

Report from the Advisory Committee
of
the Solvay Institutes

2015

Executive Summary

Many of the conclusions are identical to the ones from the previous meeting and are repeated here.

- The Solvay Institutes are run in a most impressive and competent way.
- Within the existing organization and budget we find that the activities have reached an optimal stationary level.
- The Solvay Conferences are the pearls in the activities. Every effort should be spent to uphold this level. We note that the planning for the chemistry centennial conference in 2022 is being started.
- 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 gain exposure to world-class scientists. We note that there are attempts to further include Belgian universities outside Brussels.
- The Solvay Public Lectures are of utmost importance to foster interest in the most modern science within the public mind. It is very impressive to gather some 900 people on a Sunday afternoon.
- The strong and steady support from the Solvay family and the Solvay group provide a solid basis for the institutes.
- The strong support from the two universities both economically and morally are also very important for the institutes.
- The Solvay Institutes build an important bridge between the two language groups in Belgium.

We would further like to emphasize that it is very rewarding for the Committee to see our recommendations being so seriously considered. We see very 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 newly established local chemistry committee must be more active and enlargement with chemists from the interface with biosciences at ULB should also be considered.
- The Solvay institutes should get engaged in the modern social media in order to spread information about the various activities especially as concerns the public lectures and the Colloquia.
- The Solvay institutes should consider the idea to introduce "Solvay Lectures" by young outstanding scientists.
- The Solvay Institute should find ways to involve the students more actively in participation of the colloquia. One possible way would be to organize a lunch for graduate students with the colloquium speaker and give some of them the opportunity to meet and discuss with world leading scientists.

- 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 the entry of the universities into new modern areas.

Introduction

The Committee that consists of Prof:s Lars Brink (Göteborg), chair, Ben Feringa (Groningen), Karen Goldberg (Seattle), Gunnar von Heijne (Stockholm), Hermann Nicolai (Potsdam), Hiroshi Ooguri (Pasadena and Tokyo) and Jacques Prost (Paris) met in Brussels on October 12 - 14, 2015. Unfortunately Prof. Leticia Cugliandolo (Paris) could not attend the meeting, since she had a commitment in Santa Barbara which had been planned since long in advance. In order to prepare ourselves we had obtained a report on the activities 2013/14/15 and the budget for 2014. We have also had the report from 2012 as a reference for the work.

On October 12 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 13 the Committee had extensive interviews with Prof:s Henneaux and Sevrin and Lode Wyns and with various representatives from the local faculties, Prof:s Coheur, Van Eck, Geerts, de Wit, Danckaert, Gaspard, Barnich and Craps. The Committee furthermore interviewed the two assistants of the staff. The Committee also had a lunch meeting with Prof:s Eddy Van Gelder (president of VUB), Patrick De Baetselier (Vice rector for research at VUB) and Paul Geerlings (Vice President of the ISI) together with Prof:s Henneaux, Sevrin and Wyns. The day was concluded with a visit to ING Bank Headquarters for a discussion with M. Boyer, the new member of the board of directors and with a discussion with Jean-Marie Solvay. On Oct 14 the Committee first met with Prof Serge Schiffmann (Vice rector for research at ULB) and then with Prof Eric De Keuleneer (president of ULB). Finally the Committee had a meeting with Baron Daniel Janssen. Between and after the interviews and at the dinners and finally in the afternoon of October 14 the Committee had its deliberations.

The Committee found that all interviewees were very enthusiastic about the Solvay Institutes like at previous times. 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. The Committee very much appreciates that the two universities allow and support this. It puts, however, a limit as to how much work the staff can do for the Solvay Institutes. We will comment more on this fact later.

The Committee appreciates that the recommendations from previous reports have been given such strong considerations and are very pleased to see how well they have been implemented. We have previously commented on the very heavy workload of the Director. It is still heavy but our impression is that it is more reasonable now. We will comment on these points later in the report.

Scientific Activities

The Committee is again very pleased to see how well all activities are working. The two Solvay Conferences held since the last report have been huge successes giving strong imprints in their respective fields. The Committee commends the strong commitments here not only by the Director but also by the scientific secretaries of the two scientific committees as well as by the committees themselves.

Even though a lot of work was committed to the organization of the Conferences, the Institutes have continued to have an almost full program 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 note that also Zürich has now joined in here as a fourth node. We find that all these programs have been excellent as in the past. Hence there is no reason for us to discuss the individual activities. The Committee notes though that there were less workshops in chemistry this year and urges the local chemistry committee to make sure that the program is filled up covering some of the rapidly emerging fields of chemistry.

