Warnakulasooriya
W P R Liyanage
Y M P B K Warnasooriya
Y M N S Bandara

Admission as Associate

Mr. D M D S Dissanayake
Mr. W M S C Wanasinghe

Admission as Licentiate

Mr. R Kapila
H M A K Herath
V R Pathira Kankanamge

correction to Chemistry in Sri Lanka Vol. 28 No. 3 page 12

Transfer to Fellow Mr. D H L W Jayamanne

Professional Chemical Education for the well-being of Society for the Knowledge Based Era

Prof. J N O Fernando

Honorary Rector, College of Chemical Sciences

We have over the past few days witnessed that this mammoth Exhibition and Trade Fair CHEMEX 2011 has inaugurated the International Year of Chemistry so designated by the United Nations.

I believe that we have been able to enhance the appreciation of Chemistry for the well-being of the Sri Lankan Society as a consequence of what we have been able to offer to thousands of school children who have attended this great event, and seen the wonders that Chemistry has to offer.

Although the disciplines of Chemistry is followed by all Sri Lankan science students at the Advanced Level stage and Chemistry continues for many decades to be the most sought after programme for specialization in the SCIENCE Faculty of Sri Lankan Universities, Chemistry is viewed by a large majority of Sri Lankans merely as a means to an end and not as a profession by itself. The importance and the indispensable need for Chemistry as a profession on a level similar to that of other professions such as Medicine, Engineering, Law and Architecture has not been widely disseminated. We hope that the numerous events and activities planned for the International Year of Chemistry with the global tag line Chemistry - Our Life, Our Future will enable the Chemistry Profession to receive more recognition than at present and the importance place of Chemistry Industry in the life of any nation is appreciated particularly by young people. Chemistry is indeed a creative and innovative science and its research applications are indispensable in any area of society be it pharmaceuticals, agriculture, engineering, communications, constructions, environment, food, textiles etc.

We are now well into a Knowledge Based Society in which the new material for a productive economic development has moved away from money to Information, Education and Knowledge. Knowledge is the key to the development of people and if this critical asset is provided to disadvantaged people, then they would be in a better position to clear out of the poverty trap. The only route to great knowledge is through proper Education & Training permitting people to take full advantage of emerging technologies. Information which is weightless, invisible and omnipresent is converted to the meaningful form of knowledge, understanding and wisdom through Education.

It is in this context that diverse form of Chemical Education has a big role to play towards the well-being of society. The unique role played by the College of Chemical Sciences of the Institute of Chemistry Ceylon

by providing over the past four decades two invaluable professional programmes at the technicians/technology and the Graduateship levels is indeed a very significant and praiseworthy. Our Institute has therefore been able to supply 746 Chemistry technologists who are providing a useful supportive role at the middle level and then remain up to today as the only such programme amongst the basic sciences. The more ambitious and demanding Graduateship Programme in Chemistry provides over 40% of all the Graduate Chemists produced in Sri Lanka and we are since 1996 the largest provider of such Graduate Chemists: The 739 Graduate Chemists so far produced had also enabled Sri Lanka to produce at no cost to the national exchequer useful and productive chemists who are making enormous contributions towards the well-being of society and national development, both nationally and globally.

This four year programme is perhaps the most low cost degree programme anywhere in the world but produces high quality Graduate Chemists who have been recognized and accepted both for higher degrees and employment in Universities and institutions spread globally.

The Institute of Chemistry Ceylon which conducts these programmes, with efficiency, equity and efficacy had also been able concurrently to enhance its own infrastructure and service for the well-being of Sri Lankan society. These educational programmes have enabled the Institute to enhance its office facilities from zero to that of a four storeyed building at Rajagiriya so that the general well-being of Sri Lankan society has got a tremendous boost. The employment of 40 full time staff and several visiting Staff in order to provide these educational facilities has also been made possible through the Institute's direct involvement in human resource development through professional Chemical Education. The Graduateship Programme has also been recognized and accredited by the Northumbria University in the UK and the Cincinnati University in the USA by giving credit exemptions for Sri Lankan students who wish to proceed abroad after two years enabling them to obtain a foreign degree at a much reduced cost since the first two years are conducted at the College of Chemical Sciences.

Let us therefore recognize the role of Chemistry in contributing solutions to global challenges and appreciate the invaluable role played by Sri Lankan Chemists in providing professional Chemical Education with magnificent human resource development for the well-being of society.

Science and its role in a better world; Role of young academics

Vinitha M. Thadhani

Executive Committee member, Global Young Academy (Group Leader, Science Education)

Senior Lecturer, University of Sri Jayewardenepura

Scientific innovation has been, and will continue to be the dominant engine of global growth. Socio-economic development is no longer dependent on natural resources (eg. Japan, European countries). The countries which believed in investing on science education are making more progress than the countries who have invested on gold and oil mines. Knowledge is now the main driving force of world economies and there is a lot needed to be done by the young scientists of the country to reach this goal.

Sri Lanka's ability to create a demand driven education system that focuses on lifelong learning will determine the country's capacity to embrace the benefits of knowledge economy. Scientific literacy is essential to stimulate an environment conducive to new knowledge generation, discovery and innovation.

Access to science education has grown steadily in Sri Lanka in response to the need to widen scientific literacy. Curriculum reforms through the years have sought to improve the quality of science education and important strides have been made. The literacy level in Sri Lanka has reached up to 95%. Despite this progress there is a concern about science education. Students are not able to demonstrate acceptable levels of achievements in applying their knowledge to everyday situations and to work place. The innovation in Science and technology division in Sri Lanka has been below satisfactory when compared to other neighboring countries.

Competency based science education

Science is taught in many schools mainly as examination oriented, using conventional teaching/learning methods and does not stimulate interest.

Memorizing facts and information is not the most important skill in today's world. Facts change, and information is readily available, what is needed is an understanding of how to get and make sense of the mass of data. Primary and secondary education should focus on teaching students 'how to learn' rather than emphasizing occupation specific knowledge. Providing students with lifelong learning skills will make them more adaptable to the rapidly changing needs of the market. Inquiry based learning is a form of active learning, where progress is assessed by how well students develop experimental and analytical skills rather than how much knowledge they possess.

In a recent all Island survey conducted by Institute of chemistry, from more than 8500 school children (Grade 10-12), it was revealed that more than 80% of

our school children preferred learning science which included student centered activity, along with the traditional method of chalk/board/dictating notes methodologies.

Young academics should be more frequently involved in curriculum development, improving teaching methodologies etc. This process would enable to pass the experience of senior academics to the relevant authorities through the young scientist.

Interdisciplinary research

A world which is increasingly facing global challenges such as climate change, resource exploitation, and public health disparities etc, can not face these challenges using a science of single disciplinary. Thus unlike earlier times, we would hardly find any Ph.D. which are given on single disciplinary. Sri Lanka should also promote this by having especial granting schemes for research which are multidisciplinary.

University/ Industry partnerships

A key issue for many at the forefront of innovation is to ensure that the intensive research and development is put to good use and that the technology in universities, are transformed in to commercially viable products. This issue is a global problem, and academics need to stay connected with industries to make sure their products add value to the economy. Young scientist who often tackle research problems in less conventional ways than do their older more established peers, also could be good ambassadors to reach this goal.

Importance of formation of National academies for young scientist

There is a stark difference between the world of sports and science, in both young people from around the world try to surpass all previous accomplishments in pursuit of world records or scientific discoveries. Selected entirely on merit, athletes receive honor just for participating in the games, spurring the next generation of young people in each nation to excel. And as star athletes age, they often support their sport in other ways, serving as advocates, mentors, or coaches. In contrast in too many nations including Sri Lanka selection and promotion processes in science involve consideration other than merit. Senior scientists receive most of the resources available for scientific research and young scientists rarely receive societal recognition for their work. Perhaps as one

consequence, science is typically not a top career choice. Thus many exceptional scientist around the world thereby go unrecognized, their talents allowed to wither away untapped.

In an attempt to reverse such trends, a nascent young national academies movement has begun across the globe, namely Global Young Academy (GYA), a new international group of young scientists has recently been established by inter Academy Panel for International Issues (IAP) to promote this cause. The GYA promotes establishment of national young academies and provide a forum for young scientists in countries without such organizations.

Many senior academies have seen the need of establishing national young academies of their respective countries. Germany Academy was the first, to form a young national academy 10 years back. Netherlands followed it. And in recent past, Sudanese, Denmark, Scotland, South Africa, Thailand, and Japan young national academies have been formed, to encourage and empower their young members to engage in interdisciplinary research, communicate science to society, and provide advice on national science policies, especially those affecting young scientists.

In the interests of scientific and resource sustainability, a country should encourage the views and approaches of its best young scientists, who often tackle research problems in less conventional ways than do their older, more established peers. The establishment of NYA in Sri Lanka would emphasize

bringing together young scientists from all fields related to science to expand research capacity and exchange best practices in science policy and education. This effort would also aspire to advance communications between science and society.

Prevent Brain Drain

The university education of Sri Lanka has never failed to produce quality graduates, who are able to obtain enrolment to foreign universities. On the other hand large numbers of excellent young scientists of our country migrate to developed countries. This is the worst situation which a country could face. This is due to the difference in research opportunities between developing and developed countries. These expatriate scientists often have a desire to support research development in Sri Lanka, but do not know how and where to start. Methods should be developed to *Attract them back---* by creating an enabling environment such as salaries, research funding, access to literature/ Instrumentation etc. with the ultimate goal to improve the scientific environment in the country, which will lead to a decrease in the brain drain phenomenon.

