Convocation Address

Chemistry in the Developing World

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Madam President, Dean of the College, Council Members, Members of the Academic Board, Staff, Students and Parents, Guests and most importantly, the Graduands, Licentiates and Technologists at this important Convocation.

Thank you so much for your kind remarks. Let me say at the outset that I am truly honoured to have been invited here today to this important gathering that celebrates the passing out of 52 Silver Jubilee Graduate chemists (making a grand total of 519 over the years), together with 47 Laboratory Technologists (totalling 668) and 5 Licentiate Chemists. I understand that this is a record number for any single year. Mr President, you can feel justly proud of this achievement. The College of Chemical Sciences is a strong body indeed and there is no reason why it should not continue to grow in excellence and to achieve still higher aspirations. I was much taken with the comment from your Chief Guest at last year's Convocation (Professor Arjuna Aluwihare) when he suggested that the College is the academic parent to the Graduands. This is a lovely way to think of the College and I hope very much that you will all continue to maintain contact with the College and all it offers.

I realise that past Addresses to these Convocations have dealt largely with local issues and concepts. This is very fitting of course but I hope I can crave your indulgence by talking to you about more external matters. As you know, my role within the Royal Society of Chemistry is devoted to international affairs and involves extensive travel, mainly to countries in the developing world. Actually, I have visited your wonderful country only twice before. The last occasion was in 1991 for an RSC Sri Lanka Section symposium on Poverty Alleviation through Chemistry for Improved Food Production. On my first visit in 1986, I seem to recall being taken on a bus with several others to visit a hydroelectric project some hours away. It remains in my mind because the bus broke down several times and I can well remember, together with your Honorary Dean who was also in the same group, helping to push it at midnight! Wonderful times! So, I will talk a little about the developing world that I hope you will find interesting.

Governments and NGOs are starting to recognise the importance of science and technology to progress in the developing world. Supporting chemistry is a key driver towards this and the Royal Society of Chemistry is now increasing its own efforts with new and important initiatives in its relationships with international bodies, in publishing and in education.

Science is back on the agenda in the developing world. In March 2006, Paul Kagawe, President of Rwanda announced his government would be setting up a new Ministry of Science, Technology and Scientific Research. This will drive that country's strategy to apply scientific research to improve health, agriculture and the environment.

This is just one example of how the developing world is starting to follow a knowledge-based path to development. Many other regions are well ahead already. In particular, Brazil, India and China have already achieved a degree of development in science and technology far greater than other countries in their regions.

So why is science and technology so important to the developing world? In fact, some have argued that the pursuit of its own science capability is not at all essential and that developing countries could acquire the knowledge and technologies needed for their development from the world market. However, experience shows that this is not the case – even if technologies are imported they still need to be adapted for local use which needs qualified human resources. In addition, there are many challenges unique to the developing world such as tropical diseases and agriculture. These are only now receiving attention from the developed worlds' scientific community.

Science and technology are essential components of social and economic development. They are crucial in tackling problems affecting the developing world such as health care, safe drinking water and food supplies. In addition, technological advance will effect the whole economic growth of developing countries. New and improved products, processes and services will help to raise productivity and competitiveness. The international community does now acknowledge that science and technology are fundamental in alleviating poverty and most government aid programmes at least pay lip-service to the need for science and technology support to be integrated into development budgets. The 2004 *Commission for Africa* report recommended the international community should commit up to US$3 billion over the next 10 years to develop centres of excellence in science and technology. As Dr William Kalema, a member of the Commission said, '*a stronger science, engineering and technology capacity for Africa is not a luxury, but a necessity*'. Such comments are not simply applicable to Africa, but also to the larger international community.

Chemistry in the developing world is making progress. In February 2006, a *Federation of African Societies of Chemistry* (FASC) was launched at the annual congress of the Chemical Society of Ethiopia in Addis Ababa. The RSC President at that time, Simon Campbell, and myself attended this launch to show RSC support for this initiative. The Federation aims to encourage cooperation and help disseminate research and mirrors such regional groupings in Europe, Latin America and of course Asia, where the Federation of Asian Chemical Societies is pre-eminent. The Society has long supported chemistry in the developing world – but this help is now more important than ever. Climate change will make conditions even more difficult for many regions and the problems likely to arise will need chemical scientists to find solutions.

The RSC itself is an international organisation of close to 45,000 members and with over 15% of its membership outside the UK and Republic of Ireland. Many of its international members are in developing countries and the Society's first International Section was established in India in the 1920s, with the Section in Sri Lanka formed later that century. We support chemical societies in developing countries, both financially and with expertise. For example, in the 1990s, both Botswana and Malawi set up new Chemical Societies with the help of the RSC. We also regularly support conferences in the developing world, such as the recent environmental chemistry workshop in Namibia; the first chemistry conference held in that country since independence. The RSC provided financial support to enable the attendance of young scientists from outside Namibia, a method of support that has worked well with many other conferences.