The Committee found that the European graduate school in fundamental physics is a very

unique and successful enterprise. We ask the local chemistry committee to consider the possibility to organize something similar in a suitable subfield of chemistry. This would give a chance to Belgian graduate students in chemistry to meet graduate students from neighboring countries and at the same time get advanced graduate courses in a very stimulating milieu.

The Committee finds that the activities of the Institutes are now at a fairly optimal level given the economic and personal resources. Neither program should be extended at the price of being diluted. We understood like last time that it could be difficult to get someone for a Solvay chair 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. We find it advantageous if she/he could also extend the activity to visit and make contacts with other universities in the country,

The Committee wants to make a small new proposal by introducing "Solvay lectures" by young outstanding scientists. Besides recognition, it fulfills two purposes; attracting some of the most bright young minds to Brussels and provides further exposure to frontier fields of chemistry and physics at minimal costs. We are aware that there are now many distinctions given to a very small group of young scientists, so a program like this should not necessarily reward the same people. There are many young excellent European scientists that could be taken into consideration. The local physics and chemistry committees could be given the task to find these people in a way which is not too big a burden.

The Committee is impressed that the Solvay Colloquia scheme is working so well. In many universities it is very difficult to motivate the graduate students but also older scientists to attend talks in fields which are distant from their own. One suggestion to further increase the interest among the graduate students would be organize a lunch for some graduate students with the speaker and to advertise the colloquia on Facebook and Twitter. This has proved to work very well at other institutions.

The Committee noticed that there are also a number of workshops that are not directly organized by the institutes but get contributions from the institutes and can hence carry the Solvay name. This is a way to increase the number of Solvay workshops which is to be recommended. We trust that the Director and the local committees make the selections according to the same principles as for the ordinary Solvay workshops.

Finally it was taken up the question if scientists engaged in the institutes can sign papers with the Solvay institute address together with their university address. We encourage this initiative as a way to honor those who work voluntarily for the institutes and to give further visibility to the activities of the institutes.

The balance between physics and chemistry

The optimal way to run the two institutes is to have a perfect balance between physics and chemistry. Traditionally this was not the case and the Committee has previously urged the director and the board to find this balance. The Committee is pleased to see that there has been great progress over the years to get the activities in chemistry up to a more even level with physics. It has certainly been improved since the last report, but there are still things to be done. All interviewed chemists were very pleased with the work of the Director to implement this, so now the initiative resides with the local chemistry committee. We found that this committee is not yet working at an optimal level, and we urge its chairman to engage the members of the committee more actively. Since there are very interesting interfaces to biochemistry in other departments we strongly suggest to also involve members from those departments. This should be done while still having a strong focus on novel developments in the basic chemistry research.

It is very important that the local committees meet regularly and be active to propose new activities within the various programs, and it is the responsibility of the chairs of the two committees to oversee this.

The Committee is pleased to see that the organization now is very symmetric in regards to the two fields. This time we noticed no complaints about the organization structure. All persons interviewed were happy with it.

We have previously encouraged the institutes to use their positions to introduce new important fields in physics and chemistry to the universities. There is of course again a balance to be sought for, since 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. We notice that the new activity in biophysics will be followed up by a workshop. This is an excellent way to support new research directions.

There was a question from the local chemistry committee if they could contact the scientific committee for advice. We encourage this and since there is now also a full representation of chemists in the advisory committee we also encourage the chemistry committee to keep an open dialogue with the advisory committee. We note that such contacts already exist between the local physics committee and the scientific committee for physics and the advisory committee.

Broadening of the activities outside Brussels

The new local committees with 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 but also strengthen further already strong subjects in the Brussels area. The Committee notices that the increased involvement of those outside of Brussels has resulted in proposals for workshops. The chairmen of the local committees should make sure that this will continue. As mentioned above the Committee encourages the Director to oversee that the Solvay chairs are present not only in the Brussels area.

We are very pleased to see how well the two universities work together in matters related to the Solvay institutes. Already at the previous meeting we noticed how hard and successfully the staff and the Director work to consolidate 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.

Staff and Support for the Director

Like at the previous times the Committee has understood that the success of the Solvay Institutes rests heavily on the tireless and excellent work that the Director and the staff perform. The appreciation for them is remarkable from all persons interviewed and very well deserved. 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 and the Committee only has put forward some small suggestions to increase the programs. The bulk of the new work should reside with the local committees.