Given that science, technology and innovation is pivotal to economic advancement and societal benefit, the voice of the young scientists community contributes importantly to the success of these issues. Thus it is the utmost responsibility of all young academics who are passionate about science to play their role in best of their ability in the prevailing circumstances, for the betterment of tomorrow.

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Electrochemical Science: Advancement, contribution towards national development

Dr. U S K Weliwegamage

College of Chemical Sciences, Institute of Chemistry Ceylon, Rajagiriya

Electrochemistry is one of the very important theoretical and applied topic coming under physical chemistry. It accommodates a broad technology including a vast range of applications. At our day to day life we make use of many applications of electrochemical technology. It may be ranging from a simple dry cell to any advanced device. Electrochemistry deals with the processes take place at the electrode solution interface, most are quite complex multistep processes and involves charge and mass transfer, adsorption desorption, electro deposition, etc.

Historical background:

The two English scientists John Daniell and Michael Faraday (1791-1867) are honoured as founders of electrochemistry. The development of electrochemistry dates to eighteenth century. Michael Faraday stated his famous two laws of electrochemistry in 1832. He was the inventor of electric motor as well. Daniell invented a primary electrochemical cell

known as Daniell cell which generated electricity consisting of copper and zinc electrodes.

The English scientist William Gilbert discovered magnetism during the same period. In 1663 the first electricity generator was invented by the German scientist Otto von Guericke. In 1785 the laws of electrostatic attraction was formulated by Charles-Augustin De Coulomb. The investigations of Luigi Galvani using a frog leg in 18th century set the foundation to studies in real electrochemistry, the relation of electricity and chemical reactions. The electrolysis/decomposition of water to generate hydrogen and oxygen was studied by William Nicholson and John Wilhelm Ritter in 1800. The work on electrolysis of Sir Humphry Davy in the same century led to the isolation of the two elements sodium and potassium. At a junction between two dissimilar metals, when there is a heat difference in the two metals a junction potential arises, which was discovered by Thomas John Seebeck in 1821. The

Ohms' law was formulated by German Scientist George Ohm in 1827. First fuel cell was produced by William Grove in 1839. In 1868 George Leclanche invented the first widely used dry cell Zinc- carbon battery.

The famous Arrhenius theory of electrolytic dissociations of aqueous solutions was published in 1884, which contributed very much to the understandings of ions in solutions. The studies on conductivity by Friedrich Ostwald (1894) supported the ideas of Arrhenius and also discovered about strong and weak electrolytes. Walther Hermann Nernst in 1888 put forward the ideas on electromotive force of electrochemical cells and famous Nernst equation.

Major Branches of Electrochemistry:

- (1) Theoretical Electrochemistry : This deals with the simple and advanced principles of electrochemistry
- (2) Applied Electrochemistry : This has several branches
 - (i) Electroanalytical chemistry: This includes the analytical techniques based on electrochemical principles. They are mainly divided as two electrode and three electrode techniques. Conductometry and potentiometry include the major two electrode techniques. Potentiometric sensors are used in determining many important analytes such as different ions, pesticides, etc. Among the three electrode techniques: voltammetry (e.g. cyclic, square wave), amperometry, stripping analysis, polarography are included. There are many important daily applications of such techniques such as amperometric glucose electrode / biosensor based on glucose oxidase enzyme activity, used by diabetic patients. Amperometric sensors are very sensitive and could be used in trace level determination of several analytes such as pesticides, some heavy metal ions, and substances like peroxides. Apart of these cyclic voltammetry is a very important primary investigation tool of redox properties of systems, known as the spectroscopic analogue of electrochemistry.
 - (ii) Electrochemical energy sources: They include a wide range of electrochemical cells, simple dry cells to high capacity cells used in hybrid motor vehicles. Fuel cell technology also found to be an

attractive mode of electricity generation in recent years. Nano technology also has contributed in advancement of electrochemical cells. Some such cells based on carbon nano-tubes have found to be very efficient in energy storage, which could be used in electrically driven cars.

- (iii) Corrosion and its prevention: Corrosion and its prevention is a very important area in material science. The corrosion of metals is an electrochemical process. Design of methods for prevention of corrosion depends on the knowledge of the electrochemistry of the system.

Contribution of Electrochemistry to Industrial development of Sri Lanka

Sri Lanka once had very prominent electrochemical industries such as Paranthan Electrochemical industry, which used brine to generate sodium hydroxide having by products hydrogen and chlorine. All these are important raw materials for several industries. Further chlorine is daily needed in water disinfection, which is solely imported, although our country is surrounded by ocean. It is time to re establish this industry at Paranthan. Further there is a potential to establish electrochemical industries based on brine at some other locations as well, may be at Puttalam and Hambantota.

Metal Finishing

This industry includes electroplating, galvanizing, metal polishing etc. This is carried out in different areas of the country as cottage industries. The government or other private sector investment on this area is very low, other than few such large scale industries at some BOI export processing zones. This is a very important industry which chemists could contribute.

Electrosynthesis

Many industrially important substances (e.g. some drugs, polymers) could be produced by electrosynthesis, where the required product is generated by an electrochemical process. Such substances could be produced at very pure level compared to conventional synthetic methods.

Benevolent Fund Benefits for Members

- **Long life** Benefits: Rs. 10,000 (over 70)/Rs. 15,000 (over 75)/Rs. 20,000 (over 80)
- **Critical illness** benefits (upto Rs. 50,000)
- **International travel** for conferences (upto Rs. 50,000)
- **Balance** 50% of **Tuition fees** of any member's child following the Graduateship Programme (Since 50% concession is already by CCS, this will amount to a 100% waiver)

Any member who has paid membership fees for life (after 3 years of such payment) is entitled for these benefits. All members are advised to pay the membership fee for life and become beneficiaries.

Taurine - A therapeutic agent?

Dr. Chandani Udawatte

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A growing number of reports advocate the use of taurine and related compounds as therapeutic agents for a wide range of disorders that induce apoptosis in tissues throughout the body. Taurine is known to be a free radical scavenger and an antagonist to oxidative stress in protecting heart, lung, and liver cells from cell death, and it has proven useful as an anticonvulsant in reducing epileptic seizures. In addition, there is good evidence to show that taurine, one of the major constituents of the mammalian central nervous system, is essential for normal retinal development. The concentration of taurine in the distal layers, including photoreceptors and retinal pigment epithelium (RPE), of the vertebrate retina is estimated to be 60–80 mM. Although taurine's precise function has often been speculative, numerous studies have shown that a taurine deficient diet, or the inhibition of taurine transport, causes photoreceptor loss and RPE abnormalities in a variety of animal species including primates.

Interestingly, despite the high oxygen consumption required to meet the energy demand of cells of the distal retina, more proximal retinal layers exhibit a greater susceptibility to metabolic or hypoxic/ischemic insult. Indeed, it appears likely that photoreceptors and RPE cells are rendered resistant to metabolic insufficiencies by an endogenous agent that serves either to prevent apoptosis or to suppress the spread of cell death across the layers of cells that constitute the RPE and the photoreceptors, each of which is linked to its neighbors by gap junctions.

To determine whether taurine exerts a protective effect on the retinal pigment epithelium (RPE), the human RPE (ARPE-19) cell line was used as a model system. These cells were exposed to a cytotoxic agent, cytochrome C (cyC), which has been shown previously to induce apoptosis. Monolayer cultures of confluent human RPE (ARPE-19) cells, which express gap-junctional proteins, were incubated in culture medium with or without taurine. After scrape loading cyC, a cytotoxic agent known to induce apoptosis was introduced into the cells, these cells were assayed for caspase 3 activity and terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) staining to determine the spread of apoptosis.

A scrape-loading technique used earlier to study the spread of apoptosis through gap-junctional channels was modified. The method involves the introduction of cytochrome C (cyC) to trigger downstream caspase activity in a limited population of cultured cells, i.e., those opened to the extracellular milieu by the scrape, and to then assay by immunocytochemistry and terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) staining

the spread of apoptosis to neighboring cells through the gap junctions with which they are coupled. The procedure enabled to examine the effects of taurine on the induction and spread of apoptosis in ARPE-19, an immortalized cell line derived from human RPE.

Connexin expression: The cellular localization of Cx43 and Cx46, gap junctional proteins expressed by ARPE-19 cells, a human retinal epithelium cell line, was examined by immunocytochemistry (Figure 1). Connexin expression and Gap Junctional Inter-cellular Communication are prerequisites for the intercellular spread of cell death by toxic agents generated during apoptosis in experimental protocol. Cells were plated on sterile 35 mm plastic dishes, grown to near confluence, washed with PBS (17 mM KH_2PO_4 , 5 mM Na_2HPO_4 , 150 mM NaCl), and fixed either with 4% paraformaldehyde in PBS, or in buffered methanol, which was composed of 90% methanol, 10 mM HEPES, 0.1 mM MgCl_2 , and 0.1 mM EGTA, chilled to -20°C . Similar findings were obtained with both fixatives. The cells were then permeabilized in 0.1% Triton-X-100 for 10 min at room temperature then blocked for 2 h at 37°C in a solution containing either 3% fetal calf serum or 10% goat serum in PBS. They were incubated overnight at 4°C in a polyclonal rabbit anticonnexin 43 antibody against a synthetic peptide corresponding to a segment of the third cytoplasmic domain of rat connexin43. Antibody binding was visualized by fluorescent microscopy using goat antirabbit Alexa 488 secondary antibody as well as with a sheep antirabbit FITC secondary antibody. Cells were similarly examined for the expression of connexin 46, by incubating with a polyclonal rabbit anticonnexin 46 antibody and a donkey antirabbit cy3 secondary antibody. Differential interference contrast (DIC), phase contrast, and fluorescence images were collected using either a Zeiss Axiovert 100 M microscope or an Olympus Fluoview 300 confocal microscope.

