

## **The Role of an Academy of Sciences and Humanities\***

*Pieter J.D. Drenth*

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### **Introduction**

The world of Academies of sciences and humanities to date looks much like a multifarious conglomerate: Some Academies confine themselves to natural and life sciences, others include social sciences and humanities, or limit themselves to the latter. The role of some Academies is restricted to the organization of meetings, debates and the exchange of views and opinions about scientific issues, theories and research results, whereas others have, in addition, an evaluative and/or advisory function. Some of these advices concern science policy matters, others are concerned with problems in society that may be solved by the application of available scientific knowledge, again others deal with social and ethical issues related to the advancement of science and technology itself. Some academies not only advice on (quality of) science, but have also a national science funding task, or carry the actual responsibility for large research programmes, sometimes within own academy institutes. Variety and heterogeneity, therefore, in the world of Academies.

Still one important characteristic set of objectives has united Academies throughout history and in their present geographical diffusion: the attempt to further the critical scientific thinking in a society, the desire to advance top level scientific and scholarly research, and the promotion of independence and freedom of science as a sine qua non for its advancement.

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These two conditions, freedom and independence, have always been essential characteristics of an Academy. In fact, this was the very reason for the creation of the first Akademeia in Athens some 400 years before Christ, and for the revival of the idea almost two millennia later during the Renaissance in Europe. The very value of an Academy spring from its independent and uncontaminated search for the truth, an asset that Emperor Justinianus did not appreciate when he closed Plato's Akademeia, some thousand years later, because he considered the views developed in the Academy to be damaging for the state. In the 16th and 17th century the universities were brought more and more under the yoke of church and state, which lead to a growing need to find a place where scientific problems could be discussed freely and without danger. This opportunity was created in the newly founded Academies of those times, first in Italy in as early as the 15th century: Accademia Pontiana in Naples in 1433, Accademia Platonica in Florence in 1474; later in Italy as well as in other European countries: Accademia dei Lincei in Rome in 1603, Académie Francaise in Paris in 1635, Leopoldina in Schweinfurt (later Halle) in 1652, Royal Society in London in 1662, Académie des Sciences also in Paris in 1666, and the Brandenburger Sozietät der Wissenschaften in Berlin in 1700. In these revived Academies the spirit of independence and intellectual freedom made them free ports for oppressed and prosecuted scientists to freely express their views and to pursue their research ideas, thus becoming a fertile soil for the development of novel and often revolutionary scientific ideas and theories

As said, in spite of this conspicuous common goal, the present Academies show a great variety in roles, tasks and manifestations in their attempt to achieve this goal. In the following we will focus on the different functions and roles of an Academy, and see how these roles have changed throughout history, and how Academies have moulded them differently into concrete form.

### **Platform for communication**

Most Academies have first of all an extensive meeting and communication function. Generally this is seen as an important devoir of an Academy: the exchange of views and scientific information between members, between members and non-members, between Academies and sister institutes within and outside their country. In an active Academy gatherings of the general assembly, divisions or sections take place on a regular basis. Special meetings, theme conferences, colloquia and workshops are organized by Academies or take place under their auspices. International contacts, reciprocal visits of scholars, exchange of periodicals and other publications further stress the international character of the meeting function.

With respect to communication function we deal with a central and salient role of an Academy indeed: the presentation and discussion of new discoveries, new insights, new interpretations, and the promotion of the intellectual debate in a critical confrontation with colleagues has not infrequently led to a deepening of insights or even a shift of frontiers. This is what Plato had in mind and what has inspired the founders of the just mentioned new Academies in the Renaissance: Giovanni Pontano, Lorenzo de' Medici, Frederico Cesi, Richelieu, Johann Bausch, John Wilkins, Jean Baptiste Colbert, and Gottfried Leibniz.

