



Report from the minister of Education, Culture and Science

As minister of Education, I am extremely pleased that the 34th International Chemistry Olympiad (IChO) will be held in The Netherlands. This is a great honor for Dutch researchers and teachers, and shows that their contribution to the development and transfer of knowledge in the area of chemistry is a significant one.

“I am very grateful for the opportunity which the 34th IChO offers for demonstrating how exciting and challenging chemistry can be”

This olympiad is of considerable importance for chemistry education because it offers a good opportunity to demonstrate that chemistry is both a pleasurable and a creative subject. As one of the traditional basic sciences, chemistry has the unfortunate reputation of being a boring subject, one that primarily reflects on the essence of the elements and the materials around us but is not directed toward any practical use. This concept is far too limited. Our society urgently needs chemists for challenging boundaries in many areas. For example, a considerable amount of knowledge is needed for creating future energy supplies, improving health care, and developing new materials - knowledge which will come from chemistry in particular. The decreasing interest in the study of chemistry presents us with the possibility of a future shortage of chemists. For this reason, I am very grateful for the opportunity which the 34th IChO offers for demonstrating how exciting and challenging chemistry can be. I would like to add that teachers throughout the entire country have used a great deal of creativity in composing the questions for this competition. I hope that young people will feel challenged to participate in the olympiad and that, as a result, many of these will decide to study chemistry. Our society needs them.



Drs. L.M.L.H.A. Hermans,
*Minister of Education,
Culture and Science.*

Report from the president of the 34th International Chemistry Olympiad

It is always difficult to predict the future. When, in 1986, The Netherlands organized the 18th Chemistry Olympiad (IChO) at the University of Leiden, everyone was enthusiastic about it. This olympiad was a great success and yet it would be a long time before the IChO would be held in The Netherlands again. Nevertheless, the IChO and the affiliated National Chemistry Olympiad has become so impressive that the University of Groningen decided to host this event in The Netherlands in 2002.

Having been co-organizer of the 1986 olympiad, I have been given the honor of contributing once more to this event - this time as its president. The University of Groningen is a lively academic institution with an excellent chemistry department. Spearheaded by Jan Apotheker and Professor Jan Teuben, experts from within and from outside the university have come together to form an enthusiastic organizing committee. The Scientific Committee is chaired by Professor Binne Zwanenburg of the Catholic University of Nijmegen and consists of chemists from all universities in The Netherlands. This team is responsible for producing substantial and, of course, surprising assignments for both the practical and the theoretical segments of the olympiad.

“A competition which will provide stimulating contacts with chemistry and future chemists, as well as a close-up view of Dutch culture and the magnificent Dutch landscape”

Thanks to the generous financial support from the Ministry of Education, Culture and Science, the chemical industry, and the University of Groningen, the 34th IChO is sure to be as successful as the fine olympiads which have taken place in recent years. As president of this event, I would like to invite students, mentors, and other interested parties to be in Groningen from July 5th to 14th, 2002, for an exhilarating chemistry competition - a competition which will provide stimulating contacts with chemistry and future chemists, as well as a close-up view of Dutch culture and the magnificent Dutch landscape. I look forward to seeing you in Groningen at the 34th International Chemistry Olympiad.



Drs. W. Davids,
*President of the 34th International
Chemistry Olympiad.*



Report from the Chairman of the Organizing Committee

The 34th International Chemistry Olympiad will take place in Groningen from the 5th to the 14th of July. At this tournament, secondary school students from sixty countries will compete to determine - by means of both theoretical and practical exams - who is the best at solving tough chemistry assignments. Each participating country will be represented by four students, who have been selected by means of national preliminary rounds.

The special allure of the olympiad is that a few hundred gifted students come together to focus solely on chemistry and to solve some of its complex problems. The olympiad is, for this reason, extremely stimulating for the students, their mentors, and participating chemists. Many of the students involved in this event go on to study chemistry following graduation from secondary school. Some of these talented young people will very likely excel in this discipline.