In previous reports we have 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. On top of that he is the professor of a world-class research group. Since some years he has a very prestigious ERC grant which has allowed him to run a huge and successful group. The grant has helped also the people from his group working actively for the Solvay institute since there has been ample funding for graduate students and post-docs. The problem with ERC grants is that they are huge but only for a certain period of time. Once it is finished it is hard to maintain the high level of research. The Committee is very pleased to see that the Solvay family and Solvay group support the Director with the aim to have a full grant of the size of an ERC grant in the future. This helps the Director to have a long term planning of his research and his group. This will also make the position very

attractive the day the Director decides to step down. Here the Committee wishes that he can stay as long as the rules allow.

The two assistants play a vital role for the success of all the activities. At times the work load is very high but we heard no complaints about it. On the contrary they were very happy with their duties. One question that came up during the discussion with them was if they have all the benefits of corresponding positions within the university. It is important that this is the case and we understand that the director is taking care of this.

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. The web pages are very instructive and is continuously being upgraded with new material and new functions that streamline the activities. This was discussed in the last report and the progress is quite good. The Committee would also urge the secretariat to set up a Facebook page and a Twitter account to promote information about the activities. It need not be a great burden and the idea is just to announce the activities, not to use them as discussion fora. To generate followers of the Facebook and Twitter feeds, the email lists of previous attendants at the public lecture, and of participants and colloquia, could be used to advertise the new communication channels.

We have also noted in previous reports 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 program for this. It should be financed outside the normal budget and there is already one person, Prof. Franklin Lambert, with very deep knowledge about the Institutes engaged in this matter. We are pleased to learn that also the board is active here. By opening the archives to some chosen graduate students of the history of science they could do the bulk of the work while at the same time getting unique material for their theses. Here some strategic cooperations could be set up with University departments or institutes. Also the lectures and discussions at the Solvay meetings are of course of utmost value. The proceedings from the old conferences exist in print and we understand that the process to put them on the web page in electronic form is well on its way.

Already in the previous reports 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. There was now a proposal that workshops and perhaps also colloquia could be put on line in real time. That is working very well at some other institutes and the Committee urges the institutes to consider this idea. The public talks should be possible to make available on-line or as real time webcasts.

Finances

The Committee is very pleased to see that the economic situation for the institutes has been further strengthened. The director has since some time managed to pay off all debts and we see that the endowment is increasing. The budget is balanced and has even generated a surplus which has been the way to increase the endowment. We understand that it is difficult to attract contributions to the endowment from outside sources since the institutes are so intimately connected with the Solvay name and the Solvay group. It would be advantageous to double it since it will give the institutes more freedom and relieve the stress to apply for money from outside sources, but it can take some time. It should be emphasised that the contributions from the Solvay family and the Solvay group as well as from the two universities are stable. The Committee feels that this serves the Institutes very well in their long-term planning. We are very pleased to note the strong support from the Solvay group for some of the specific chemistry activities. As at the previous occasions we are very

pleased to see the two universities so positive to the activities. They do carry costs which are not seen in the budget, apart from the direct contributions, such as salaries and rents, but they do get a lot back and being associated with the Solvay institutes give them world-wide recognition.

The Institutes also benefits from the support of the National Lottery and from the Regions. We hope that these essential contributions will continue at the present level. It is a wise policy to take measures to put the Institutes in a position where they are less dependent on these less stable sources of financing. In that respect, besides the growing of the endowment mentioned above, we also propose that the Director continue his careful handling of the budget, and further surpluses should be used to further increase the endowment.

With the prestigious Solvay name for the various activities there should be good opportunities to attract funding from outside sources to finance some specific activities. This could help to build up the endowment further. This has to be balanced though against the workload.

We have previously noted that the institutes are quite generous to pay for participants to the workshops. As long as it is not a burden to the finances it helps to attract a strong participation. Many scientists though have good resources for traveling and are willing to use it. By a careful wording in the invitations some funding can perhaps be saved to be used elsewhere.

Conclusions

The Committee is very pleased to see that the excellent quality of all the programs has been upheld during the last three years and notes the great success of the two conferences that have been held since our last report. The task for the Director, Board and the Management is to continue along the same lines as in recent years.

The Committee is also very pleased to see that the imbalance between physics and chemistry and also about the weak participation of Belgian scientists and institutions outside the Brussels area have been handled very efficiently. Important steps have been taken to even out these imbalances both in action by the Director and the Management and by the appointment of the two local committees, one for physics and one for chemistry with broad participations. The chemistry committee can be more active though and we understand that it will be in the future.

The overall impression that the Committee has obtained also this time is that the Solvay Institutes are run in a most impressive and competent way. It is due to the excellent job of the director but also of his associates in the organization. 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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