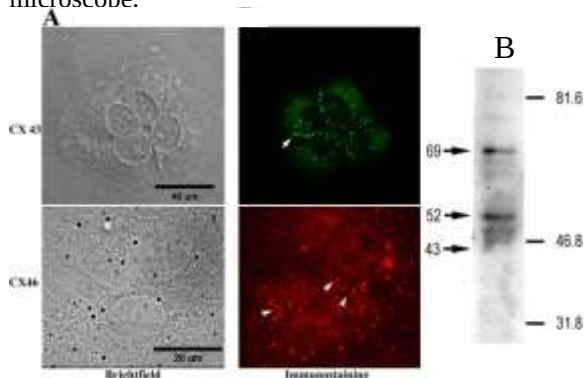


Figure 1: Connexin expression in ARPE-19 cells. **A:** Immunocytochemistry; **B:** Western blotting: Numbers and lines to the right indicate the positions of molecular weight markers.

Intercellular communication: To determine whether the RPE cells expressing connexins Cx43 and Cx46 formed communicating junctions with their neighbors, with a point of a scalpel blade a region of the monolayer was gently cut. The cells were then bathed for 5 min in 1 ml PBS solutions supplemented with 100 μ l of a 0.05% solution of Lucifer yellow and 100 μ l of 5 mg/ml solution of dextran rhodamine B, 10000 MW, neutral. Thereafter, the LY-DR solution was exchanged for the normal growth medium, and the cells were incubated at 37 °C for 1 h. LY is able to traverse the aqueous pores of gap junctions, which typically allow the passage of ions and small molecules $\leq$ 1 kDa, whereas the DR complex can only enter the cells that were injured by the scrape. The cells were fixed briefly (approximately 15 min) with 4% paraformaldehyde, washed once with PBS, mounted with Vectashield, and examined by fluorescent microscopy (Figure 2).

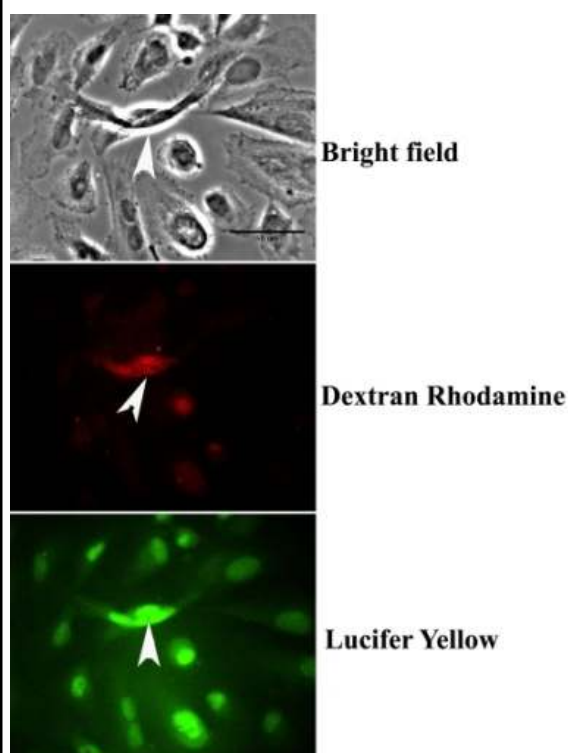


Figure 2

Dye spread in electrically coupled cells. Gap junctions mediate the spread of Lucifer yellow (LY), indicating that junctional permeability and the system of intercellular communication are intact. Arrowheads in all panels show the location of the small injury (scrape) produced by the tip of the scalpel blade. Fluorescent images of cells incorporating both dextran rhodamine (DR) and LY show that whereas the rhodamine complex did not spread from the site of the scrape (middle panel), LY spread through the gap junctions that coupled the cells (lower panel). Scale bar (upper panel) equals 50 μ m.

Scrape loading cytochrome C and apoptotic assays: Cells grown to confluency in 35-mm plastic dishes were incubated overnight in DMEM supplemented

with 10% FBS and 1% PS, either with (test) or without (negative control) the addition of 20 mM taurine. Additionally, cells were incubated with 10 mM octanol (Sigma), a substance known to block intercellular gap junctional communication. Whether the ARPE-19 cells have an endogenous supply of taurine was not determined, but there is evidence that despite numerous passages this cell line contains a taurine transporter to promote the entry of extracellular taurine. After removing the growth medium, the cells were immersed in a PBS solution containing 100 μ l of 1 mM cyC, and a gentle touch with the blade of a mechanical tissue chopper produced the “scrape” into which cyC entered the damaged cells. In this connection, it is important to note that cyC(12.3 kDa) is neither membrane permeable nor can it traverse the pores of gap-junctional channels. The cells were incubated in the cyC solution at room temperature for 5 min after which growth medium containing 20 mM taurine was added to the cyC solution bathing the “test” cells, which were then incubated in the mixture for 2 h at 37 °C. Cells exposed to octanol were treated in the same manner as taurine-incubated cells, and they were incubated at 37 °C for 2 h in growth medium containing octanol after induction of apoptosis with cyC. After repeated rinses in PBS to remove the cyC, the cells were fixed in 4% paraformaldehyde overnight at 4 °C and prepared for histochemical analysis. In examining the figures depicting caspase 3 activation and TUNEL staining (Figure 3 and Figure 4), it is important to recognize that most of the cells incorporating cyC immediately adjacent to the scrape had died and do not appear in the figures, having been washed away in the rinses used to remove the cyC.

Caspase 3 activity and TUNEL staining—Cysteine dependent aspartate-directed proteases (caspases) play a prominent role in apoptosis [32, 33], and caspase 3 activity provides a reliable reporter of cells undergoing apoptosis; DNA degradation revealed by TUNEL staining is also considered to be a major indicator of apoptosis. Briefly, immunocytochemistry for the presence of caspase 3 activity was performed using a rabbit polyclonal antibody against cleaved caspase 3. The caspase 3 antibody was diluted 1:100; the secondary antibody was donkey antirabbit cy3. In the TUNEL assay, partially degraded DNA is labeled with fluorescein-dUTP by using terminal deoxynucleotidyltransferase (TdT) to introduce the nucleotide preferentially into 3' strand breaks [34]. After induction of apoptosis by cyC, the cells were treated according to the manufacturer's instructions for TUNEL staining. The cells were washed three times with PBS and fixed with 4% paraformaldehyde in PBS for 1 h at room temperature. They were then rinsed with PBS, incubated for 2 min with an ice-cold permeabilization solution containing 0.1% Triton X-100 in 0.1% sodium citrate, and rinsed again with PBS. Next, 5 μ l of TdT and 45 μ l of TUNEL label solution

were mixed well and added to the cells, which were allowed to incubate at 37 °C for 1 h in a closed humidified chamber. After two rinses in PBS, the cells were mounted in Vectashield and viewed under the fluorescent microscope.

Image acquisition and processing—Cells examined for dye transfer and immunocytochemistry were visualized with a Zeiss Axiovert 100 M microscope through either a plan-Neofluar 20X/0.5 or an Achroplan 40X/0.6 phase objective, and photographed with a SensiCam CCD camera (resolution 1280x1024; Cooke Corp., Auburn Hills, MI). Image processing was controlled by MetaMorph software. For each of the assays indicated, we determined the number of cells staining for a specific marker within a $9.6 \times 105 \mu\text{m}^2$ field that included the site of the scrape. Computing the ratio of stained cells to the entire cell population within the field gave the percentage values indicated by the histograms shown in Figure 5. Statistical analysis was performed using Student's *t*-test; differences at $p < 0.05$ were considered significant.

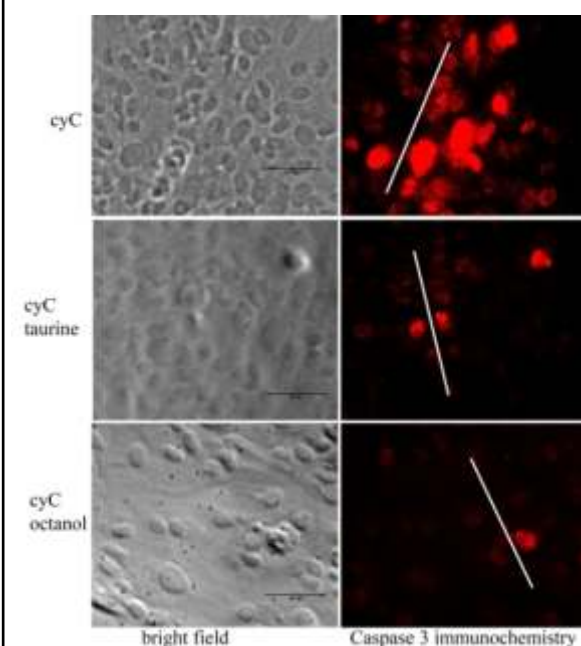


Figure 3: Cell death revealed by caspase 3 activity. In the absence of taurine or the gap-junctional channel blocker octanol, an antibody to active caspase 3 shows that cell death induced by incubation with cytochrome C (cyC) was widespread, extending to cells beyond the scrape (upper panels). In contrast, cell death in the presence of taurine (middle panels) or octanol (lower panels) was limited primarily to cells along the lines of the scrape. White lines indicate the position and approximate extent of the scrape. Scale bars represent 50 μm

The expression of Cx43 and Cx46 in the cells used in this study was examined with immunocytochemical and immunoblotting techniques. Typical results are

shown in Figure 1. ARPE-19 cells exhibited the punctate labeling characteristic of connexin plaques on each of the RPE cells in the field of the microscope. Punctate staining along the margin between cells was especially clear with anti-Cx43, and Cx labeling at the cell surface was also evident.

