

Inaugural address by the new President of the Max Planck Society, Professor Martin Stratmann, at the Plenary Assembly on 5 June 2014

Ladies and Gentlemen,

In preparation for today, I have been visiting a number of our Society's Institutes, where I introduced myself and took the opportunity to talk with colleagues and members of staff – not only to understand their science, but also to listen to their problems and take in their questions.

I found these visits both fascinating and motivating, in equal measure. I encountered many very young scientists who are full of enthusiasm for their research here at MPG. Even though from time to time these young researchers have concerns about their long-term career prospects, in the vast majority of cases they are genuinely satisfied with their present circumstances. I regularly found myself recalling my own early years as a scientist, the best time in any scientist's life, when I pursued my own ideas and concepts, ideas that I believed in and that I wanted to help become reality.

Ladies and Gentlemen, especially in this early stage in their career every young researcher needs the scope, the perspectives and the time to achieve a certain maturity. This, if you will, is the essence of the Max Planck Society: The confidence we place in our scientists, whether they be Directors or junior scientists, in their capability, their single-mindedness, their perseverance. This is what makes our Society so attractive, all the more so when the zeitgeist is very different and the freedom to explore is often reduced to the scope of applications and confidence gives way to control! I see this basic attitude as fundamental to our success, and I will adhere to it!

On my visits to the institutes, I was from time to time confronted with some surprising questions: For example, one young scientist related that he had spent some time at Harvard, where he found the campus magnificent and inspiring. And he concluded with a question I was not expecting: Why do we need the Max Planck Society when there are such successful alternatives? What makes MPG so special and unique?

How simple a question is that to answer? I first asked the young man another question in return: Why had he come all the way from the USA? Simple, he replied: The chief scientists at this institute comprised a legal expert, an economist and a psychologist, and the conditions surrounding his field of research were unique. What's more, the institute was embedded in an outstanding university landscape and there were other Max Planck Institutes working in similar fields. A constellation that allowed for an outstanding intellectual exchange. By which time he had already answered his own question: An interdisciplinary approach, entirely new research structures, a strong and receptive university environment, other MPIs with complementary objectives: This is, as it were, the formula that allows even a small MPI to compete with

institutions of Harvard's magnitude.

But then, on my way home, I still felt somewhat dissatisfied with myself, because I was aware that the question I had been asked is one that goes to the very heart of the German scientific system. And it stayed with me in the months that followed. It is a question that we as an organisation and as a country must constantly ask ourselves. And we must consistently think carefully and be clear as to how we answer it, for it will serve as a guide to the continuing development of science in Germany. So why does Germany need the Max Planck Society? Would the country genuinely be missing something if there were no Max Planck Institutes?

Ladies and Gentlemen, in order to answer these questions it is decidedly expedient to consider our history and our origins. What was the original purpose of our Society, what plans were there for the future at that time? Where better to begin than with Adolf v. Harnack, a theologian and member of the Prussian Academy of Sciences. In 1910 he penned a memorandum on the "Necessity for a new organisation to promote the sciences in Germany", which ultimately led to the foundation of our predecessor organization, the Kaiser Wilhelm Society. First of all, I was much impressed by the brevity of the memorandum and the virtuosity of the language, the clarity of analysis and the acuity of the conclusions. Also from today's perspective, it is a brilliant text which was quite clearly not the product of the levelling effect of large committees and working parties, but of the creative power of a small number of fine minds. Even today, this memorandum must give us food for thought: It formulates key questions and proposes solutions that are valid to this day, and it warns us to consistently, if constructively, question established thinking in order to find the answers to contemporary issues.

In his considerations, Harnack initially harks back to the ideal of the university developed 100 years previously by Humboldt as an institution which combines research and teaching as one inseparable unit and which to this day constitutes the basic formula for most universities. Based on this successful underlying university structure, he analyses the development in research up to the early 20th Century and comes to the conclusion that scientific research has expanded at a vastly dynamic rate which far exceeds anything that might have been imagined in Humboldt's day, with consequences for the economy that were visible to all. Harnack states that *"there are entire disciplines that no longer fit within the framework of the university, partly because they demand such huge mechanical facilities and instrumentation that no university institute can afford them, but partly also because they address problems that are beyond the reach of students."* Examples at that time included nuclear physics, organic chemistry and breakthroughs in biology, particularly infection biology. He concludes – long before the age of mass-market universities – that *"the laboratories and capabilities of the universities are proving ever less adequate, as ever greater requirements are rightly imposed on them to allow students to engage in the practical work which should become the focal point of their education, to the point where these needs threaten to monopolise all resources."*

His proposal to the then Kaiser foresaw the creation of professional non-university research institutes in the most modern fields of science of the time: Institutes which Harnack wished to amalgamate within a uniform organization. He concludes *“that in the organisation of these research institutions, it is most important not to define their objectives in advance, but to allow them every freedom for future development. The direction of research should be a product of the personalities of the academics that lead them and of the development in science itself. Were the institutes to be dedicated from the beginning to specific purposes, it would be all too easy to be led down blind alleys, for science often exhausts itself with surprising speed”*.