It is fair to say that the RSC regards Africa as a priority area for assistance and it also provides support for the *Chemistry Research Applied to World Needs* (ChemRAWN) committee which is part of the International Union for Pure and Applied Chemistry (IUPAC). I have had the honour of serving as its Secretary for the past four years. In 2007, this committee held a major conference on chemistry, sustainable agriculture and human wellbeing in sub-Saharan Africa. This mirrors exactly the topic of the 1991 meeting in Sri Lanka that I mentioned earlier. It is clear that not a lot seems to have changed in the intervening 27 years!

Returning to IUPAC, I would urge your country to be a member and to contribute to the mass of chemistry projects worldwide. The cost is trivial and the benefits are enormous. The RSC has been at the forefront of IUPAC's efforts in proposing that 2011 will be designated as the International Year of Chemistry by the United Nations and UNESCO.

In the Middle East, I have been intimately involved in three ground-breaking conferences designed to facilitate relationships between scientists in Israel, the Palestinian Authority and the Arab world. Based on a series of workshops with six Nobel Laureates, the latest event, held in December last year in Istanbul, provided a forum to discuss the challenges and needs of this part of the world. These conferences, held on 'neutral' territory, help to facilitate collaboration between Israeli scientists and their counterparts across the Arab world that would otherwise be impossible.

In addition to supporting networks and events aimed at allowing scientists from the developing world to communicate with each other, the RSC provides small grants to support individual researchers in impoverished or less well endowed institutions. The society gives grants of up to £2000 a year and this year grants were given to 29 scientists of whom twelve were from the developing world. It is a matter of regret that there were no applications from Sri Lanka.

Access to scientific information is the essential ingredient in the establishment of a sustainable science base in the developing world. Institutions cannot afford subscriptions to even a fraction of the large number of journals published today. Researchers routinely encounter problems accessing the articles they need to further their work. The RSC has for many years donated journals to departmental libraries in developing countries around the world but two years ago, we became the first learned society in the world to provide free access to its journals back-catalogue to over 50 developing countries.

The RSC launched this major new initiative at the House of Commons with the support of Hillary Benn MP, at that time the UK Secretary of State for International Development, as well as representatives of all the main political parties. The archive gives electronic access to every paper published in its journals from 1841 to 2006, that is 165 years of chemical science research heritage from over 1.5 million journal pages and about 300,000 articles.

As here, the RSC recognises the importance of education in achieving any development of science and technology. This is often a huge problem for developing countries that are not able to provide the level of resources needed to teach practical chemistry in schools. Chemistry suffers particularly as, without access to chemicals and equipment, teachers cannot demonstrate the basic principles, nor pupils learn basic techniques.

In response to a request from the Scientific Advisory and Information Network in Nairobi, copies of a CD-ROM on Practical Chemistry for Schools and Colleges were donated to Kenya. The material was produced by the Chemistry Aid project, run from Southampton University with support from the RSC. An encouraging response has opened up possibilities for providing other resources and extending the education programme to other developing countries. In addition, the Society supports teaching in the developing world through the Voluntary Service Overseas scheme (VSO) and at present, the RSC

supports four chemistry-based science teachers. This past year, the RSC has gone further than ever in its support for chemistry in the developing world. Recent meetings with the Chief Scientific Advisor to the UK Department for International Development have sparked ideas for new collaborative projects that the Society hopes will be carried forward during this year. Access to science and technology is only one of the problems facing the developing world, but without it, it seems certain that the poorest countries will not have the ability to solve their other problems.

I spoke earlier about our, admittedly rather low-key, journal and book support for institutions. It is therefore with the greatest of pleasure that I can tell you that the Royal Society of Chemistry has donated several copies of each of eight UK Open University texts to the College library. These should prove to be an excellent resource for your students – and teachers! In addition, each of this year's Graduates, Technologists and Licentiates will receive a personal copy of the RSC book entitled Elegant Solutions and these will be available at the felicitation lunch later today – I hope they have all arrived safely!

With these few words, let me finish by wishing you all a truly wonderful Convocation and I shall look forward to hearing something of your Graduates' excellence at tomorrow's research seminar. Thank you all very much for listening to me.

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Address by Guest of Honour

Dr. David Ponniah, *C.Eng.*
Warden, S.Thomas' College, Mt. Lavinia

The Chief Guest Mr Stanley Langer, Dr Nandanie Ediriweera, President, and the Council of the Institute of Chemistry, Professor JNO Fernando, Graduands, Distinguished Invitees, Ladies and Gentlemen. Good morning to you all.