It goes without saying that these scientific debates are only efficacious if the top scientists and scholars in a country participate. This leads to three important conclusions with respect to the selection of Academy members:

1. For the admission to membership of an Academy only scientific and scholarly criteria may be applied. No political, ideological or social considerations should be allowed to play a role. Administrative qualities and management experience may be supportive, but can never replace the scientific yardstick. Unfortunately Academies have not always been obedient to this commission. With respect to the appointment of members they have not always been able to resist political or ecclesiastical

pressure, or coercion by dictatorial rulers, as past and recent history (e.g. in Central and Eastern Europe) history shows.

2. A second danger is that the younger, creative and innovative researchers have insufficient chance to be admitted. The danger of 'conservatism' is reinforced by three conditions: the restricted number of members to be admitted, the high age at which members become 'resting' or emeritus member, and the cooptation system. For the latter condition I do not quite see a good alternative. The first is mostly fixed by law or bylaws of the Academy, which are often hard (although not impossible) to change. I would, therefore, make a plea for a lowering of the age-limit at which members receive a 'resting' or emeritus status (for the rest with full rights, with a possible exception for membership of the Board), a limit which in many Academies is 70 years or higher at present, or sometimes even non-existent. In my opinion this lowering of the age-limit is the best way to allow for more, younger scientists, who do not belong to the 'old boys network', to be admitted to an Academy.
3. Given the restricted number of places in an Academy and the increasing differentiation and specialization of sciences more and more high quality scientific expertise is to be found outside Academies. It is important for an Academy to be able to activate the wide range of available expertise, within and outside its walls. Some Academies solve this problem by creating a category 'aspirant' or 'corresponding' member. Others invite 'outsiders' to become members of advisory committees or working groups. But it is important for an Academy to guard against insulation from the scientific community at large.

A final word in this respect about another asset of an Academy. Thanks to the availability of expertise from a variety of disciplines there is ample opportunity for a multi-disciplinary debate. In past times such discussions were a matter of course, because of the general character of science and philosophy. With the present increasing specialization the multi-disciplinary address becomes more and more seldom. I hope that the

Academies will be able and willing to give this important traditional aspect of scientific communication an abiding place on their agenda.

### **Promotion of research**

With respect to the second function of an Academy, the promotion of scientific research, we can observe important changes throughout history. In the beginning of the newly created Academies research was their primary task. The university of that time (*universitas magistrorum et scholarium*) was basically a learning institute, intended for the transfer of the attainable, canonized knowledge. In addition, these universities had, certainly in the 16th and 17th century, strong ties with the ideology of the churches. Academies were much more places for research, and, hence, more independent of the church doctrines. Thus, they performed a function, which the universities could not accomplish. In many cases even their names reflected this research function: *Accademia dei Lincei* (lynx-eyes) in Rome, *Accademia della Crusca* (to separate chaff (*crusca*) from wheat) in Florence, and the *Accademia del Cimento* (experiment), also in Florence.

In the Academies of those times one could come across studies in physical geography (Apanius, Stensen), in mathematics (Descartes, Wilkins), in physics (Newton, Huygens, Oldenburg, Tsirnhaus) and later chemistry (Boyle, Guericke), in biology and zoology (Linneus, Van Leeuwenhoek, Swammerdam), astronomy and astrophysics (Kepler, Galilei, Cassini, the Greenwich Observatory which came under the Royal Society in 1710), medical studies (Harvey, Bausch, Mentzel), and even interest in practical and technical applications of scientific insights (Bacon, Leibniz). Also large scale philological and literary studies (Corneille, Racine, Schikhart, Pellison), as well as historical and pedagogical (Comenius, Skytte, Ratke) studies were undertaken. Most of these studies included philosophy; in fact, almost all natural scientists and mathematicians in those days were philosophers at the same time.

Only in the 19th century the Academies started to loose this primary research task, a tendency which continued in the 20th century, at least in

the non-socialist countries. This had a number of causes: In the first place, specific research institutes were created outside the Academies, sometimes supported with public, sometimes with private funding. Secondly, research took place increasingly within universities; indeed in many cases carried out by members of the Academy who had taken professorships at these institutes of learning. In the third place other institutions were created for supervision and financing of research programmes, the predecessors of the later Research Councils (CNRS, ZWO, DFG, ICSTI), or Research Organizations (e.g. Max Planck-Gesellschaft). Finally, the nature of research changed. It developed increasingly - and this is particularly the case in the experimental and empirical sciences - into an collective activity, carried by research groups in stead of individual scientists. For Academies it became more and more difficult to offer the appropriate infrastructure and funding.