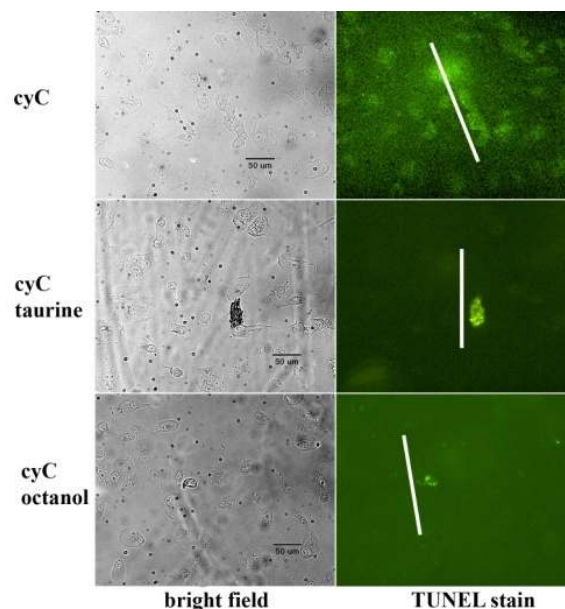


Figure 4. Apoptosis visualized by TUNEL. TUNEL staining of ARPE-19 cells incubated in the presence of cytochrome C (cyC) with (middle panels) or without (upper panels) exposure to taurine also showed that significantly fewer cells were undergoing cyC-induced apoptosis in the presence of taurine. Octanol had a similar effect to taurine in blocking the spread of cell death induced by cyC (lower panels). Scale bars represent 50 μm .

In this respect the labeling is similar to that seen on other non-neuronal cell types, e.g., astrocytes. Immunoblot analysis further confirmed Cx43 expression on ARPE19 cells. As described previously, anti-Cx43 labeled multiple bands representing different phosphorylation states of the protein [25]. Prominent bands at approximately 69 kDa and 52 kDa are near the sizes reported for major upper and lower phosphorylated forms of Cx43; other minor bands were also detected. The arrow at 43 kDa identifies the position of a weak band at the size expected for the nonphosphorylated form of Cx43. Phosphorylation is implicated in the regulation of a variety of connexin processes, and the finding of multiple phosphorylated Cx43 species in ARPE19 cells suggests involvement of this connexin isoform in the formation of functional gap junction channels. The gap junctions formed in apposed cells are permeable to LY, a tracer that provides an index of junctional permeability. As shown in the images in Figure 2, when a small incision is produced in the monolayer of ARPE-19 cells and then exposed to a solution containing LY and DR, cells remote from the site of injury were filled with LY. In

contrast, the larger DR complex is confined to the site of the lesion. These results demonstrate that connexins are expressed in the cell line used for this study, and that the system of intercellular communication is intact. Figure 3 illustrates the effects of taurine on the spread of cyC-induced apoptosis revealed by the antibody to cleaved caspase 3. These images show that before introducing taurine (upper panels), cell death spread to many cells remote from the site of injury (white lines in the images in the second column). However, in the presence of taurine (middle row of images), or by adding the gap-junctional blocker octanol (lower row of images), there is virtually no spread of cell death beyond the site of injury. A similar result was obtained with the TUNEL assay for apoptosis. As shown in Figure 4, TUNEL staining was observed in cells remote from the location of the scrape in cells exposed to cyC only (upper panels). However in the presence of taurine (middle panels) or octanol (lower panels), TUNEL staining was observed almost exclusively in cells near the site of the scrape (white lines). Cell death was assayed by determining the fraction of cells within each dish that displayed either caspase 3 activity or TUNEL labeling. Averaged data obtained in 3 (TUNEL) and 4 (caspase 3) separate experiments under each condition are illustrated in Figure 5. As shown in the bar graphs, taurine reduced cell death by more than 80% and was clearly as effective as the gap junction blocker octanol in this regard. Although the effects of taurine and related aminosulfonates on gap junctions have been reported in numerous studies on a variety of different tissues, the results have not been consistent and often depend on the type of connexin expressed.

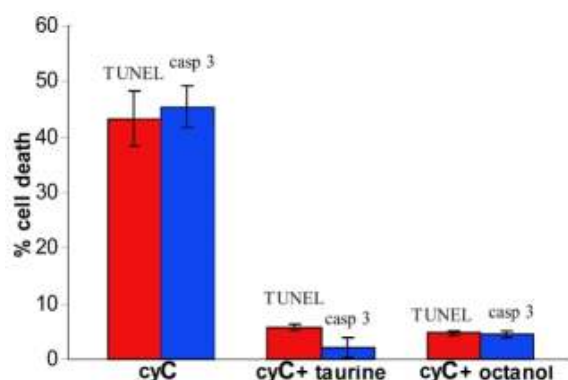


Figure 5: Quantification of cell death. Percent cell death was determined with activated caspase 3 immunocytochemistry and TUNEL assay. The percentage cell death was reduced by approximately 80% in the presence of taurine or the gap junctional blocker octanol, ($p < 0.001$, comparing taurine- or octanol-treated group means to respective cyC-only control means; ANOVA with Student-Newman-Keuls post hoc testing). The reduction in percentage cell death in the presence of taurine was statistically indistinguishable from that in the presence of octanol ($p > 0.05$). Error bars depict SEM; $n = 4$ for caspase

activity and $n = 3$ for the TUNEL assay. “casp 3” refers to activated caspase 3 immunocytochemistry and “cyC” refers to cytochrome C.

Taurine (2-aminoethanesulfonic acid) is often referred to as a “conditionally- or semi-essential amino acid” because it is not used in protein synthesis. However, it is important to recall that taurine is ubiquitous in nature and is the most abundant amino acid in excitable cells and tissues throughout the body. It comprises a large percentage of the total free amino acids in the heart, kidney and plasma and is vital for normal development. It is present in high concentrations in skeletal muscle and in liver, where it plays a significant role in conjugation of bile acids. Many of the physiologic functions in which it has been implicated have yet to be clearly defined, but there is evidence that taurine interacts with various neurotransmitter systems, participates in membrane stabilization, and is effective in modulating numerous calcium-dependent processes. In addition, there is new evidence indicating that taurine is able to inhibit apoptosis by preventing formation of the apoptosome, a key element in the deleterious action of mitochondrial-derived cytochrome C leading to the caspase-mediated apoptotic cascade. Clearly there are several avenues by which taurine can act to protect RPE cells from cell death, and they would explain in large part both the present experimental findings and the resistance of the outer retina to metabolic insult. Moreover, the loss of these properties may account for the multiple abnormalities in the visual, cardiovascular, and reproductive systems when taurine is depleted from the diet of animals deficient in cysteine sulfinic acid decarboxylase, an essential enzyme for the biosynthesis of taurine from cysteine or methionine. Nevertheless, it remains to be seen whether the effects of taurine reported here result from one or more of the foregoing mechanism or by activating some other intracellular pathway that inhibits the cell death process. Numerous studies have reported that cell death signals induced by cyC and other agents can be transmitted through the aqueous pores of gap junctions to adversely affect their neighbors, but that this so-called “bystander effect” can be suppressed by blocking the gap junctional channels connecting the various cell types. Thus there was the possibility that taurine exerts its beneficial effect by blocking the propagation of apoptosis through the intercellular channels that couple RPE cells, a possibility strengthened by reports that in some cell types gap junctional communication is inhibited by taurine. Although this study does not address directly a putative role for taurine in diabetic retinopathy, it is noteworthy that its effectiveness in suppressing organ lipid peroxidation and in reducing insulin resistance has led to the suggestion that taurine may be beneficial in preventing or ameliorating

hyperglycemia-induced retinal defects. In humans and in animal models, diabetes is consistently associated with a progressive increase in a range of abnormalities affecting the structural and functional properties of neurons and blood vessels of the *inner* retina. These findings are in contrast to the seemingly milder effects of diabetes on the blood retinal barrier (BRB) and cells of the *outer* retina. Although there are reports of reduced amplitude electroretinogram potentials generated by the photoreceptors and RPE, as well as evidence of a small reduction in the thickness of the outer nuclear layer, the pathophysiological changes are neither as consistent nor as profound as those seen in the inner retina. This is somewhat surprising considering the highly vascular capillary bed (choriocapillaris) that nourishes cells of the outer retina, the accumulation of glucose within the RPE in response to hyperglycemia, and the glucose transport properties of the photoreceptors and RPE. Clearly, the high concentrations of taurine in the RPE and photoreceptors may contribute to the relative sparing of the distal retina, which occurs despite the fact that hyperglycemia causes altered expression of the tight-junctional protein occludin, an increase in the lipid content of the RPE, and permeability defects in the RPE. Nevertheless, the data on the beneficial effects of taurine supplementation in diabetes are still too sparse to be considered significant, and further biochemical and physiologic experimentation addressing this important issue is clearly warranted. Lastly, it has not escaped our notice that the present results provide a possible mechanism for the protective effects of tauroursodeoxycholic acid (TUDCA) reported by Boatright et al. In their study, the authors provide convincing evidence that TUDCA, a taurine containing derivative of bile acid, protects photoreceptors from genetically mediated and photically induced cell death. This agent, which has been shown to prevent apoptosis in a broad spectrum of neurologic and systemic diseases, is deconjugated by the bacterial flora of the intestinal lumen to release taurine. Thus, it may not be inapposite to suggest that taurine could be the active substance underlying the therapeutic actions of

TUDCA. However, it is important to stress that in its unconjugated form, ursodeoxycholic acid (UDCA) has proven to be efficacious in the treatment of gallstones and cholestatic liver diseases. When delivered subcutaneously, as done in the Boatright et al. study, UDCA may be equally effective in suppressing photoreceptor cell death.

