Europäische Akademie

zur Erforschung von Folgen wissenschaftlich-technischer Entwicklungen
Bad Neuenahr-Ahrweiler GmbH

Direktor:
Professor Dr. Carl Friedrich Gethmann

# Newsletter

Akademie-Brief ▪ No. 32 (June 2002)

## Editorial

*Recently the Europäische Akademie zur Erforschung von Folgen wissenschaftlich-technischer Entwicklungen Bad Neuenahr-Ahrweiler GmbH invited Professor Buzzoni (University of Macerata) as guest speaker. The lecture was on epistemological questions of medicine and took place in the Europäische Akademie on 16th May 2002. Main questions of the subsequent discussion centred on two different standpoints regarding medicine i.e. from the scientific and from the patients point of view and correlated different expectations. This event was organised in the form of an internal colloquium of the Europäische Akademie.*

*Despite of its mission and methods, mainly directed to the consultancy of specific external target groups, the Europäische Akademie developed from its beginnings a means of continuous internal scientific communication. This takes place in the form of a monthly academy colloquium. Since the year 1996, 70 seminars of this type have been organised in this way. The topics discussed range from technology assessment to the philosophy of science and practical ethics applied to medical, environmental and other problem areas of societal relevance. Verbal contributions to the colloquium, made by scientists from both inside and outside of the Europäische Akademie, have enabled a transfer of knowledge in both directions. The "Akademie-Kolloquium" pursues the ancient traditional model of a forum for scientific reflection. So, external referees are also highly welcome to come and discuss their theses or even to conduct preliminary work in a "protected environment". Further aims of the internal colloquium are to improve and broaden the intellectual scope of the academy's scientific staff and to discuss new questions and ideas, emerging from the scientific work and in advance of their possible implementation in terms of future research projects. In this way the academy also gains in the accomplishment of its mission. The Europäische Akademie will report on the course of the colloquium in its newsletter at regular intervals.* SL

## Focus

### Protection of the Environment from Ionising Radiation. A New Challenge in Risk Management

*Deborah Oughton*

Over the past 2-3 years, there has been an increasing awareness that the existing system of radiation risk management needs to move from a strong anthropocentric basis, i.e. focusing exclusively on the protection of man, to a system that also addresses effects on non-human fauna and flora. However, the development of such a system raises a number of challenging ethical questions, and many organisations have expressed the need to also consider the ethical and philosophical basis behind frameworks for environmental protection. In practice, the changes reflect the increasing challenges that the nuclear industry, authorities and regulators are facing within application of policy, including the need to address more widely such values as public acceptability, perception of nature, transparency and stakeholder involvement.

Traditionally, radiological protection frameworks have focused almost exclusively on the protection of man. This is largely because the body responsible for setting standards, the International Commission on Radiological Protection (ICRP), has relied on the tenet that "if man is adequately protected then other living things are also likely to be sufficiently protected" (ICRP, 1977). The flaws in such a philosophy have been increasingly recognized, from both a scientific and risk management point of view, and there is a growing international awareness that radiation protection needs to explicitly address the question of effects on the environment. In 1991, ICRP added a caveat that "individual members of non-human species might be harmed but not to the extent of endangering whole species or creating imbalance between species". Nevertheless, a number of problems remain with the existing state of affairs in radiation protection.

First, little scientific evidence is available to support the ICRP statements. Experience from laboratory studies and accidents has established that radiation can have a number of detrimental effects in biota, including mortality, reproduction and genetic damage. However, current knowledge about effects on wild plants and animals is limited, subject to large uncertainties and there is little consensus on the relevance and acceptability of these effects in the context of risk management. Second, the ICRP statements are potentially invalid in certain situations, for example where pathways to man do not exist, where accidents have contaminated areas with low population densities or in the case of sea disposal. Third, the present radiation protection framework is incompatible with existing systems for other environmental stressors.