The International Chemistry Olympiad also provides mentors with an opportunity to compare the best chemistry programs from a variety of countries and to re-assess their own programs in this light. In this respect, the olympiad can serve as a stimulus for the discussion that is now taking place in The Netherlands concerning the content of the chemistry curriculum in secondary education. Above all, we hope that the competition will increase a wider interest in all aspects of chemistry. There is, after all, a great need for chemists.

“Some of these talented young people will very likely excel in this discipline”

The competition will be held in the ‘Nijenborgh’, a building situated in the University of Groningen’s Zernike complex. The participating students will reside in Zuidbroek and their mentors will be housed in Eernewoude. The University of Groningen (RUG) and the National Chemistry Olympiad are involved in the organization of the olympiad.

A large portion of the costs for the olympiad, f 2 500 000.-, will be met by government subsidies and a contribution of the University of Groningen. Industries will also be asked to sponsor this event.

I hope that this will prove to be a splendid olympiad and that our guests will thoroughly enjoy their stay in The Netherlands.



Drs. J.H. Apotheker,
Chairman of the Organizing
Committee, 34th International
Chemistry Olympiad.



The chemistry and physics departments, University of Groningen

Report from the Chairman of the Board of Directors, University of Groningen

In July 2002 I will be very proud to welcome more than 60 teams of brilliant chemistry students to the University of Groningen. Coming from the five continents, they will participate in de 34th International Chemistry Olympiad.

“The students will try to be smarter and faster than their fellow students in solving exciting and intricate chemistry problems”

Their goal will be similar to those who participate in sporting events: they will try to be smarter and faster than their fellow students in solving exciting and intricate chemistry problems. Just as in any olympic games, they will be here to win - yet most of their joy will come from participating in this memorable scientific event.

The influence of science on society is greater than ever: just think of the ‘information highway’, for example, or of the effects which our growing knowledge of genes will have on medicine or pharmacy. Nevertheless, there is far less respect and love for science than there was in the past. In my opinion, the importance of such an international competition for young chemists is that it demonstrates how much fun science can be.

I am convinced that the organizers of the 34th International Chemistry Olympiad will do an excellent job and I would like to draw this event to everyone’s attention.



Prof.dr. S.K. Kuipers,
Chairman of the Board of
Directors, University of Groningen.



Windmill in the mist

The Netherlands? What kind of country is that?

Ask any number of Dutchmen and –women this question, and you’ll get as many different answers.

Ask a **soccer fan**, and he’ll tell you all you’d ever want to know (and possibly more than that) about Holland – home of Johan Cruyff, about the golden ages of Ajax during the 1970’s and 1990’s, about the national team of 1988 with Gullit, Rijkaard and Van Basten. To which he’ll sadly add that it is high time the Dutch learned how to take penalty shots, because another defeat at the World Cup semifinals will be more than this fan’s feeble heart can take.



The Dutch soccer team during the World Cup qualifying match Estland-Holland (2-4) on June 2nd 2001.

Ask a **nature lover**, and he or she’ll wax lyrical over green flowering pastures teeming with meadow birds. He or she will tell you about the Waddenzee, the largest European wetland reserve. Large parts of the sea fall dry during low tide. Because of this dynamism and the abundance of food, the area is extremely rich in plant and animal life. It is a nursery for North Sea fish, and in winter time it provides food for many hundreds of thousands of hungry migratory birds. But nature lovers will also raise their eyes to heaven in despair at rapidly advancing cities that engulf ever larger areas of open space, with traffic flows that turn a bit of peace and quiet into a scarce commodity.

Or ask a **historian**. With a little luck he or she will entertain you with stories of the Dutch Golden Age of the 16th and 17th centuries. The age in which majestic Dutch merchant vessels sailed the seven seas. He will talk about historic figures that left an indelible impression on the Dutch and their country, such as 15th-century humanist Erasmus, known primarily for his Praise of Folly. Or of Christiaan Huygens, who invented the pendulum clock and developed the theory of probability, and who is also known for his contributions to the development of the telescope. Or of Spinoza, the philosopher, and Berlage, famed for his early 20th-century architecture.