CyC, too large a molecule to traverse gap junctional channels, produced apoptosis in cells injured by the scrape as well as those distant from the site of the scrape, presumably by the intercellular transmission of a toxic agent through the gap junctions that couple these cells. Incubation in taurine, or the gap-junction blocker, octanol, before application of cyC, reduced significantly the fraction of cells undergoing apoptosis. Results indicate that taurine can serve to suppress cell death in RPE cells independent of any effect on gap junctions. Various avenues were considered by which taurine can exert its protective effect, but the precise mechanism involved under these experimental conditions has yet to be identified.

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Graduate Chemists Welfare Fund

This fund has been established with effect from 1-1-2012. The principal benefits towards CCS Graduate Chemists would be,

- a) To provide partial assistance towards international travel of those proceeding abroad for PG degrees (once a life time)
- b) To provide partial assistance towards registration fees in respect of IChemC/CCS events such as International Conferences (Preference for those presenting papers)
- c) To provide assistance towards registration fees for IChemC/CCS training seminars etc.
- d) To provide partial assistance towards activities of the Alumni Association.

Note: Depending on the demand, Graduate Chemists who maintain positive content and participate in IChemC/Alumni activities will get preference for the above mentioned benefits.

Polyphenylenes: Synthetic advances towards the nanostructures

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College of Chemical Sciences, Institute of Chemistry Ceylon, Rajagiriya

Polyphenylenes

Polyphenylenes contain two or more conjugated benzene or aryl rings that are attached to form differently patterned molecules in varying size and shape. Phenylene-based conjugated materials can provide versatile platforms for the development of graphene sheets *via* cyclodehydrogenation. Their characteristic features are high thermal stability, good solubility and processability, and a dense packing arrangement with strongly twisted phenylene rings. Their properties are related to their size, substitution, shape and functionality, and these features can be optimised to obtain advantageous electronic properties.¹

These properties have encouraged the synthesis of different types of polyphenylenes over the past two decades; these can be categorised as linear (a),² hexagonal-shaped (b),³ star-shaped (c),³ hyper branched (d),⁷ ribbon type (e)⁴ and dendrimers (f)⁵ (Figure 1).

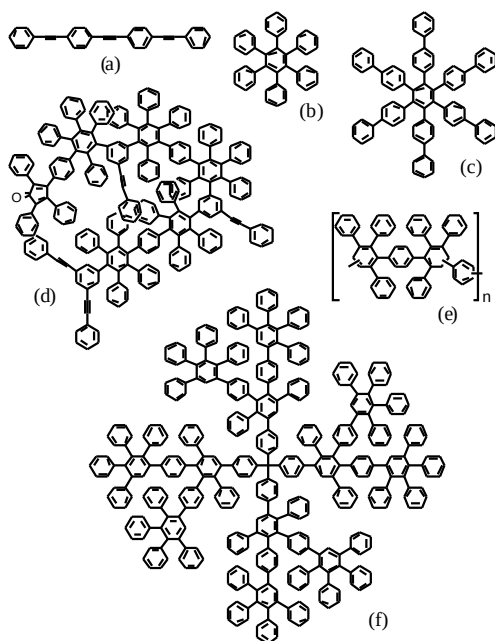


Figure 1: Representative polyphenylenes (a) linear,² (b) hexagonal,³ (c) star-shaped,³ (d) hyperbranched polymer,⁷ (e) stepwise polymer or ribbon⁴ and (f) dendrimers.⁵

Hyperbranched polyphenylene polymers (Figure 1 (d)) have become well-established compounds in polymer chemistry.⁶ They usually feature a high density of functional groups, a globular shape, high thermal stability and good solubility and processability, comparable to the properties of the corresponding dendrimers. However, in contrast to their linear analogues, hyperbranched

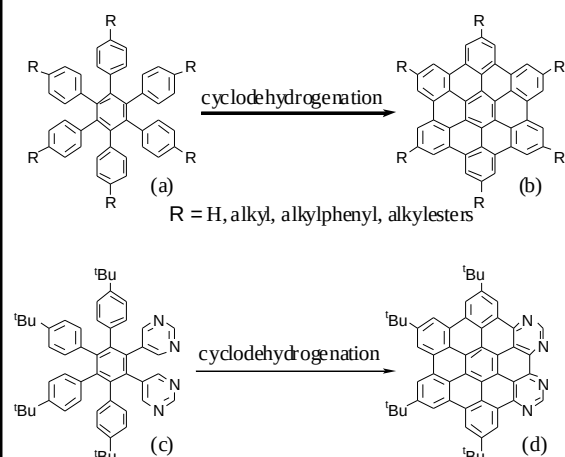
polyphenylenes are non-conducting polymers, because extended π -conjugation is hindered due to their tightly packed and twisted phenylene units.⁹ The properties of hyperbranched polyphenylenes make them promising candidates for applications as insulating materials in microelectronics, where features including high thermal stability, good processability, solubility and low moisture absorption are required.⁹

Dendrimers (Figure 1 (f)), which are highly branched and structurally regular molecules, are popular in life and materials science⁹ because of their special properties such as globular shape, controlled size, chemical composition and multivalent periphery (several oxidation positions). Functionalisation and the supramolecular chemistry of dendrimers are the most rapidly expanding areas of dendrimer research.⁵ Functionalisation of dendrimers either at the periphery or at the core will alter their properties.⁷ Dendrimers assembled among themselves⁵ or with other guest molecules, creates a wide collection of novel structures and surfaces with new and promising properties.⁵

Linear and conjugated polymer and hyperbranched polyphenylenes have been studied widely as luminescent materials because of their blue-emitting feature. Blue light emitting polyphenylenes are largely interested in using organic light emitting diodes (OLEDs).⁸ The OLEDs technology development had led to new discoveries in this area such as in solution and solid state luminescent materials could be used as the light-emitting layer in OLED. Even in the polymer chemistry the blue emitting polymers is restricted mainly by polyphenylenes.⁸ Wide band gaps allowing emission of blue light (400-450 nm) are typical for polyphenylenes. In addition, the linear oligo-polyphenylenes can be regarded as the backbone from which multidimensional polyphenylene systems can be produced by functionalisation and structural variation.

Many polyphenylene systems have attracted interest as precursors in the formation of fused polyaromatic hydrocarbons. Hexaphenylbenzenes (Figure 1 (b)) have drawn attention as precursors to a class of molecules known collectively as superbenzenes or star-type hexabenzocoronenes (HBCs, Scheme 1 (b)), which were synthesised *via* cyclodehydrogenation of hexaarylbenzenes (Scheme 1 (a)). These substituted HBCs exhibit a range of notable physical, chemical and photophysical properties, e.g., thermal stability,³ good solubility, processability,¹⁰ and interesting electrical and optoelectronic properties.³ It is important from the

synthetic point of view that HBCs are of good manageable size and shape by which to alter the substitution patterns and solubility. Therefore, HBCs have the added advantage of investigating their various characteristic properties in either the solid state or in solution using different techniques. This allows HBCs to be studied in more detail than the highly insoluble large sheets and globular-shaped graphenes which were synthesised from polyphenylenes such as those shown in Figure 1 (d), (e) and (f).



Scheme 1: Cyclodehydrogenation of hexaarylbenzenes (a) and (c) to give functionalised hexa-*peri*-hexabenzocoronene (HBC) (b),³ and nitrogen-heterosuperbenzene (N-HSB) (d)¹⁰ respectively.

Incorporation of long-chain alkyl or alkoxy groups at the periphery can induce discotic liquid crystalline properties to HBC compounds. These HBC graphite segments self-assemble to form columnar superstructures.⁴ Incorporation of nitrogen into hexaarylbenzenes (Scheme 1 (c)) towards the formation of nitrogen-heterosuperbenzenes (N-HSBs) (Scheme 1 (d)) have shown added advantages such as the nitrogen atoms are ideally positioned for bidentate coordination to metal centres, increased solubility and charge transfer character.¹⁰

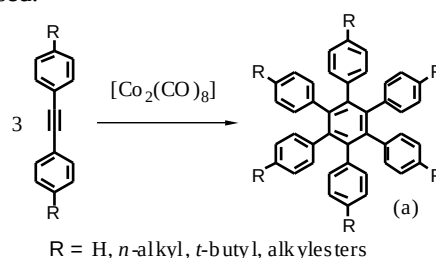
Routes to Branched Polyphenylenes

The various types of polyphenylenes discussed above are obtained from two types of synthetic routes: (i) cobalt-catalysed cyclotrimerisation of suitable diarylacetylene derivatives and (ii) by repetitive intermolecular [4+2] cycloaddition of tetraaryl cyclopentadienone to suitable diarylacetylene derivatives.

(i) The Cyclotrimerization of Suitable Arylacetylene Derivatives

The intermolecular [2+2+2] cycloaddition of three unsaturated units to form three new σ -bonds (Scheme 2).¹¹ This reaction only allows identical functionalisation of the phenyl substituents on the

hexaphenylbenzene unless an asymmetric acetylene is used.