The nature of Academies changed at the same time. They became rather societies of scholars, the members of which prosecuted a variety of professions outside the Academy: at universities, in libraries and research institutes. However, the influence of Academies on research also in this period should not be underestimated, both owing to the enduring scientific discussions and debates, and because of the actual support to publications, exchanges of scholars, and even expeditions (such as those of Darwin and Livingstone, sponsored by the Royal Society of London, or the Kamtschatka-expedition under the auspices of the Russian Academy in St. Petersburg).

The Academies in Central and Eastern Europe in de 20th century took a different direction. In those countries the Academies often accommodated very large numbers of research institutes. In fact, the bulk and the best of fundamental and applied research was allotted to the Academy institutes with the objective the advancement of socialism and the scientific-technological progress in the country (Grau, 1988, pp.315). The Akademija Nauk SSSR (which was founded in St. Petersburg in 1724, and moved to Moscow in 1934) was more or less a shining example for the 14 Academies in the Union. In 1983 it counted 256 regular, 524 corresponding, and 107 foreign members, and had about 300 research institutes, in which over 50.000 personnel was employed. True, the change

of 1990 did result in major reforms and retrenchments in the Academies of the former Soviet republics, particularly in defence and space research, but it cannot be denied that in many CEE-countries an important part of scientific research still takes place at academy institutes.

Western Europe in the second half of the 20th century shows a varying picture with respect to Academy research. Top level frontier research is carried out (among others) by academicians, but mainly in their own universities or research institutes. As far as their own role in research is concerned most Academies confine themselves to the stimulation, sponsoring or (in certain cases) execution of specific projects. In many cases these high quality projects have a long term duration and a multidisciplinary character. Other Academies (such as the Royal Netherlands' Academy) do have research institutes under their jurisdiction, in which important high quality research is carried out, that has not found a place within universities, because of its scope, its inter-university character or for other strategic reasons.

The question 'what is the ideal formula?' cannot be answered easily in conformity. The answer depends on historical and national conditions. In general we would favour a reserved attitude of Academies with respect to actual responsibility for the execution of research, but there may be circumstances under which Academies have to play a more active role. We may agree on the following principles:

- Research and education are mutually dependent on each other, and should not be separated. In principle research, also fundamental research, should take place at the university.
- In many countries additional organizations exist for the promotion of basic or applied research, in which Academies should not interfere.
- If the national research map would nevertheless show white spots in areas where national interests would require research efforts, and if the Academy can mobilise the necessary expertise, the latter should be entitled to step in.
- If certain important projects cannot be carried out by universities or other institutes because of their scope, their interdisciplinary character, their expected duration, or for other reasons, and if there is agreement

that the Academy should take it up, the latter should be entitled to do so.

### **The advisory role**

Although the advisory function was not always explicated in academy-by-laws many Academies have considered it as their responsibility to convey judgements on the basis of their scientific insights to governments, institutions or the public at large. Also monarchs have acknowledged the usefulness of science for the promotion of trade and commerce, and prestigious Academies like the Royal Society of London and the Académie des Sciences have carried out a good deal of applied research. Leibniz was very disturbed by the fact that Leopoldina restricted itself to pure and fundamental research, and the Brandenburger Sozietät, which he founded in 1700, explicitly included the application of science for the benefit of the state in its objectives.

Later the Academies are confronted with an advisory role, often in an informal way, but sometimes also explicitly prescribed by law or regulations. This is possibly the most challenging, but at the same time most controversial role of an Academy. What kind of advices can be distinguished? We would like to separate out three categories of advices:

1. Advices, based upon quality assessments. One may think of advices on continuation, termination or adaptation of certain lines of research, programmes or projects, or of the appraisal of individuals or research groups for the endowment of scholarships or prizes. Also in the in recent years growing tradition of calling in assistance of visiting committees for the evaluation of departments, faculties or whole institutes Academies can play an important role. Furthermore, mentioning should be made of research foresight advices, which are concerned with trends and developments in various scientific disciplines, both at the national and international level, which could be used by the government or other relevant institutions for the development of a science policy for the future.