Ask a **geographer**, and after trumpeting forth about the unique qualities of Amsterdam, he will inevitably tell you about water, dikes, polders, windmills and how a considerable part of Holland actually lies below sea level. He will also add that if he had been commissioned to plan all this, it would have looked very different and undoubtedly much better.

Ask a **computer artist** what art can tell you about the Dutch. With one hand on a mouse and a joint in the other, she may tell you somewhat wistfully about Rembrandt’s modest but masterful self-portraits that only just manage to lift a corner of the veil over the Dutch soul. In another way, this also goes for Van Gogh’s expressionistic brush technique, for the systematic road to abstraction that Mondriaan took, and for Escher’s inimitable metamorphoses.

Or ask **any passer-by** about the Dutch weather. They will invariably complain. The summer is too wet and too cold, the fall is too wet and too windy, the winter is too wet and too warm and the spring is too wet and too late. But if the sun is in a good enough mood to peek out from behind the clouds, their faces will brighten up immediately. One will praise the ever-changing beauty of Dutch cloudscapes, the other will boast about the vibrant colors of a park lit by the watery sun on a September evening. Yet another will daydream over memories of a pond in the winter, newly frozen-over.



The Dutch flag



Beatrix, Queen of the Netherlands

And of course, ask a **chemical scientist** about The Netherlands. If you happen to meet one with a sense of history, he'll mention the names of the three Dutch scientists that won the Nobel Prize in the previous century. The first Dutchman ever to win the Nobel Prize was a chemist, Jacobus van 't Hoff, who received this most prestigious of accolades in 1901 for his work on chemical equilibria and osmosis. In 1936 it was Petrus Debye's turn for his research into the interaction between radiation and matter. Recently, in 1995, Paul Crutzen was awarded the Nobel Prize for his research into the hole in the ozone layer. That same chemical scientist might also tell you about the important part the (petro)chemical industry has played in rebuilding The Netherlands after the Second World War. He will tell you about large multinationals such as DSM, AKZO-Nobel and Shell.

The Netherlands? What kind of country is that? You'll note that this is not an easy question to answer. There are so many other stories that you will hear or may have heard. That is why it may be worth your while to read some more about Holland, before you go. And please, do try to look beyond wooden shoes, tulips and cheese. It will make your journey so much more interesting.



Polypropylene storage facilities at the DSM-site Geleen

A landscape with a fascinating history

Rapeseed fields in the Province of Groningen



Walking on the mud flats of the Waddenzee



The Grand Terp

"If the sea level rises, the people of Groningen will survive", according to British filmmaker and artist Peter Greenaway, known primarily for his movies which include gems as *The Cook, The Thief, His Wife and Her Lover*. Last summer, he built an artificial *wierde* in honor of the Groningers. He constructed this mound of mud, sand and clay near the city of Groningen, host of the 34th International Chemistry Olympiad in 2002. The 12 yard-high Grand Terp measures 230 ft across. This work of art is a symbolic representation of how the inhabitants of the northern provinces, the Groningers and the Frisians, have waged war against the sea for over 2000 years.

Floods

This battle has left many visible traces. Apart from hundreds of *wierden*, this fascinating history is still very much alive in old as well as newer dikes, meandering waterways and winding roads. The first inhabitants appeared as early as 600 B.C. on the wetlands along the shores of the Waddenzee, the shallow waters at the edge of the North Sea. They lived on the banks of the rivers that flow northward, where they bred cattle, hunted for fish and planted crops. During the first few centuries there was little need for protection against the sea, but from the second century B.C., things started to change for the worse. To their horror, the inhabitants noticed that the sea level began

to rise, and floods increased in number as well as in size. Many people fled the area. But those who dared to stay, sought higher ground – they constructed mounds of clay, sods, manure and garbage, on which they managed to survive the floods. Through the ages, the mounds became higher. The highest *wierde* reaches 5,5 yards above sea level. They also became bigger, to a size of about 820 ft across. Entire villages were built on the *wierden*. In the early Middle Ages, the first churches appeared on these home-made hills. Surprisingly, dikes did not appear until about 1100 A.D. They protected small areas against the sea, but they often burst during storm floods.