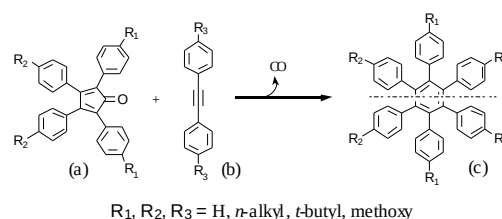


Scheme 2: Cyclotrimerisation ([2+2+2] cycloaddition)

The synthesis of the star-like hexa(*para*-diphenyl-4-yl)benzene (**Figure 1 (c)**) is via cyclotrimerisation using *para*-diphenyl-4-yl acetylene. Like-wise, oligophenylene-substituted acetylenes can be used to produce a wide range of star-shape polyphenylenes.

(ii) The Intermolecular [4+2]-Cycloaddition of Tetraaryl cyclopentadien-1-one to Suitable Arylacetylene Derivatives

Diels-Alder [2+4] cycloaddition reaction, is the most versatile synthetic route to achieve a broad spectrum of diversely functionalized hexaarylbenzene derivatives using suitably substituted diarylacetylenes (b) (dienophile) and 2,3,4,5-tetraaryl cyclopenta-2,4-dien-1-ones (tetracyclones) (a) (diene) (Scheme 3).



Scheme 3: Diels-Alder [2+4] cycloaddition reaction.

In addition to the synthesis of hexaarylbenzene derivatives the capacity of this Diels-Alder reaction can be extended using different types of acetylenes (dienophiles) (c-d) and cyclopentadienones (dienes) (a-b) (Figure 2) as precursors for larger all-benzenoid hydrocarbons with various topologies. This synthetic strategy has been employed as a step growth reaction in the formation of linear (a), hyperbranched (d),⁷ ribbon (e)⁴ and dendrimer (f)⁵ polyphenylenes (Figure 1).

The reactivity of the diene and dienophile in a Diels-Alder reaction is influenced by their respective substituents. The most favoured reactant combination is that of an electron-rich diene and an electron-poor dienophile. This combination of reactants is associated with a decrease in the energy gap between the interacting frontier molecular orbitals i.e. the highest occupied molecular orbitals (HOMOs) and lowest unoccupied molecular orbitals (LUMOs). For example, methoxy groups on the diene cause an increase of reactivity in a 'normal demand' Diels-Alder reaction because of the resonance effect of the methoxy groups to the diene.¹²

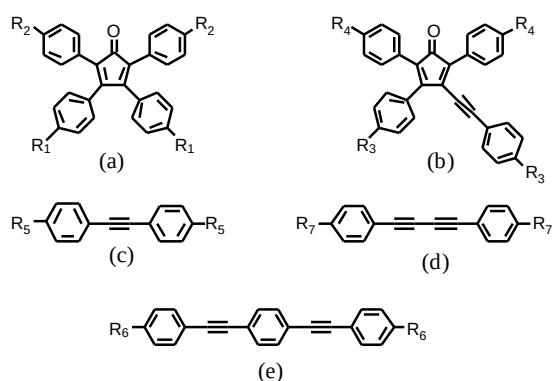


Figure 2: Different types of tetraarylcyclopentadienones (tetracyclones) (a-b) and diarylacetylenes (c-d) which leads to give dendrimers and hyperbranched polyphenylenes via Diels-Alder [2+4] cycloaddition reaction.

The oxidative cyclodehydrogenation of these three-dimensional simple hexaarylbenzenes to branched oligopolyphenylenes gives coronenes, superbenzenes, superacene-trimers, combined linear- and trimer-HBC, ladder type and stepladder graphite segments in high yields. These graphenes and

polymers which possess two-dimensional planar confirmation, high electron delocalisation and functional optic-electronic properties, attract great scientific interest because of potential applications in areas such as electroluminescence, plastic lasers and molecular electronics.⁴

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Diploma in Laboratory Technology in Chemistry 37th Batch (2009/11)

Honours Pass (6)

D M Perera, A K M S Perera, T A V Fernando, E R De Silva, W D G L Kumara, A H J Athukorala

Merit Pass (18)

K.W.N. Dayarathne, R.M.N. Dinesh, D D Perera, C.G. Ravindran, W.A.N. Saman Kumari, C.M. Manimendra, S M F Rushda, B.K.I. Pushpakumara, W.B.P.P. Rajarathna, K.H.M.A. Kulathunga, M R F Rumaiza, L.L.N.A. Alwis, K G O S Silva, W.A. Gominda, W.M.C.D. Wanasinghe, H.M.S. Athulasena, A.V.K.M. Gunawardana, S.A.S.S. Siriwardhana

Ordinary pass (32)

K.M.M.P.M.B. Godakumbura, W.U. Rajapaksha, W Ajith, J Nanthakumar, U.P. Wagaarachchi, V.P. Chaminda, K.K.S. Udayana, A N V Wijewardana, D H S De Silva, B N P Bulathsinghalage, M A S R K Kumara, H.P.R.K. Buddhika, H.L.M.R. Bandara, U.K.D.H. Dineshika, H P P K Jayathilake, M.P.B. Warakaula, K.M.S.P.Kumara, H A D N K Horadagoda, N.W.H.K. Padmali, R.L. Karunarathne, K.A.S. Eroshanie, D A I Madusankanie, M.N. Meedeniya, U.L.R. Senanayake, N V N Nuran, S S Thilakarathne, M F S M Arshard, S J N Rathnapriya, W P S S Wanasinghe, S N Wickramarachchi, M H P Ishama, M B S P Batagala

DLTC Overall Prize List-2011

First Prize	G C N Jayasuriya Award for the Best Performance	D M Perera
Second Prize	A K M S Perera	Third Prize
Mr P R K Fernando's prize for Industrial and Food Chemistry		T A V Fernando
Mrs M N K De S Goonathilake's prize for Clinical Laboratory Technology		D D Perera
		D M Perera

Dr. Devanathan I knew A Tribute to a Teacher

Dr Samson Hettiarachchi

Consultant, Electrical Power Research Institute, USA

Professor Sotheeswaran, President Institute of Chemistry; Professor J.N.O. Fernando, Rector, College of Chemical Sciences; Dr. Jonas Fernando, Chief Guest; Distinguished Guests,

It is indeed an honor and a privilege for me to stand in front of this august audience and deliver this commemoration lecture about an individual who has earned my great admiration and highest respect. Dr. Devanathan was my teacher, my mentor and was a guiding light to me in many ways. Dr. Devanathan was one of the best scientists produced by Sri Lanka at the time. His reputation as an eminent electrochemist was world renowned. He was the very embodiment of a true scientist. Although 34 years have passed since his untimely demise, the impressions of his personality remains still living and vivid upon the minds of many of us. Dr. Devanathan was not just a man with high intellectual capacity but also a man with a touch of genius that we all recognized. He took the best of the best in the world head on with no malice or arrogance to prove a point. His only goal was to understand the scientific truth, the goal he pursued relentlessly.

Some of the people he challenged were giants in the field of electrochemistry on his path to unraveling the mystery of the electrical double layer, that ultimately led to the Bockris, Devanathan, Muller model. Dr. Devanathan had an unceasing determination and an unquenchable thirst to succeed in whatever research he did or directed. He was not afraid to get in to unfamiliar territories and ask the question, why not?. His move to Tea Research Institute is a good example. In this regard, I would like to quote one of the great presidents of the United States of America, John F. Kennedy Jr. President Kennedy said, and I quote, "*some men see things as they are and ask why; I dream things that never were and ask why not?*", end of quote. It was this kind of dream and the urge to succeed that fueled Dr. Devanathan's enthusiasm in science, an enthusiasm that was infectious to all around him.

Dr. Devanathan was a strong believer that, even though we came from a small country called Ceylon at the time, in intellectual capacity we could match anyone in the western world. He instilled this confidence among all of us who worked with him. His work on the electrical double layer is a great testament to this belief.

Dr. Devanathan produced some outstanding and dedicated scientists like late Prof. Mrs. Pereira and Dr. Jonas Fernando, both of whom did postgraduate degrees with Dr. Devanathan. Dr. Mrs Pereira's work on electrocapilarity is well known that led to a greater and a deeper understanding of the inner workings of the electrical double layer. Dr. Jonas Fernando's work on

metal dissolution and deposition of mechanically strained electrodes was one of a kind original work that was done by using a mechanical lathe to strain copper wires through an electrolytic cell. I followed this latter work keenly, but little did I know at the time that 20 years later I would be working in the same area at the Nuclear Energy Division of the General Electric Company to solve problems related to stress corrosion cracking in the power generating industry.

Most of us know about Dr. Devanathan's contribution to better understand the electrified interface. But, there is another important invention that Dr. Devanathan made that has often gone unnoticed. This invention relates to measuring hydrogen permeation through metallic materials in order to prevent their failure by hydrogen embrittlement. This was done by using a well known electrochemical cell called the Devanathan-Starchuski cell, and the work was done at the University of Pennsylvania. This technique has a lot of technological implications, and it is still being used even today by many to study hydrogen diffusion through metallic materials.

Dr. Devanathan was also a prolific, brilliant and an articulate writer who could write scientific papers with impeccable clarity.

Dr. Michael Angelo Vincent Devanathan graduated with a B.Sc.(First Class Honours) in Chemistry from the University of Ceylon in 1947. He obtained his Ph.D. from the University of London in 1951 for his contributions to the theory of the electrical double layer. He returned to the University of Ceylon in 1952 and continued his research in the field of Physical Chemistry of the electrified interface. He produced 3 M.Sc.s and 10 Ph.D.s through his research.