2. Advices regarding science policy, such as the desired balance between pure and applied science, between natural sciences and humanities, and between scientific research and science education. Also advices regarding the content of certain institutionalised forms of organization or financing of scientific research in the country, or advices on curricula of graduate research schools and career opportunities of young scientists fall within this category. Finally this category includes advices on the prioritising of research areas for funding within the realm of the national strategic research policy.
3. Advices on political decisions, based on scientific research. Some of these advices have a medium or longer time perspective (global change, energy, system of medical care, TV and violence, peace and détente, world population). Others have a more immediate or acute character (BSE, mouth and foot disease, radiation of mobile phones, earth-quakes). For some of these advices abundant and solid knowledge is available and needs only 'translation'. For others only incomplete, probabilistic and uncertain knowledge is available, which must lead to a different type of advice (more constrained or more in terms of expected risks and probabilities) or no advice at all, depending on the nature of the issue and the chances and effects of both positive and negative errors.
4. Advices on ethical and societal questions related to or generated by scientific research. Some of these questions have to do with (im)proper behaviour of scientists (fraud, misleading, plagiarisms), others with experimentation or data gathering (informed consent, privacy, intellectual property), again others with the question what is being done with the results and by whom (contract research, commercialisation of research results, misuse or misinterpretation of results) or with problems with the media (too optimistic or unjustified reports, misquoting).

As far as the advisory role is concerned, and in particular with regard to the ethical and societal questions, we touch upon an interesting and important

issue, namely the supposed primacy of scientific objectives for an Academy. Is not veracity the main touchstone of its activities?

In our view that is true, but it would be a major mistake to derive from this presupposition that scientists, and Academies of science, do not carry moral and societal responsibility. True, scientific practice is inconceivable without the freedom to think, to speak, to carry out and to communicate about research. If science is unable to retain its independent and impartial nature, it will sooner or later become irrelevant and useless. But at the same time there is the – in recent years increasing – need for public accountability. Scientists nowadays are confronted with a variety of ethical, social and political questions that cannot be pushed aside with the argument that they are normative and not scientific. The challenge for scientists and Academies of science in the future is therefore not to make a choice, but to find a balance between freedom and responsibility.

Are Academies equipped for such an advisory role? The following elements make out a good case for an affirmative answer. First, there is the attainability of abundant scientific knowledge and experience within their walls. Second, Academy members are (should be) ‘disinterested’ in the proper sense of the word: in an ideal case no political, economic, regional or professional interest group can nourish the hope of being especially favored by an Academy’s advice. Third, these members have a firm scientific orientation, and emphasize the free and uncontaminated nature of science. They are independent and there is little danger that they would turn into another political pressure group.

However, whether Academies will also become a major advisor in ethical, social, and legal matters, as described above under 3 and 4, depends on the willingness of the Academies to take the moral and societal accountability of science seriously - which, in turn, depends on the willingness of their members to accept this responsibility - and on the public’s willingness to assent to such a role for the Academy. For the latter condition it is important what has been said before: (1) an academy should truly represent the world of (top) science, including the voices of the younger, and the female scientists, and (2) also the expertise outside an Academy should be mobilized, for instance through its participation in advisory committees or workgroups. It further does not need arguing that

an Academy in its advisory role should collaborate compliantly with other agents in the field, each from its own posture and with its own perspective : University Associations (educational policy), National Science Research Councils (funding motives), Technology Assessment and other national science or technology advisory committees (with a disciplinary or technological perspective).

### **Internationalization**

Finally, a word about internationalization; not surprising for a speaker who represents an international federation of national academies. Science has grown from an individualistic to a collective, collaborative activity. At present science cannot grow in isolation. It presupposes cooperation and contact, exchange of knowledge, expertise and research results. And, of course, these contacts have to cross national borders. The term ‘national science’ has become almost a *contradictio in terminis*.

