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Editorial

The International Year of Chemistry at Half Time

This is now the mid of 2011 and, in 2011, we celebrate the International Year of Chemistry. The request had been presented by the International Union of Pure and Applied Chemistry, IUPAC, and UN, in its declaration on the 30th of December 2008, placed IUPAC and UNESCO at the helm of the event.

First of all, if UN and UNESCO are generally well known, it is necessary to present IUPAC. Besides the National Chemical Societies and the Regional Federations of Chemical Societies, IUPAC is an international scientific and non-governmental organisation having official links with UNESCO. It is considered as totally independent and objective. IUPAC is a member of ICSU, International Council of Scientific Unions, the mission of which is to coordinate interdisciplinary activities aiming at strengthening international science for the benefit of society. ICSU is composed of two kinds of members: the 121 Scientific Organisations, national and multidisciplinary, generally the Academies of Sciences of the countries, and the 30 Scientific Unions, international and monodisciplinary. IUPAC is the Chemistry Union.

The year 2011 is particularly appropriate for IYC, since it is the 100th anniversary of the creation, by the Société Chimique de France, the Deutsche Chemische Gesellshaft and the Chemical Society (London), of IACS, the International Association of Chemical Societies, which addressed the need for international cooperation among chemists and international standardization of nomenclature, atomic weights, physical constants, and scientific communication, and aimed at establishing a common language among chemists of all the world. In 1919, after the First World War, IACS became IUPAC. The year 2011 is also the 100th anniversary of the attribution to Marie Sklodowska Curie of the Nobel Prize in Chemistry. This will be an opportunity to celebrate both this extraordinary scientist and women in Chemistry.

IUPAC and UNESCO have four objectives for IYC:

- increase public appreciation of Chemistry in meeting world needs;
- encourage an interest in Chemistry among young people;
- generate enthusiasm for the creative future of Chemistry;
- celebrate major historical events of chemistry, the centenary of the creation of the International Association of Chemical Societies, the future IUPAC, and the achievements of Marie Curie and the contributions of women to Chemistry.

Therefore, IYC will be a conversation between Chemistry and Society about the future shape of chemistry for sustainability set in the context of chemistry's achievements.

How is IYC organised? IUPAC and UNESCO decided to organise only a small number of cornerstone global events and activities and that most activity should be focused nationally and open to all. IUPAC and UNESCO are very keen for industry and other stakeholders to take part. The year will be run through the website www.chemistry2011.org. Of course, most countries have their own website, very often having a link in the international one. The partners are UNESCO, United Nations, EuCheMS, FACS, FASC, FLAQ, NAOs (National Adhering Organizations to IUPAC), National Chemical Societies, industry, educational and research institutions and individuals.

To date has taken place the launch ceremony, on the 27-28th January at UNESCO headquarters in Paris. The IUPAC's International Congress and Council will be at San Juan de Puerto Rico, July 30 – August 7, and the closing ceremony on the 1st December in Brussels. Two international manifestations have been organized: "women sharing a moment in chemistry", when, one week before the opening, women gathered on the same day (so over the 36-hour-period that constitutes this date around the world, there was a sequence of breakfasts starting in the Asia-Pacific region and eventually on the West coast/Hawaii). Some venues were able to arrange a Skype session so that they were put in contact with another venue hosting a breakfast elsewhere at the same time. The videos of several of these "breakfasts" were shown during the opening ceremony. The other international manifestation was a Global Experiment, "Water: A Chemical Solution", for students and their teachers around the world to explore the chemistry of water, and the role of water in society and the environment. The provision of pure water is one of the greatest ongoing contributions of chemistry to human well-being. The Global Experiment demonstrates the concepts of water quality and water treatment clearly and simply for students around the world, through four activities that can be carried out by school children of all ages. It was officially launched on the 22nd March in Cape Town as part of the Water Day.