Harnack did not intend his proposal to lead to the complete separation of research and education. On the contrary, he wanted to make a distinction between a university whose primary task in Humboldt’s sense is to provide a close combination of research and teaching, and a research organization that is dedicated first and foremost to research, but which characteristically also encompasses elements of education, albeit highly specialized and tailored directly to the needs of research. His memorandum was not a draft for a new alternative university model – quite to the contrary, it foresaw the continuous fruitful exchange of scientists.

There is one aspect of Harnack’s comments that is particularly striking:

He makes no mention of any division between basic and applied research. His words are at all times coloured by the understanding that the findings of basic research are of direct consequence for applications and so too for the welfare of society. I am utterly convinced that even today there is no such dividing line and that any distinction lies in the methodologies of research: On the one hand there is knowledge-driven research that is exempt from any practical targets but frequently leads on to applications, and on the other there is demand-driven research oriented towards specific goals.

Nor does Harnack ever speak of excellence. Universities and the new non-university institutes may differ in terms of a division of labour based on partnership, but not in terms of their quality. To think otherwise would have been inappropriate, for at the start of the 20th Century German universities were setting international standards, and with just about 55,000 students they were outstanding institutions.

And today? If anything has changed, it is that the number of students in Germany now stands at over 2.5 million! Over half each annual cohort meanwhile goes on to study at university, and rightly and primarily desires a good academic education as a means of successfully embarking on a career. Only very few of them will actively participate in the advancement of science. So German universities are forced to perform a balancing act. They must guarantee that half of each cohort receive an outstanding education, and at the same time provide a high quality research infrastructure for what is likely to be a very small proportion of their students. A research infrastructure that is becoming steadily more complex and expensive!

I imagine most of you are the same as I was until recently: You’ve never seen a mouse house

from the inside. Ladies and Gentlemen, this is the highest of high-tech, with semi-conductor-style ultra-clean room technology! Or again, consider modern physics laboratories: They now push the limits what is structurally possible, with no vibrations, no electrical or magnetic interference. And if you think that the humanities at least should not cost a great deal, you are much mistaken! Historians now use methods akin to those employed by well-equipped criminologists, psychologists avail themselves of the latest, and extremely costly, magnetic resonance imaging techniques – our colleagues the legal experts are perhaps the last remaining species of scientist of modest appetite!

Adolf von Harnack's analysis is of greater topical relevance than ever, with universities that are almost at the point of collapse under their educational burden, infrastructures, the costs of which are exploding and which can only be operated by skilled professionals, and international competitiveness that must be safeguarded in economic terms. Meanwhile, in the midst of all this, are highly motivated and capable scientists, the best of whom are highly coveted internationally; scientists who must be courted and who are quickly lost if the general conditions are not right.

And something else has changed since Harnack's time: The education market has become more global and students more mobile. Many of them are guided primarily by the reputations of universities or research institutions. For reputations are a credible indicator of outstanding performance in research and teaching – and a promise of an optimum education and an ideal start to a career. A glance at the Shanghai ranking shows that the US research university model is particularly successful, with just three non-US universities among the top twenty in the current ranking – Cambridge, Oxford and the ETH; none of which are in Germany.

Harvard, Stanford, Yale – these are the scientifically highly successful international gold standard. With a generous budget (Harvard has over € 3 billion per year at its disposal) they attract the world's best professors, they have developed professional management structures, and they provide a small number of students with a hands-on scientific education. Josef Joffe, editor of *Die Zeit*, recently published a commentary entitled "Mount Olympus slams the door", in which he remarked on figures apparently indicating that Stanford University will this year accept just 2,100 applicants out of total of 42,000. That is just 5% – while 30 years ago the figure was 20%! The Anglo-American system is optimizing itself at the cutting edge: Universities are becoming a primary filter in the selection of a social elite who more or less inevitably will go on to occupy leading positions in politics, industry and science. This is the only way to justify the enormous tuition fees, and the only explanation for the huge endowments: In 2012/2013, Stanford University alone pocketed over 900 million dollars in donations, four times the budget of the University of Heidelberg.

In Germany, unlike the USA or England, there are no such distinct differences in quality between the universities – despite the Excellence Initiative. Our universities are funded almost entirely out of the public purse – funds that must be democratically justified – and open to all those with the

relevant abilities. Germany puts its faith in a very high quality, and internationally recognized, broadly available education, and takes a sceptical view of the formation of social elites at isolated educational institutions.