The international nature of science and scholarship has always been apparent as was symbolized by the many ‘international’ scholars in the 15th and 16th century (Erasmus, Kepler, Huygens and Descartes a.o.) who traveled widely and published for an international public (in Latin, of course), and by the frequent exchange of scholars and scientists between the various European Academies in later centuries. But the global perspective of science has become particularly conspicuous to date with the explosive developments of fast and easy electronic communication means. Many research themes have an international character and cannot be studied from a purely national perspective (environment, health and infection diseases, transport, trade, migration, tourism). For a number of mega-programs single national funding falls short of what is needed and only combined efforts can furnish the necessary means (CERN, EMBL, SO). Moreover, collaboration and collective efforts can strengthen the competitiveness of the higher level gremium (e.g. Europe), a basic argument for Commissioner Busquin to promote the ‘European Research Area’, with a complementary character and added value vis-à-vis the national research programs.

Academies are full and active partners in this international scientific scene. Also for the position of Academies it is true that the whole is more than the sum of the parts, and that a European association, such as ALLEA, intends to be more than the sum of national Academies in Europe.

The idea is not new. Already in 1787 Johann Gottfried Herder stood up for a united German Academy that transcended the local Academies of those times. Later German Academies joined their research efforts in a Kartell, since the requirements of an important research program ('Enzyklopädie der mathematischen Wissenschaften', and 'Thesaurus linguae latinae') exceeded the available resources of any singular Academy. In the first 'International Association of Academies' many European Academies united: the German Academies of Berlin, Göttingen, Leipzig and München, as well as the Academies from London, Paris (Académie des Sciences), St. Petersburg, Rome and Vienna. One non-European Academy joined, the American NAS. One year later the Academies of Amsterdam, Brussels, Budapest, Oslo, Copenhagen, Madrid, Stockholm and Paris (the two other Academies within the 'Institut') joined. From this agglomerate and by a politically complicated roundabout way the two most significant international scientific organizations emerged: the 'Union Académique Internationale' (UAI) for the humanities, and the 'International Council of Science' (ICSU) for the natural sciences.

In Europe new opportunities for co-operation arose in the 1990's, due to the end of the Cold War and the increasing significance of the European Union in the area of science and higher education. Initiated by the Académie des Sciences, the Royal Society, the Royal Swedish Academy and the Royal Netherlands Academy ALLEA was officially constituted in 1994. ALLEA's members are the national Academies of sciences and humanities. It now has members from all over Europe, from Iceland to the Georgian Republic, from within the European Union and beyond. ALLEA exchanges information and experience among Academies. In ALLEA the national Academies collaborate to serve the scientific community, European political organizations and the general public. Committees and working groups focus on science and ethics, intellectual property rights, privacy in the information society, research strategies in smaller countries and other issues related to science and scholarship in Europe.

It is clear that ALLEA is not the only player in the field. There are funding agencies (ESF, the Framework Programmes of the European Commission), there are associations of universities (AEU) or Deans of Faculties (DEAN's Network), European Associations of engineering academies or applied research councils (EuroCase, EARTO), and also European Associations of individual scientists and scholars (Euroscience, Academia Europaea and other European Academies of Sciences and Humanities). Where possible ALLEA tries to cooperate with these institutions and organizations, for instance in the context of EURAB (the European Advisory Board within the EC), EASAC (the European Academies' Science Advisory Council), and other gremia. But ALLEA also wishes to reserve the right for itself to bring to the open its own standpoints and views with respect to the promotion of excellence in science and scholarship as ALLEA's members see it. The recent reaction of ALLEA on the proposal for the Framework Programme 2002-2006 of the European Community (ALLEA, 2001) is a case in point.

### **A final word**

In this paper I have tried to make clear that throughout its historical development the idea of an 'Academy of Sciences' can be marked by both continuity and alteration. Let us hope that also in the future the Academies of sciences and humanities in Europe will be able to preserve their basic principles as well as to adapt to the demands of time and culture.

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