The city of Groningen



The ancient city of Groningen is bustling with life. For over a thousand years, the city has been the single most important center of activity for miles around, which is clearly noticeable in many of the inner-city buildings. Also, Groningen has always provided a good home to students. No less than 35,000 out of Groningen's 180,000 inhabitants are students at the university and other institutions for higher education. Sample the inner city's street life, and you'll know. Taste the youth culture and night life in one hundred and sixty bars and restaurants, fifteen movie theaters, seven theaters, a casino and a music center. Lovers of fine arts should not miss out on the opportunity to visit one of the city's museums, the highlight being the internationally renowned Groninger Museum designed by Alessandro Mendini. This museum, spectacularly situated in the canal surrounding the inner city, regularly boasts controversial modern art exhibitions. Part of the museum is dedicated to the historical and cultural development of the city and the province, as evidenced by archeological artifacts that were unearthed from the Groninger *wierden*.



The Groninger Museum



The Martini-tower in Groningen

Groningen University

The university was founded in 1614 by Ubbo Emmius, a traveling scientist. This was not the only university he managed to set up – he also founded one in Göttingen. Apparently he was not an easy person to get along with, because he got himself thrown out of several cities. The university has flourished, and has gained a world-wide reputation for excellence in several fields. The institution is especially renowned for its contributions to the exact sciences, not in the least through the efforts of scientists like Frits Zernike - yet another Nobel Prize winner from Groningen – and more recently thanks to the development of the chemical motor by Ben Feringa's group. You will read more about this in upcoming issues of *Catalyser*.

Monks

Monks have had a significant influence on the evolution of the landscape. From the twelfth century onwards, they founded dozens of monasteries in the northern coastal areas. They also built dikes, polders and waterways. They ventured to construct locks, in order to control the water level inland and to keep the sea out. This made it possible for the farmers to build their farms on the lower grounds around the *wierden*, as they still do today. The only difference is that today's dikes are high enough to withstand even the severest of storms. The monasteries did not hold so well. Once about 120 monasteries dotted the landscape in the Frisian coastal areas. Now, all that is left are a few bits and pieces. But if you drive along the narrow roads between the pastures, you can always see several churches on the horizon, whichever way you look – they all stood the test of time. And there they always will be, sitting peacefully on top of their *wierden*, as old as time itself.



The main university building, University of Groningen

Friday July 5th

- Arrival of students, mentors and guests.
- Welcome reception and dinner in the main university building ('Academie Gebouw').

Saturday July 6th

- Official opening in the Martinikerk.
- Jury meeting 1:
Determine practical assignments.
- Excursions, including a walk around Groningen.

Sunday July 7th

- Excursions.

Monday July 8th

- Practical exams.
- Activities for students at the university sports center.
- Boat excursion for mentors and guests.

Tuesday July 9th

- Jury meeting 2:
Determine theory assignments.
- Excursion for students: 'Water Management and Chemistry'.
- Excursion to Makkum for guests.
- Frisian evening for mentors and guests.

Wednesday July 10th

- Theory exams.
- Excursion to Amsterdam, Marken and Volendam for mentors and guests.
- Boat excursion for students; evening out in Groningen.

Thursday July 11th

- Assessment of theory and practical exams.
- Jury meeting 3.
- Excursions, including 'Skûtsjesilen'.

Friday July 12th

- Comparison of marks and determination of points.
- Jury meeting 4.
- Excursion to Amsterdam, Marken and Volendam for students.

Saturday July 13th

- Shopping in Groningen.
- Closing ceremony.
- Closing dinner and party.



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Ministerie van Onderwijs, Cultuur en Wetenschappen



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