

Report from the Advisory Committee
of
the Solvay Institutes

2012

Executive Summary

The committee wants to restate the conclusions from the last report namely that

- The Solvay Institutes are run in a most impressive and competent way.
- Within the existing organization there is not much room for a large extension of the activities.
- The Solvay Conferences are the pearls in the activities and the Centennial Conference in 2011 was a landmark in physics. Every effort should be spent to uphold this level.
- The Solvay Workshops are held at a very high scientific level with excellent speakers and participants.
- The Solvay Chairs and the Solvay Colloquia play very important roles for the universities in Brussels to get exposed to world-class scientists.
- The Solvay Public Lectures are of utmost importance to foster interest in the most modern science within the public mind.
- The Solvay Institutes and the Solvay family play an important role by providing means for postdoctoral and graduate student fellowships.
- The Solvay Institutes build an important bridge between the two language groups in Belgium.

We would further like to emphasize that we see good progress in the attempts to even out the differences between physics and chemistry and also to engage scientists from outside the Brussels area.

The committee has the following recommendations

- The Solvay Institutes should continue to strive to broaden the funding base in order to reach an endowment large enough to ensure long-time planning stability.
- The Solvay Institutes should continue to take an active role in promoting new subjects to facilitate for the universities to go into new modern areas.
- If new initiatives are taken they must carry the same excellence stamp as the other programmes.
- The Institutes should try to engage more the successful activities in bio-physics/bio-physical chemistry. A possibility would be to associate more in the chairs and the workshops the groups that are active in these areas, including those which are present in other departments than physics and chemistry. Issues in life science will most certainly be driving much of science this century.

Introduction

The Committee that consisted of Prof:s Lars Brink (Göteborg), chair, Leticia Cugliandolo (Paris), Gunnar von Heijne (Stockholm) (via Skype for part of the discussions), Hermann Nicolai (Potsdam) and Jacques Prost (Paris) met in Brussels on October 23 - 25, 2012. Unfortunately Prof. Hiroshi Ooguri (Pasadena) could not make it to the meeting since his flight from Tokyo to Brussels was cancelled in the last minute. In order to prepare ourselves we had obtained the annual report for 2011 and also the budget for 2011. We have also had the report from 2009 as a reference for the work.

On October 23 the Committee met with the Director and the Deputy Director Marc Henneaux and Alexander Sevrin together with the President of the Board of Directors Jean-Marie Solvay for an informal dinner. On October 24 the committee had extensive interviews with Prof:s Henneaux and Sevrin and with various representatives from the local faculties, Prof:s Barnich, Craps, Marage, De Wit, Gaspard, Geerlings, Goldbeter, De Baetselier and Wyns. The committee also had a lunch meeting with Prof Véronique Halloin, the general secretary of FNRS and a meeting with Baron Daniel Janssen. The committee furthermore interviewed the two secretaries of the staff. Between and after the interviews and at the dinners and finally in the morning of October 25 the committee had its deliberations.

The committee found that all interviewees were very enthusiastic about the Solvay Institutes like last time. They are all committed to the cause to run the various activities and to uphold the excellence stamp that the name Solvay carries. Apart from the secretariat, the work behind the activities is performed on a voluntary basis within the academic positions. This puts a limit as to how much work the staff can do for the Solvay Institutes. We will comment more on this fact later.

Let us first state that the Centennial Conference in 2011 was a very heavy workload for the involved people in the last three years, but it was also a huge success for the Institutes. Even though the burden has been so big, the Director and the Board have followed our recommendations on most points in our previous report from 2009 which we find very impressive. We see very active attempts to find the right balance between physics and chemistry as well as between Brussels and the rest of the country.

Scientific Activities

The Committee is very pleased to see how well all activities are working. The Centennial Conference was as noted above a huge success. Some 70 world leading scientists from a broad spectrum of fields in basic physics participated and the programme with longer overviews and shorter contributions led to intensive discussions among the participants. The Conference will certainly be remembered long in the future. The Proceedings which account for all the reports and the ensuing discussions will be a reference for the status of basic physics for years to come.

Even though a lot of work was committed to the organisation of the Conference, the Institutes have continued to have a full programme of Solvay workshops, Solvay colloquia, Solvay chairs as well as Solvay public lectures. On top of this the institutes have contributed to a European graduate school. We find that these programmes have been excellent as in the past. Hence there is no reason for us to discuss the individual activities. A question that was discussed now and in the previous report was if the institutes should try to accomodate more workshops. The Committee finds that the Institutes should be careful if they want to extend. The important thing is to keep the excellence of the meetings. Neither programme should be extended at the price of being diluted. We understood that it could be difficult to get someone for a Solvay chair and be present in Brussels for the whole month. This is what should be preferred but if it cannot be achieved, a recipient of such a chair could divide up the time. As in all such questions it is up to the Director and the board to be flexible.