In his career, Dr. Devanathan served as Associate Director of Research at the University of Pennsylvania, Assistant Director at Central Electrochemical Research Institute in Karaikudi in India, Head of Physical Chemistry CISIR, and finally as Director, Tea Research Institute, Talawakelle.

Dr. Devanathan had over 25 patents in Sri Lanka, India and the U.K. He won the all India Invention Promotion Award for his work on alkaline MnO_2 battery for high capacity cells, a Gold Medal at the All India Industrial Exhibition for invention of an air depolarized cell and a plaque from the University of Pennsylvania for his contribution to electrochemistry.

He published about 80 research papers, majority of which were in prestigious international journals, some in Transactions of the Faraday Society. For his authoritative contributions to the Physical Chemistry of Electrified Interfaces, in 1964, Dr. Devanathan was awarded the

D.Sc. (cum laude) by the University of London.

I would now like to give you some of my personal impressions about Dr. Devanathan. I first met Dr. Devanathan when I was an undergraduate at the University of Colombo. It was the month of May in 1969, as special degree students in Chemistry we were awaiting his arrival at the Chemistry Lecture Theater. I vividly remember, Dr. Devanathan walking in to the Lecture Theater in his usual unassuming manner scanning through all of our faces with an innocent smile on his face before beginning the lecture, a smile that we have rarely seen among other lecturers. After a couple of lectures, I soon realized that this is the man I could learn from and want to work with in the future.

The same year I was assigned to Dr. Devanathan to do my third year Seminar along with two of my colleagues. When we approached Dr. Devanathan to get our seminar topics, he asked all three of us to talk about just one topic, "water". This became a puzzle to us because we were not sure how 3 of us could talk about water for one and a half hours. The following week we met him again to get a better understanding of what he expected from us. He had absolute clarity as to what he expected. He wanted one of us to talk about physical properties of water, the second one to talk about the bulk interactions and I got to talk about the interfacial interactions. This was one of the best learning periods of my time with Dr. Devanathan.

When the time came for our research projects, I was assigned to Dr. Devanathan to work on the electrocrystallization of thin films of cadmium hydroxide. This required the use of mercury to prepare the cadmium amalgam. When I started reading about this work, I realized that this work had already been done at University of Newcastle back in 1967. It was puzzling to me why he wanted me to do this work, the reason I realized only later on. Even though we had the purest form of mercury from the CISIR stores, Dr. Devanathan wanted us to distill the mercury, not once, not twice but three times. He didn't stop there, he wanted us to electrolyze the mercury to remove the dissolved impurities. I vividly remember how we distilled the mercury in a hood on the corridor just outside the physical chemistry laboratory of the CISIR. The work also required a special electrochemical cell. It was then that I realized that Dr. Devanathan was an avid glass blower as well. He created a piece of art in making that cell and showed Edwin, the Colombo University glass blower, how to make a complicated electrochemical cell. I was able to reproduce the work done by the Newcastle group of scientists who were some of the best in the world at the time. The work constituted applying a potential pulse and recording a current/time transient while the anodic layer was being formed. The current-time transients showed multiple peaks just like those reported by the Newcastle group. On close observation, I and one of my colleagues noticed that the multiple peaks were related to oscillations of the free standing mercury column rather than to an electrochemical process. Dr. Devanathan was thrilled when we reported this

observation to him. Soon we realized why he wanted us to repeat this work, he believed that the multiple peaks were an experimental artifact. He wanted us to repeat the work with mercury atoms frozen on a gold electrode, sure enough there was only one peak corresponding to anodic monolayer formation of cadmium hydroxide. I continued this work at the CISIR in the evenings after my graduation until I left for my Ph.D. This was one of the most rewarding and exciting times of my career with Dr. Devanathan.

Three years later in 1975, on my return after the Ph.D., I learnt that Dr. Devanathan had left the CISIR and assumed duties as the Director of TRI, but we continued our technical interaction. I would visit him when he came to Colombo for Board meetings. Even though he could have stayed in a lavish hotel in Colombo, he used to stay in a small guest house opposite the Ramakrishna mission in Wellawatte. I used to visit him there, and he would show me the work he was doing on applying the Physical Chemistry principles to plant growth. I would show him the work that I was doing on repassivation kinetics with a few graduate students. One of them, Mr. R.A.D. Kumarawickrema was awarded the Ph.D. degree for this work.

It was early 1977, I came to know that Dr. Devanathan was admitted to the Kandy hospital for a heart condition. The next day, I took the train to Kandy and visited him in the hospital. He was in good spirit, his two daughters were there by his bed side. All we talked about was work, none about his heart ailment. He was describing to me how he was planning to hire a couple of chemists from CISIR to TRI. I learnt that he was going to be released from the hospital in a few days time, and I travelled back to Colombo. Just a couple of weeks later I got the dreaded news that Dr. Devanathan had passed away. It shocked me, beyond belief.

A few of us got together, rented a van, travelled to Tallawakelle to attend his funeral, in order to take one last look at this great man. Sadly, it was not to be, by the time we got there, we were late by a mere ten minutes, his casket was buried and the burial mound was already in place. We silently prayed for him, sprinkled some earth on the burial mound. The return trip to Colombo was quiet and very somber, in total darkness literally and metaphorically.

With Dr. Devanathan's untimely demise, the scientific world lost a brilliant electrochemist, Sri Lanka lost one of her great sons, Mrs. Devanathan lost an affectionate husband, his four children lost a loving father, we lost a great teacher of the highest order and a trusted friend.

I have often wondered why good people have to die so young, Dr. Devanathan was just 52 years of age at the time of his death.....I am still looking for an answer to this question.

Dr. Devanathan may be no more, but his legacy lives on, if not we wouldn't be talking about him today.

I would like to end this part of my lecture with a quote from one of the greatest scientists who ever lived in our era, Albert Einstein. Einstein said, and I quote *"Now he has departed from this strange world a little ahead of me. That signifies nothing. For us believing physicists the distinction between past, present, and future is only a stubbornly persistent illusion"*, end of quote.

Eighth Convocation Awards & Prizes 2011

First Class Honours (12)

Ms. P A M K Erangi, Ms. G Mayoorini, Mr. U D Hewagamage, Ms T G Vithanage, Ms. G D S Dassanayake, Mr. U L A S Perera, Mr. D C Senevirathna, Ms. P M D Amarawardena, Mr. K A D S Ravinatha, Ms. B G N D K Somatilaka, Ms M S Wickramasinghe, Mr. T P D Abeysinghe

Second Class Honours (Upper Division) (20)

Mr. B A T N Gunasekara, Ms. K G D L Kirinda, Ms. L D D Maheshika, Ms. M R M Perera, Mr. D W C L D Premawardhana, Ms. U V R Senaratne, Mr. J H S C Tissera, Ms. D C Wimalasiri, Ms. K A S J Kularathne, Mr. M T M Ansaf, Mr. B R Aravinda, Ms. A N Fernando, Ms. M M N Fernando, Mr. R M J S Hunukumbura, Mr. K C Jayathilaka, Mr. M Y R Perera, Ms. A R N Silva, Ms. J M H R S Peiris, Ms. K A De Silva, Ms. F N Jamal

Second Class Honours (Lower Division) (14)

Ms. T T D T Fernando, Mr. E W K Perera, Ms. R A U I Ranatunga, Ms. W D V K Subasingha, Ms. K G Vendabona, Ms. H A M Perera, Ms. A Dissanayake, Mr. P A A S P Kumara, Mr. K M P Kumarasinghe, Ms. J P Mariathas, Mr. S P T K Pathirana, Ms. H W V P Waravita, Ms. U Wegodapola, Ms. H G G Purnima

Third Class Honours (15)

Mr. H A L L Hettiarachchi, Ms. A H T N Jayamandira, Ms. T H E U Kulasoorya, Ms. H W U Kulathunga, Ms. V Sinthuja, Ms. T Dharushana, Ms. S A Xavier, Ms. H M D C K Herath, Ms. G L L M Dabera, Ms. S F Ghouse, Ms. D S Gunasekara, Ms. R Ratnarajah, Mr. S D Thalagalage, Mr. K A D Vinoy, Ms. P H Gamage

Pass (22) : Ms. S R T Dharmasena, Ms. M M J S Fernando, Ms. B K I P Jayasinghe, Ms. W A M Madhavi, Mr. P D N S Sumanadasa, Ms. A A S A Adikari, Mr. K C Athapattu, Ms. K D Fonseka, Ms. S Mahathevan, Mr. S A J L Perera, Ms. M G S Y Ratnayake, Ms. D S Thabrew, Mr. V D Thanthirige, Ms. J W S L Jayewickrama, Mr. W G C S Amarasinghe, Ms. B Banureka, Ms. K Rubatharani, Ms. U L M Dissanayake, Ms. T Glanista, Ms. H M T M Siriwardhane, Ms. D C Liyanapathirana, Ms. M Weerasinghe

GRADUATESHIP (OVERALL) AWARDS

First	Shireen Jayasuriya Memorial Gold Medal	Ms P A M K Erangi
Second	Graduateship Silver Jubilee Commemoration Award	Ms G Mayoorini
Third	Graduate Chemist (25 th Batch passing out) Silver Jubilee Commemoration Award	Mr U D Hewagamage

AWARDS FOR OVERALL EXCELLENCE IN ALL LEVELS OF STUDY (THEORY)

Prof. J.K.P Ariyaratne Memorial Award for Overall Excellence in Inorganic Chemistry	Ms P A M K Erangi
Professor Leslie Gunatilake Award for Overall Excellence in Organic Chemistry	Mr K A D S Ravinatha
Haniffa Award for the Overall Excellence in Physical Chemistry	Mr U L A S Perera