Nevertheless, Germany has succeeded in creating a climate for research at the very highest level; a climate that is attractive to the leading international scientific elite and that bears comparison with the leading American universities. This has been and is being achieved with the aid of the Max Planck Society, which is addressing important social tasks in close cooperation with the broad-based universities: MPG is a scientific beacon with the ability to fire young people with enthusiasm for research, to help to prevent the best among them from migrating, while also attracting outstanding minds from abroad.

Ladies and Gentlemen, we can be truly thankful that we in Germany with our particular combination of breadth, depth and permeability can hold our own at the cutting edge – and that we can do so scientifically as well as economically, and with no little interdependence between the two! By contrast, many countries have in recent years either entirely lost their former scientific prominence or have failed even to reach the front rank of research nations, with substantial consequences for their economic performance capabilities.

So now I could offer the young scientist whose question set me thinking so hard the following answer: Max Planck Institutes are needed now more than ever – small, highly specialized research institutes structured according to the Harnack principle under a shared institutional umbrella, able to concentrate on cutting edge research and scientific graduate training and equipped with a budget that is also internationally competitive.

However, is the status quo sufficient? Surely all of us who have visited Asia can see the competition we are facing from that region? Not just economic competition, but in research and education? Can you imagine what it will mean if in future 40% of students worldwide come from Asia? Will our country then not more than ever have need of young, creative people from across the world – young people whom we can encourage after studying for a while in Germany either to remain here or return home as future ambassadors for Germany? Are our educational institutions truly visible and attractive, and do they offer potential students from across the world the prospect of a reputation that counts for something in their homeland? Do we not need to be particularly attractive, if we are to overcome the language barrier alone? Despite the enormous tuition fees, the USA currently attracts almost ten times more Chinese students studying abroad than Germany ... but why? Have we the courage to adapt our structures to the new conditions prevailing in the global education market? Are we willing to revise our ways of thinking in order to make the best of the resources and structures available to us? Or to put it briefly, are we ready to dare more Harnack?

Ladies and Gentlemen, as in Harnack's day we find ourselves in a period of tremendous scientific and social change that is defined by the competition between the wider regions of Asia, America and Europe. Now as then, economic and scientific aspects are tightly interwoven. How will

Europe – how will Germany – position itself in the course of this not least scientific contest? What goals must we achieve to ensure that the continent we all value so highly performs well?

Let me summarise goals and means in four propositions:

1. We must be wholeheartedly committed to the development of the European Research Area. If one considers the total numbers of Nobel Prizes for science that have gone to Europe and the USA, the figures are not so far apart. However if one looks exclusively at the trend since World War II, one must concede that the USA is meanwhile much better off than Europe! Of the ten institutions hosting the most Nobel laureates, only two are European: the University of Cambridge and the Max Planck Society. So there is much to do, and all the more so given the yawning gaps between research areas within Europe. Is it acceptable in the long term that entire countries should have no chance in the contest for outstanding scientists? Do we not need European career structures similar to those in the USA which offer good prospects for advancement for young scientists throughout Europe? After all, in Europe as a whole there are 183 universities that feature among the top 500 in the Shanghai ranking (by comparison, there are 149 in the USA), albeit very few of them in Eastern Europe.

The Max Planck Society, through its Max Planck Centers, Partner Groups and Institutes abroad, has created some outstanding means by which to strengthen the European Research Area. MPG already has Institutes in three European countries (Italy, Luxembourg and the Netherlands). And this commitment to Europe could be expanded provided there are host countries that are willing to follow our philosophy. That this should happen is ultimately also to the benefit of Germany, which must necessarily have an interest in the continuing economic and scientific development of Eastern Europe in particular. Europe must make itself more attractive to students of outstanding calibre and alter the ratio of “brain drain” to “brain gain” in its favour and with sustained effect. Universities and research organizations will be of elementary importance in this process, and MPG and I as its President stand ready to help.

2. Expenditure on education and research will increase. The scale of the necessary investment, however, will not be determined by us, but by our competitors.

We cannot rest on the laurels earned in past years. The lead the German economy holds will last not for decades, but for just some years at best. And as the past has shown us, economic monocultures are in themselves a danger. We therefore need to see an ever expanding diversification of our economic base, founded on scientific innovations.

Consequently, we must strengthen the universities, and we must do so through structural

diversification and not by way of general, uniform budget increases. An increase in basic funding should be a matter of primary consideration, since universities too need scientific as well as financial scope to define and determine the emphases of their research for themselves. We must take care, however, not to eradicate the distinctions that have already been achieved. The recent approvals granted by the DFG for special research areas reveal a close correlation between success in the Excellence Initiative and success in other excellence-driven DFG programmes. This is a genuine endorsement of the Excellence Initiative, the effects of which could and should be consolidated by raising the flat-rate programme funding which currently does not even cover the costs.