The balance between physics and chemistry

The committee is pleased to see that there has been some progress in the last years to get the activities in chemistry up to a more even level with physics. There are still things to be done, but the interviewed chemists were all pleased with the work of the Director to implement this. The setting up of two separate local committees, one for physics and one for chemistry with broad participation in fields as well as in geographic spreading is a very promising step. It will be very important that these committees meet regularly and be active to propose new activities within the various programmes, and it will be the responsibility of the secretaries and the chairs of the two committees to oversee this. There was a slight complaint that there is not yet an equal number of assistants to the director from the two fields in the managerial committee. Since the work with the conferences and the publishing of the Proceedings of those are so time consuming there must be other persons involved in the other activities. There is still room for more chemists to help in these endeavours. We encourage the Director to find and appoint one more chemist to the managerial committee to help with workshops, colloquia and chairs.

A deputy director for the chemistry activities would also help. The proposal to appoint a former vice-rector would be a splendid solution. There were some complaints that the faculty in chemistry is not taking such an active part as the one in physics. One solution to this would be the appointment of a deputy director from chemistry with apart from other missions one to engage the chemistry faculty. Another one is to more involve the activities in chemistry outside the conventional chemistry departments, such as the one in biochemistry. The committee was very pleased to see the recent success in biochemistry where one member of the faculty at VUB is an important collaborator in the work that led up to this year's Nobel Prize in chemistry. We would urge the Institutes to follow up on this success in the form of future activities.

The institutes should also use their position to introduce new important fields in physics and chemistry to the universities. It was said by a representative from ULB that there is no room for such extensions but a university must always have an eye on introducing new activities often at the expense of older activities. In the end it is the departments and the universities that decide about future directions, but the activities of the Solvay Institutes should help them in these decisions. This is another important role for the Solvay Institutes within the Belgian scientific endeavours.

Finally the Committee finds that we need one more chemist in the committee. We urge the Board to appoint one more member to help the Committee to better advise in chemistry.

Broadening of the activities outside Brussels

The new committees with a strong participation of scientists from the rest of Belgium is a very promising attempt to engage the faculties outside the Brussels area in the activities. These people bring in new expertise in subjects not strongly represented in the Brussels area. This should lead to more proposals for the various programmes and hopefully also participation in the activities. The Committee would encourage the Director to oversee that the Solvay chairs are present not only in the Brussels area.

Already at the last meeting and again this time the committee became well aware during the discussions with the staff and the Director of the important bridge that the Solvay Institutes build between the two language groups in Belgium. The commitment to this cause is very strong and we heard appreciations for it from many corners. Also for this very difficult issue the Solvay Institutes have an important role to play.

Post-doctoral and Graduate Student Fellowships

The committee has noticed already last time the great voluntary work that many people on the faculty perform for the Institutes. It was then suggested that a good way of rewarding this work

could be to finance either a graduate student or a post-doctoral fellow for those persons. Apparently, within the Belgian system of financing graduate students it is difficult to find funding for foreign students in their first years in Belgium. A grant from the Solvay institutes could be a handy way to overcome this problem. We notice that the Director is given a grant from the Solvay family for his activities and if the economy allows there could be room for further grants from the Institutes.

If Solvay Institute funding is used for such positions it is mandatory to ensure that the excellence of the students match the status that the name implies. The post-doctoral fellow or the graduate student could be called "Solvay fellow" and "Solvay graduate student" resp. to increase the attraction of such a positions.

Another scheme for fostering excellence in Belgian science proposed last time was a suggestion that the Institutes might advertise two "Solvay Post-doctoral Fellowships" one in physics and one in chemistry, each year. The winners of the competition should then get a position for five years where it is mandatory that the first two or three years be spent abroad and the remaining years at an institution in Belgium. This would give exceptionally gifted Belgian students a chance to get postdoctoral training in the best universities in the world for a longer period and then be given enough time back home to get established in the Belgian system. We understand that the Board has discussed this issue and not given it a high priority. We agree with that, but will still leave it open as a possibility. This would be somewhat costly and cannot be done within the present budget, but if most of the burden could be carried by say a research council or some other organisation it could be an option.