I would like start by thanking the Dean and the Academic Board of the College of Chemical Sciences in the Institute of Chemistry, for inviting me today and to be given the opportunity to felicitate the Institute of Chemistry in the year of its Silver Jubilee Batch of Graduates. I do consider it a privilege and honour to be here for this very important and significant event in the life of the Institute. Although, Chemistry was never my strength, I am pleased to be here as a scientist by training but an applied scientist or engineer by profession.

Let me first and foremost congratulate the College on its 25th Batch of Graduates. I am sure that it has been an exciting and challenging journey for all of you in the Institute, and you should be rightly proud and pleased with the output of graduates. I must also extend congratulations to all the graduates and licentiates.

I would like to take this opportunity to thank the Institute of Chemistry for a long and mutually beneficial partnership extending for over 25years. We as a School are very pleased to be able to provide facilities for the initiatives undertaken by the Institute of Chemistry in enabling those interested in Chemistry to obtain a formal education. It was certainly visionary thinking of those within the Institute. Because of this initiative chemistry and chemistry education have benefited. It has not only raised the profile of Chemistry education but has also increased the availability of well trained and educated chemistry graduates, and this has in turn been important to us who are involved in secondary education.

I am also pleased to note that S. Thomas' College seems to have played an important part in the life of the Institute through many of the alumni or old boys. We have Professor JNO Fernando, Mr Mevan Pieris and Dr RD Guneratne, and of course the Late Professor PPGL Siriwardene who have all played a significant role in chemistry and in the Institute. I must say that it has been a fruitful partnership for the Institute and for us at S.Thomas' College.

I am sure we all realize that scientists and engineers are the wealth producers of an economy and it is particularly true in a developing economy such as our own. The development of an economy and the improvement of the quality of life requires a strong and vibrant scientific and technological base. Without this we cannot envisage having innovation and advances in products and services. We can argue that we need scientists more than ever in the face of global restructuring and serious environmental concerns. Chemistry in particular has a significant contribution to make to global and local pollution and to problems associated with environmental change.

Therefore we must ask the question; Does the SL education system produce young people with sufficient mathematics and scientific skills and competencies in order to meet the demands of an expanding economy and progressing scientific and technical expertise? The answer must be an emphatic no, but maybe with a proviso, of adding 'not yet'.

Although the free education system in SL has contributed to rising literacy levels, the quality of science education has not kept pace, and where in this modern world it is scientific literacy, and not general literacy that is important, we as a nation have been

badly handicapped.

There have been changes for improving the standards of science literacy but unfortunately are still not sufficient. In Sri Lanka general or combined science up to year 11 had been taught in about 6500 schools. Recently what had been combined Science has now been divided as having three distinct strands of physics, chemistry and biology. As a result there has been a significant increase in the content and I am certain it would eventually raise scientific literacy. But unfortunately commensurate with the content increase, there has not been a increase in the allocation of teaching and learning time or periods to be able to cover this enlarged syllabus. We seem to have gone two steps forward and one step back, but nevertheless progress has been made.

Beyond year 11, *i.e.* after O/L, science is available in only about 600 schools in this country. This has curtailed access to science and mathematics, affecting particularly those in rural areas. The 600 schools are required to have adequate laboratory facilities but do not and as observed by the NEC in 2003, and I quote 'these requirements are hardly satisfied in most schools' unquote. Further of these 600, only 450 schools are considered to be viable due to the shortage of adequately trained teachers. The World Bank report published in 2005 goes even to say that, I quote 'Effective GCE A/L science teaching is confined to 'about 200 urban schools' unquote. This unfortunately restricts access to good science education. There is a further issue of well educated science students. Of those sitting the O/L exams only around 40% pass in science and mathematics. This number is further reduced by an added requirements of credits in mathematics or science. This results in only about a third of those qualifying for admission to the A/L classes being eligible to do science. Even in a developed economy as the UKs, student numbers doing science have dropped. As recent as in Nov 2007 it was reported that because of a significant drop-off in the number of people studying physics and chemistry at A-level that a number of universities have closed their physics and chemistry departments, an unprecedented step.

A third comment on science education is about the practical aspects of science. Science lends itself to an active learning environment such as hands on experiments and demonstrations, for example, in this learning environment the teacher ceases to be the source of all information but rather assumes the role of the facilitator who guides the students through the learning process. Unfortunately in our secondary system, much less attention is paid to practical work, independent studies and projects. This has affected science education much more than any other subject. Improvements are being made in enabling teachers to be creative and innovative in order to make the students think, predict, observe, compare and reason. A step in the right direction. A comment that I came across which illustrated this aspect of science was I quote 'the active learning perspective does not depend on the state of the equipment but rather on the state of mind of the teacher'.