It should also be noted that what sets the German university landscape apart on an international level is its high and homogenous performance capacity and its availability to all – an advantage which must under no circumstances be forfeit. In past years in my role as a Max Planck Director based in Düsseldorf, I have been active in encouraging support for science in the Ruhrgebiet – and to specific intent. Structural change still remains one of the defining features of the region, and the inherent problems can only be overcome through education and science. First-class universities are called for to provide educational opportunities for the many gifted children, in order to keep them in this region and deter them from migrating.

Ladies and Gentlemen, in the Ruhrgebiet in particular many of the children are born to immigrant families - these children too are our future! Therefore we need educational opportunities for all, and we should attach no small value to the diversity and high quality of Germany's educational institutions, from technical colleges to internationally renowned universities!

3. We must create genuine value added through cooperation, particularly with an eye to the formation of a scientific elite.

Ladies and Gentlemen, it is clear to us all that broad-based universities and highly specialised Max Planck Institutes can ultimately only form a sound foundation for science in Germany provided that both sides cooperate with one another intelligently and efficiently. The key question is, how can one commit to networking without losing one's own specific identity? How can one create genuine value added through cooperation between organizations that are otherwise pitted against one another in competition for resources and personnel – cooperation that is honestly desired, that is beneficial and that is not imposed by compulsion?

Local campus structures have a large role to play, as these structures - in addition to scientific training – can also cater for the social needs of individuals and families. I also see great opportunities in the development of supra-regional science-driven clusters in future-

oriented fields of science. In this context we can concentrate on the most internationally visible areas of emphasis and in so doing substantially strengthen the attraction of graduate training for students with an enthusiasm for science and contribute to the development of internationally visible career paths. The Max Planck Centers that we currently operate together with leading international universities present an ideal model that could easily be transferred to Germany.

The Max Planck Society can do little to contribute to the education of broad swathes of the population, in comparison with the universities we are too small. However we are certainly in a position to substantially promote research-oriented graduate training and network this closely with first-class research. Our goal must always be to bring together intelligent minds with an interest in research. This goal – one might also regard it as one of the core objectives of the Excellence Initiative – will only be achieved in close cooperation between Max Planck Institutes and leading universities.

4. The Max Planck Society must not only acquire a younger and more feminine aspect, it must also be more courageous in the future orientation of its Institutes.

The many visits I have made in recent months have shown me that the Max Planck Society is well positioned and equipped, it is highly visible internationally and highly attractive to scientists from all over the world. And I will ensure that it remains so in future: We shall and must appoint the best people internationally, but also increasingly recruit students on an international basis, not least because of the demographic changes taking place in our own country. We shall fight for every fine mind – and frequently we shall win!

We must make greater efforts to ensure that we are also genuinely attractive to younger scientists. Albert Einstein was 36 years old when he first published his general theory of relativity in 1915. Two years had passed since Max Planck had brought him to Berlin, and at the age of 38 he became Director of the newly established Kaiser Wilhelm Institute for Physics. Einstein was certainly an exceptional talent, and yet experience shows that it is at this age that many scientists make their decisive breakthroughs. Let them make these achievements with us! So it is with good reason that I say today, I wish to make the Max Planck Society even more attractive to younger scientists who must come to regard the Max Planck Society as a home that offers them good prospects and opportunities to develop their own research.

However MPG must acquire not just a younger but also a more feminine aspect! And it is already doing so! Now that we have a large number of women among our doctoral students and post-docs, we must once and for all ensure that they are willing and able to carry on working in science. We find ourselves here in competition with numerous

business undertakings, and it is a contest we can only win by offering convincing alternatives. We need to offer a package that is genuinely attractive and persuasive to female scientists. I shall make every effort to achieve this, and on this basis we shall succeed. The subject of gender, however, will be with us for many years still, since even a strong Max Planck Society cannot entirely rewrite conditions in society.

During the term of office of Peter Gruss we began to address many new scientific topics and established these institutionally both by restructuring existing institutes and founding new ones. We were able to do so because the Federal and regional state governments provided us with an increase in funding. Of course, science does not stand still; it goes merrily on its way, paying no heed to any increases that may or may not be granted to us. Entirely new branches of science are developing in the space between the natural sciences and humanities, the field of computer sciences has staged an unprecedented triumphal march, while the boundaries between chemistry and biology are disappearing and intelligent materials will revolutionise the material sciences. We shall address many of these topics, and in future we will probably find ourselves more than ever consistently questioning - and where necessary also re-adjusting - the orientation of existing institutes. Only by doing so will the Max Planck Society remain in a position in future to dare to venture into new areas of research, thereby redefining the boundaries of knowledge.

But one thing will not change, and that is the focus on our scientists, male and female! In all our decisions it is people and their needs that must be at the centre of our concern – and here I refer not only to our Directors, but also to the many thousands of other Max Planck scientists of all age groups!