As far as the national celebrations are concerned, most countries seem to be very keen on participating. This can be seen on the IUPAC as well as on the national IYC web sites, but as I was invited to many events since the beginning of the year, I can testify the reality of this assertion. I learnt a lot during the last five months, and I wish to share my impressions with the readers of the Journal of the Brazilian Chemical Society. Two points have to be noted: 1) are our efforts, the kind of manifestations which are organised, the best way to fulfill the four points aimed at by IYC? 2) and beyond 2011, what can we, as chemists, do to keep IYC alive?

Answering the first question, the most important is to increase public appreciation of Chemistry in meeting world needs. By the public, I mean the citizens, the decision makers, the politicians, the journalists. The best way is not to defend chemistry, but explain it. The use of the argument "chemistry is everywhere" must be cautious, if we do not want to see chemistry disappear under all the sciences it is vital for and lose its own identity as a science by itself to be considered as a science at the disposal of the others. We should rather use the fact that chemistry, as Janus, the Roman god of the doors, has double faces: it is an **exact**, but also an **experimental** science; it is a **fundamental** science, but also the most **industrial** relevant one.

We must know that the image of Science in general is not good; the image of chemistry is bad, and the public does not trust scientists. The public uses a wrong definition of chemistry: *The chemist is the one who synthesizes artificial, and as a consequence most probably toxic products*. Thus Chemistry means danger, pollution, toxicity, and is opposed to natural, innocuous, clean.

So, when we speak to the public we must:

- not lie, and admit that chemistry, like any great enterprise, has a downside as well as an upside;
- **explain** that this is the science which shows how our material world is made;
- that global change is creating enormous challenges relating to energy, food, water, health, sustainability, climate change and that chemists can **afford some of the keys** to help humankind;
- tackle the opposition "natural /chemical", explain that **natural substances** so much advocated are 100% chemistry, that to use them, we need the chemists, and that chemists help preserving Biodiversity, via the synthesis of natural substances extracted from endangered species;
- we must be simple and imaginative: explain without or with a minimum of formulas. The way of representing molecules, which seems to us so simple and informative is terribly obscure for the non-chemists. Find convincing arguments: for the energy challenge, for instance, energy conversion and storage are maybe not fully understood, but energy conservation via insulating materials is easy to understand;
- do not forget to tell that chemistry is also analysis, purification and processing.

A tendency is maybe to have too many events organised for the chemists themselves. Of course, it is very nice to see that we share the same ideas, but we must not only preach to converted people. Why not, for as many scientific meeting possible, organise one (or more) conference for the public? Why not profit from the presence of a great name of chemistry (a foreigner if possible: no man is a prophet in his own country) to ask him to go to a college and speak to young people and maybe their parents?

Why not organize several events in small cities, where everybody is aware of what will happen and where the distractions are not numerous enough to prevent people to attend "something about chemistry"? I have had an extraordinary experience in a small less-than-3,000-inhabitant-city in the South of France: many people attended, listened to two conferences, watched a short play about Marie Curie and then freely discussed around a glass of wine. It is wonderful to see exactly what are the problems that people really have: then you realize that you did not know what you had to tell them, but that now, you can seize the opportunity and answer to their true queries.

Another crucial point is to reach the media, in order that newspapers, TV, radio present also the chemists' opinion, and not only that of journalists or of those who do not support chemistry. The audience share is much better when it is spoken about all the dangers that chemistry makes the citizen to be exposed to, rather than when it is spoken about the progresses chemistry has and will give to humankind.

And beyond 2011, what can we, as chemists, do to keep IYC alive?

Not so many people, even chemists, remember that 2009 was the year of astronomy. If we want that IYC does not face the relative obscurity that has befallen IYA and does not sink into oblivion, we have to think that one year is not enough. We must carry on with our efforts and explain chemistry during next years as if it were still IYC.

But words and promises are not sufficient: we have to be active and really meet world needs, change our way of making chemistry, no more start with familiar questions and disciplines, but start with practical problems, *"Rewrite the social contract - Do away with the old disciplinary structures - Focus on chemistry's strengths - teach students rather than use them ... chemists can still be curious, en route to addressing the big societal challenges of our times"*.[1]

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Reference

1. Whitesides, G. M.; *Nature*. **2011**, *469*, 21.