Staff and Support for the Director

Like last time the Committee has understood that the success of the Solvay Institutes rests heavily on the tireless and excellent work that the Director and the secretaries perform. Also the enthusiasm of the other persons involved is necessary for the success. We realize that within the present set-up one is close to the limit for what can be achieved. We are pleased to see that the secretarial staff now consists of two full-time positions and by all accounts we understand that the secretaries perform a remarkable job. With this highly skilled and motivated staff there might be room for a modest increase in the number of workshops but any new activities have to be balanced against the administrative load and the need to keep up the excellence of the activities. The Committee is not urging the Management to increase the number. It is up to them to gauge the situation and decide the appropriate number of the various activities.

Last time the Committee found the workload of the Director to be extremely heavy. Not only did he have to actively work for the funding of the Institutes and to oversee all the activities but also to take a very active role in the daily running of the Institutes. The last three years have been if possible even more strenuous for him with the Centennial Conference being planned and organized at the same time as directing all other activities. For the future his situation must be improved. The appointment of a deputy director for the chemistry activities should ease the burden. Another heavy burden of the Director is to search for external funding to the activities. We appreciate the efforts from the Board and hope that they can take a big responsibility for this difficult affair also for the future, perhaps by appointing a person dedicated to that task. At last it is up to the Director to find a way of working which allows him to fulfill also his other activities within the university. We note that he has a very prestigious ERC grant and it is important that he also has ample time for his research.

It was remarked last time that a very important aspect of all the activities is the documentation on internet. We notice that the normal running of the web pages is performed very expertly by the staff. It is suggested in order to promote the activities and to lighten the burden for the secretariat that efficient databases and systems for organizing the list of activities within the website, as well as for communication with lecturers and participants in meetings and workshops should be introduced. Some external professional help is probably necessary to implement such systems. The

director should check if there is further rationalizations that could be made to facilitate the work. The ultimate question is to check if there is funding to be saved in the long run here.

We also noted last time that the Solvay archives contain material of utmost importance for the history of science. In some respects they are unique in the world containing correspondences between some of the most important figures in the history of science. We understand that the Director has a long term plan to implement such a programme. It should be financed outside the normal budget and there should be one person with good knowledge about the Institutes and their history responsible for it. Perhaps some historian of physics could be engaged. Also the lectures and discussions at the Solvay meetings should be made available. One can here compare with the Nobel archives, which are increasingly made available on internet (apart from the ones which are still confidential.)

Already last time the Committee noted one experience from recent Solvay Conferences and Workshops that physicists want to have all the talks directly available on the internet, while chemists often want to have meetings between closed doors, being worried that intellectual property rights might otherwise become compromised or that important new ideas might be exploited by competing groups. The Institutes have to keep this in mind when making information available. If there is a possibility to show the films from the recent Conferences on the internet site, it would be very advantageous for all parties.

Economy

The committee is very pleased to see that the economic situation for the institutes has been further strengthened. We note that there are no debts left any longer. The budget is balanced and has even generated a surplus which has been used to pay off the old debts. This means that the Institutes are better off for the coming years than it has been in the past. We propose that the Director continues this careful handling of the budget, and further surpluses should be used to further increase the endowment unless the working committees decide to increase a certain programme. The endowment has been increased since last time but it would be preferable if it could be further enlarged. A solid endowment gives the Institutes a strong base for their independence from the universities and the common funding agencies and allows for long-term planning. We appreciate all the efforts that the Director and the Board have undertaken and encourage them to continue in this difficult endeavour.

With the prestigious Solvay name for the various activities there should be good opportunities to attract funding from outside sources to finance many of the activities. This could help to ease the burden on the endowment and help build up the endowment. This has to be balanced though against the workload.

The institutes pay the travel money for participants to the various workshops. Many scientists have quite good resources for traveling and we would encourage the institutes to gently ask the participants if they could cover the travel money from their own resources. This could give a surplus from the workshops that could be used elsewhere.

Conclusions

The Committee is very pleased to see that the excellent quality of all the programmes has been upheld during the last three years and notes the great success of the Centennial Conference. The task for the Director, Board and the Management is to continue along the same lines as in recent years.

The Committee was somewhat concerned last time about the imbalance between physics and chemistry and also about the weak participation of Belgian scientists and institutions outside the Brussels area. Some important steps have been taken to even out this imbalance both in action by the Director and the Management and by the appointment of two new committees, one for physics and one for chemistry with broad participations, and the Committee is pleased to see all that progress and believes that this is the correct way to go.

The overall impression that the committee has obtained is that the Solvay Institutes are run in a most impressive and competent way. It is remarkable that the director and his staff have re-established the Institutes as world-leading institutions so swiftly, and the committee can only congratulate Belgium and the scientific communities in physics and chemistry to have these activities.

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