It is in this context of these three aspects that the Institute of Chemistry has played an important part. Through its graduate programmes the Institute has raised the standards of science literacy, particularly in the use of experiments, whether in the laboratory or simulated on computers. The Institute has also provided opportunities for many, particularly rural, students, who have been deprived of science in secondary education. Further the Institute through the Graduate programme have increased the pool of well qualified science graduates, which can only be good for science literacy in this country.

So let me end by not only congratulating those graduating but also the institute for a job very well done and wish you the very best in all your future endeavours.

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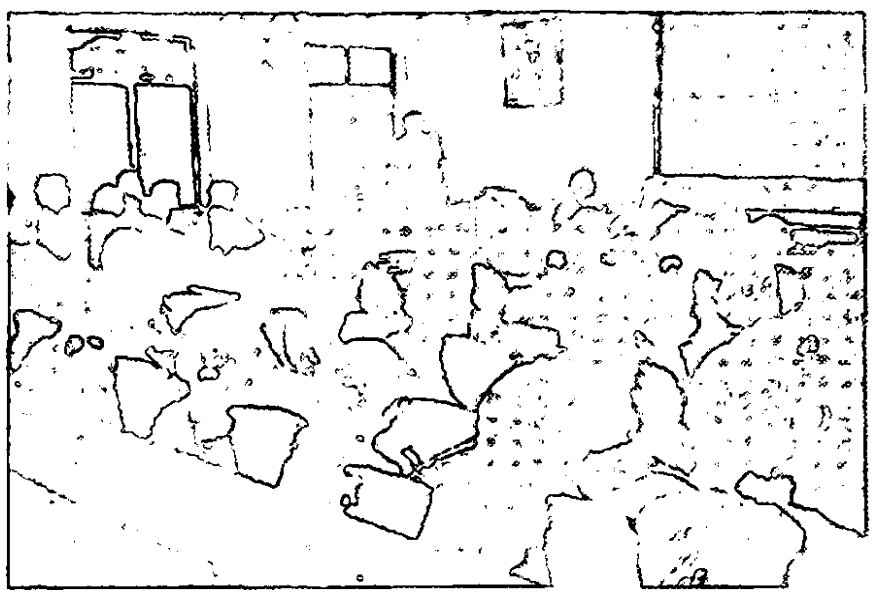
Advancement of New Graduateship programme from September to March



Prof. J N O Fernando, Dean/CCS addressing the 30th batch of undergraduate students at the inauguration ceremony.

The enrollment of the 30th batch of undergraduate students, for the College of Chemical Sciences for the year 2008 was advanced from September to March. This was to enable students who received the Advanced Level examination results after the commencement of the 2007 programme in September to enroll for the next programme without delay. 52 students have been registered and lectures commenced from 15th March 2008 at Adamantane House, Rajagiriya. Hereafter the enrollment for each academic year would be in March of that year.

35th Diploma in Laboratory Technology in Chemistry (DLTC)

The thirty fifth DLTC programme commenced on 23rd November 2007 at Adamantane House. The Chief Guest at the inauguration was Mr. K R Dayananda, Senior Research Officer, ITI.

This programme has been conducted since 1973 at Aquinas College of Higher Studies but from 2005 the programme was conducted at Adamantane House. This year forty seven students were enrolled for this programme. DLTC is the only programme for laboratory technicians in Chemistry in Sri Lanka.

Web page of Institute of Chemistry

The Institute presently has a membership of over a thousand professionally qualified chemists. The facilities at the Headquarters of the Institute (Adamantane House) located in Rajagiriya, have enabled the Institute to enroll a larger number of students in the tertiary level educational programmes in Chemistry leading to Graduateship qualifications, and the course of study for the Diploma in Laboratory Technology.

The Institute of Chemistry is also the largest single organizer of training programs, workshops, seminars and international conferences, in the field of Chemical Sciences, in Sri Lanka. To undertake the publicity of the fourth International Conference that is being organized by the Insitute in June 2008 on the topic "Innovations in Food Science and Technology and Health-Care for Social Well-being" which is expected to attract participants from all over the globe, the Council launched a dedicated web site (**www.ichemc.com**) recently. The web site will thereafter continue to be the primary one of the Institute of Chemistry and the College of Chemical Sciences.

Building Expansion

This year we were successful in securing a land in close proximity to the existing site on a Government 50 year lease in order to expand the building space that is urgently required for carrying out the Institute's educational and professional development activities.

The building expansion project in the new land would accommodate all lectures, laboratory, library and other educational activities that are now being conducted at S. Thomas' College Mt. Lavinia and the future requirements of the education and professional development programmes in close proximity to the existing site. It will enable us to accommodate more students for the Graduateship in Chemistry and DLTC programmes and will improve facilities for research.