

Round table on Research, RSME, Granada, February 6, 2015.

Contribution of Bernard Teissier

Over the last thirty years or so I have been very much impressed by the speed and quality of the development of Mathematics in Spain.

Today, in Spain as in many other countries, this development is in great peril and I will try to analyze the causes of this situation and offer some suggestions.

I will concentrate on three main themes : the decreasing support for basic research, the tendency to concentrate this dwindling support on « projects of excellence » and finally the abuse of bibliometry in evaluation of the quality of research.

- In most developed countries, the support for basic science has been decreasing sharply in recent years, while developing countries such as China, India, Brazil, in spite of their many development problems, invest energetically in scientific research, and in particular basic research. Concerning basic research, this is not a problem of resources, since it is relatively inexpensive. I think it is more a problem of attitude, or of ideology. During the cold war, it was understood by politicians that research is necessary to keep a technological and military edge, and that this is a long term issue. This incentive has disappeared, and our politicians now think only of technology as a means to get a commercial edge, and they do not understand that basic research is an absolute necessity for applied research, which in turn fertilizes technology, and that this takes a long time and cannot be decided from above, only encouraged.

This is all the more dramatic because we are going to witness important changes in applied research, in particular to deal with climate changes, the social and medical problems connected with population increase, and the management of resources, and a strong basic research would help very much this adaptation. This is what developing countries, which did not take part in the technological competition of the cold war, have understood before the developed ones. We can only hope that our politicians realize this before it is too late, but in the meantime we lose many of the innovations which should result from the education given to our young researchers up to the doctorate level. There has been an explosion of applications of mathematics in all directions but we do not really have the resources (in terms of positions for young people) to build on it.

- These diminishing resources, in addition, are very often allocated by people who do not understand the nature of research and think that it can be managed more or less like a set of industrial projects. They seek to concentrate resources on « projects of excellence » selected by committees. In the short story « The Mark Gable Foundation » published by the great physicist Leo Szilard in 1961 in his book « The voice of the dolphins », he suggested precisely this as a method for hampering research because the time of senior scientists would be taken by participating in the committees while the time of junior scientists would be taken by the redaction of projects and grant requests, and truly original research would be doomed. Szilard was a visionary in many other ways, but he had not anticipated how fashionable the word « excellence » would become, especially among those who are incapable of evaluating quality. Those who speak all the time of « excellence » are like someone who has inherited a beautiful garden carefully tended for centuries, with a rich soil full of good bacteria, rhizomes and

runners and who, because water is expensive, decides to water only the most colourful flowers.

Excellence is a bonus which happens in unpredictable ways when you have high quality.

- This brings us to the problem of evaluation. I believe that if a committee or institution takes decisions on hiring, promotion, grants, sexenios, etc., solely on the basis of impact factor or ranking of journals in which the candidate has published, it means that its members do not trust their own scientific judgement, and then they should resign or at least consult reliable experts! In fact, it can be observed that the lower the quality of scientific research is in a country, the more its scientific decisions rely on bibliometry. This is understandable, if not excusable, for some countries, but not for Spain ! In fact, I suggest that such a committee or institution, under the responsibility of its president, should set down in writing how much of its decision is based on bibliometric data and how much on an in-depth scientific judgement of the work of the candidates, based on looking at their papers. In the end, it is an ethical issue : of course it is much easier to rely on bibliometric data, but they are easily falsified, and this mode of evaluation is a real threat to the quality of science. As Winston Churchill wisely said : the only statistics you can trust are those you falsified yourself.

- Suggestions : It is urgent to stop discouraging talented young people from considering a career in basic research, so the number of Ramon y Cajal and Juan de la Cierva grants should be greatly increased. Or perhaps a more ambitious program could be substituted to both. Shorter term PostDoc positions should also be greatly increased.
- The RSME could join other european mathematical societies and the EMS to make a joint appeal to the ERC for more ERC grants, of a smaller amount, in Mathematics.
- The meetings of young mathematicians, organized mostly by them, such as YMIS, are an excellent model and should be multiplied, including in applied Math.
- Concerning the IEMath., I want to recall that at the time of the renovation of the Institut Henri Poincaré, around 1990, one of the main ideas was to attract foreign mathematicians to Paris to teach French mathematicians topics which were not sufficiently developed in France. The emphasis was on the topic, and of course on quality. The word « excellence » was never said. It has worked out rather well since.
- The RSME should continue and increase efforts with other learned societies to try and make governments aware of the responsibility they take by decreasing support for basic research and allocating this support in unadapted ways.
- And finally we should all try to make the efforts necessary so that evaluation relies as little as possible on bibliometry.