LEVEL 3 & 4 OVERALL (THEORY) AWARDS

First	Royal Society of Chemistry (Sri Lanka) Section Award	Ms G Mayoorini
Second	Professor and Mrs. H.W Dias Award	Ms P A M K Erangi
Third		Ms. T G Vithanage

BEST PERFORMER AWARDS FOR OVERALL EXCELLENCE IN CHEMISTRY PRACTICALS

Professor R.S Ramakrishna Memorial Award	Ms P A M K Erangi
Mr & Mrs Sivarajah and Family Award	Ms G Mayoorini
B A Jayasinghe Memorial Award & College of Chemical Sciences Award	Ms T G Vithanage & Mr. U D Hewagamage

PRIZES FOR INDIVIDUAL COURSES

Professor P.P.G.L Siriwardana Memorial Prize for Further Topics in Inorganic Chemistry	Ms G Mayoorini
Dr. Sudath Kumarasinghe Memorial Prize for Special Topics in Physical Chemistry	Mr U L A S Perera
Dharmachandra & Thamarasa Gunawardhana Memorial Prize for Analytical Chemistry	Mr D W C L D Premawardhana
P. Rohan . Fernando Prize for Special Topics in Chemistry	Ms T G Vithanage
Egodawatte G.Somapala Prize for Food Chemistry and Technology	Ms T G Vithanage
Professor Eugene de Silva Prize for Industrial Chemistry & Technology	Ms P A M K Erangi
Mevan Pieris Prize for Polymer Chemistry & Technology	Ms P A M K Erangi
Dr. Rohan Perera Prize for Chemical and Molecular Toxicology	Ms P A M K Erangi
Marina & R O B Wijesekera Prize for Molecular Biology & Biotechnology	Mr R M J S Hunukumbura
Information Technology	Mr B A T N Gunasekara
Mr. & Ms. E Gajanayaka Memorial Prize for Atomic Absorption Spectrometry	Mr S P T K Pathirana
N.M.S Hettigedara Family Prize for Pharmaceutical & Medicinal Chemistry	Mr U L A S Perera
Mr & Mrs Suppiah and Seethadevi Prize for Analytical Industrial Biochemistry	Ms G Mayoorini
Prize for Agrochemicals	Ms B G N D K Somathilaka
Prize for Quality Management	Mr D W C L D Premawardhana
Susila Jayaweera Memorial Prize for Biochemistry II	Ms G D S Dassanayake

PUBLICATIONS OF THE INSTITUTE OF CHEMISTRY CEYLON

Monograph	Title	Author	Price
01	Textile Fibers	Mr T Rajasekeram	Rs.50/-
02	Principles of Food Preservation	Prof U Samarajeewa	Rs.75/-
03	Biotechnology	Prof C P D W Mathew	Rs.75/-
04	Recombinant DNA Technology	Prof J Welihinda	Rs.75/-
05	Natural Toxins in Foodstuffs	Prof E R Jansz & Ms A S Perera	Rs.50/-
06	Fat Soluble Vitamins	Prof E R Jansz & Ms S Malavidana	Rs.50/-
07	Nucleic Acid and Protein Synthesis	Prof J Welihinda	Rs.75/-
08	Extraction of Energy from Food	Prof J Welihinda	Rs.50/-
09	Corrosion of Materials	Dr A M M Amirudeen	Rs.75/-
10	Vitamin C-Have all its mysteries been Unravalled ?	Prof E R Jansz & Ms S T C Mahavithanage	Rs.75/-
11	*Environmental Organic Chemistry (second edition)	Prof S Sotheeswaran	Rs.150/- (US \$3)
12	Enzyme Kinetics and Catalysis	Prof (Mrs) S A Deraniyagala	Rs.100/-
13	Insecticides	Prof (Mrs) Sukumal Wimalasena	Rs.95/-
14	Organotransition Metal Catalysts	Dr S P Deraniyagala & Dr M D P De Costa	Rs.75/-
15	Some Important Aspects of Polymer Characterization	Dr L Karunanayake	Rs.75/-
16	Hard & Soft Acids & Bases	Prof (Mrs) Janitha A Liyanage	Rs.65/-
17	Chemistry of Metallocenes	Dr Sarath D Perera	Rs.65/-
18	Lasers	Dr P P M Jayaweera	Rs.65/-
19	*Life and Metals	Prof (Mrs) Janitha A Liyanage	Rs.75/-
21	*Silicones	Prof Sudantha Liyanage	Rs.65/-
22	Pericyclic Reactions: Theory and Applications	Dr M D P De Costa	Rs.65/-
23	Inorganic NMR Spectroscopy	Prof K S D Perera	Rs.65/-
24	Industrial Polymers	Dr L Karunanayake	Rs.75/-
25	*NMR Spectroscopy	Dr (Mrs) D T U Abeytunga	Rs.65/-
26	Mosquito Coils and Consumer	Ms D K Galpoththage	Rs.100/-
27	Atomic Absorption Spectrometry	Dr K A S Pathiratne	Rs.100/-
28	Iron Management on Biological Systems	Dr (Ms) R D Wijesekera	Rs.100/-
29	Nutritional Antioxidants	Prof. (Mrs) Sukumal Wimalasena	Rs.100/-
30	*f-Block Elements	Prof Sudantha Liyanage	Rs.65/-
31	Scientific Measurements and Calculations	Prof (Mrs) S A Deraniyagala	Rs. 80/-

* - Second Edition /new print published on popular demand

CCS Publications

01	Functional Group Analysis in Organic Chemistry	Prof AAL Gunatilake	Rs. 175/-
02	Zinc Metalloproteins	Prof (Ms) R D Wijesekera	Rs. 175/-

General Publications

- ★ Chemist & The Environment (Rs.300/-)
- ★ Infrastructure Support Services for Industrial Development (Rs.200/-)
- ★ Chemical Industries in Sri Lanka – Part II (Members: Rs. 200/-, Non-members: Rs.275/-)
- ★ Proceedings of the Workshop on the Technological aspects of the Production & Processing of Essential oils in Sri Lanka (Rs.100/-)
- ★ Proceedings of the Training Seminar on Towards a Cleaner Industrial Environment in the New Millennium (Rs.150/-)
- ★ A-Level Chemistry Facts, Patterns & Principles by Dr. Seetha I Rodrigo (Rs.1500/-)
- ★ Proceedings of the Prof R S Ramakrishna Memorial Training Seminar on Modern Analytical Methods (Rs.200/-)
- ★ Historical Accounts of the Educational Activities (1972 - 2004) (Rs.350/-)
- ★ Proceedings of the Training Seminar cum Workshop on Sampling, Statistics and Standardization in Chemical Analysis and Environmental Management (Rs.150/-)
- ★ Polymer Industries of Sri Lanka (Rs. 200/-)
- ★ Industry & Environment (Rs. 200/-)
- ★ Herbal Medicine Phytopharmaceuticals and Other Natural Products: Trends and Advances (Rs. 500/-)
- ★ Chemistry in Sri Lanka (Rs. 150/-)





RSC NEWS

THE ROYAL SOCIETY OF CHEMISTRY SRI LANKA SECTION

1. Membership

According to the records sent to us from the parent body, a breakdown of the membership is as follows:-

Category	Abbreviation	Number
Fellow Life Member.	F E L	05
Fellow C Chem.	F C C	09
Member	M E M	26
Associate Member	A M E	12
Affiliate Member	A F F	01
Affiliate /Under Graduate. A F U		<u>02</u>
Total Membership as at March 2011		<u>55</u>

2. Committee of Management

The following were elected to the Committee at the 50th Annual General Meeting held on 15th July 2011.

Chairman	- Prof. Sudantha Liyanage
Vice Chairman	- Mr. W J P D Jayalath
Chairman Elect	- Dr. M P Deeyamulla
Hony. Secretary	- Mr. I M S Herath
Hony. Treasurer	- Prof. W S Fernando
Committee Members	- Dr. Positha Premaratne
	Mr. W A P Silva
	Mr. S Perasiriyan
	Mr. R M G B Rajanayake
	Prof. L G Chandrasena
	Mr. Sulith Liyanage

3. Committee Meetings

There were 12 Committee Meetings held during the period, July 2010 to July 2011. The venue of these meetings was the office of the Royal Society of Chemistry SL Section at the S L A A S Headquarters. These meetings were held to discuss the R S C SL Section's, new plans and strategies with regard to organizing the activities for the year 2010/2011 and thereafter.

4. Activities

4.1 Contributions to Activities of the Institute of Chemistry Ceylon

(a) Full page advertisement of "Chemistry in Sri Lanka".

(b) Annual Dinner

(c) Award for the Best Performance at the Graduate ship Examination in Chemistry Part II Theory Examination

(d) Contributions for the International Conference

4.2 All - Island Inter School Chemistry Essay Competition.

4.3 Inter - University Chemistry Competition.

4.4 Teacher training program.

4.5 Advanced Level chemistry seminar.

4.6 Donation of teaching and learning resources for Chemical Society of selected University.

4.7 Book donation program.

4.8 Popular Lectures.

4.9 Industrial Visit.

4.10 Writing Monographs by few committee members.

4.11 Newton A. Dias Weerasinha Memorial Scholarship 2011/2012

5. Web Site

The members are reminded of the web site of our Section, the address of which is as follows:-

[www.rsc.org/Membership/Networking/InternationalSections/Sri Lanka/ index. asp](http://www.rsc.org/Membership/Networking/InternationalSections/SriLanka/index.asp).

I M S Herath
Hony Secretary