Some European scientists have been promoting a revision of radiation protection since the early 1990's. Despite the initial scepticism shown by the majority of scientists and authorities, protection of the environment from ionising radiation is now on the agenda for the majority of international organisations concerned with nuclear issues (e.g., ICRP, International Atomic Energy Agency (IAEA), OECD Nuclear Energy Agency (OECD/NEA), EU) and is supported within ongoing EU scientific research projects. The ICRP re-

cently set up a task group to look into environmental protection and is expected to address the issue in its revised recommendations (expected 2005), The International Atomic Energy Agency (IAEA) are evaluating the need for a revision in radiation protection principles, and a number of factors are driving the development of a system of protection within EU legislation. Results are beginning to exert an influence on national recommendations (e.g., Norway, UK), and some form of international legislation and regulation is anticipated within the next 3-4 years.

Interestingly, many international organizations have identified a need to clarify the ethical and philosophical basis of any framework of environmental protection. A number of the issues are already familiar (if still controversial) within environmental ethics, such as valuing the environment, animal rights, environmental risk, the precautionary principle, and differing cultural and social attitudes towards nature. Practical management questions for radiation protection include the definition of harm, genetic change, the level at which damage is occurring (individual, species, ecosystem), and comparison of natural and man-made radiation. Other relevant issues are the public's perception of radiation risks and similarities between attitudes towards biotechnology and nuclear technology. Finally, authorities need to consider the increased public awareness and concern for environmental issues in general, and from the evolving integration of environmental protection into international convention and legislation, (i.e. Rio declaration, Convention for the Protection of the Marine Environment of the North-east Atlantic (OSPAR)).

Any evaluation of the ethical, philosophical and legal basis for a framework for protection of the environment, needs to include comparison with standards for other environmental pollutants and hazards (e.g., chemicals, biotechnology), as well as ongoing developments within human radiation protection, notably the forthcoming ICRP recommendations, and implications for environmental protection. It should be pointed out that an increased focus on ethics and philosophy is also attracting considerable attention in the field of human radiation protection.

Existing systems for environmental protection rarely consider radioactive contaminants, and it appears that environmental philosophers have largely ignored the issue of radiation effects. Although it is important that any revised framework for radiation protection is compatible and complimentary to existing laws and principles for environmental protection, it must be recognised that there is diversity in the standards and assessment criteria used to regulate other environmental stressors. Environmental law is changing on both national and international levels, recent example include the Aarhus convention, Rio declaration, OSPAR, Kyoto protocol, and the forthcoming Earth Summit on Sustainable Development (Johannesburg, 2002). The search for harmonisation of such standards is a pertinent topic within environmental risk management. Radiation protection policy has to recognise these developments, but also ensure that the knowledge of environmental effects of radiation informs and contributes to the debate. Harmonisation will in turn be dependent on the scientific and technical data generated in ongoing projects, as well as on philosophical and ethical issues such as the way one defines harm caused by exposure to radiation.

Regarding the question of valuing the environment, the IAEA has recently published a TECDOC on "*Ethical Considerations in Protection of the Environment from Ionising Radiation*". The report evaluated the diversity of cultural and ethical beliefs on the perception of nature, including anthropocentric, biocentric and ecocentric outlooks, and concluded that a broad common agreement could be found for the principles of sustainable development, biodiversity, conservation, and environmental justice within environmental and radiation protection. They also noted the need for consensus on a number of issues including an evaluation of the implications of practical principles (e.g., best available technology, precautionary principle, polluter pays, public participation) and further consideration of approaches to the "protection" of both the biotic and abiotic environment.

It is clear that developments in radiation protection of the environment will affect a wide range of stakeholders, including industry, regulators, scientists, users and the public. With this in mind a recent "Consensus Conference" was arranged as part of an International Seminar on "Radiation Protection in the 21st Century: Ethical, Philosophical and Environmental Issues" held at the Norwegian Academy of Science and Letters, Oslo, 22-25th October 2001. The conference attracted more than 50 international experts representing various disciplines and affiliations including Environmental Science, Health Physics, Radioecology, Ethics and Philosophy, representing a wide spectrum of perspectives bearing on the question of radiation protection of the environment. The purpose of the consensus procedure was to identify areas of agreement as an input to the ongoing regulatory developments. Implementing the consensus procedure at the start, rather than at the end of the development of legislation, gave stakeholders the opportunity to influence the ongoing procedure, without constraints that the consensus has to be reached at a legislative level. The final consensus statement identified significant areas of agreement on protection of the environment from ionising radiation including guiding principles:

- Humans are an integral part of the environment, and whilst it can be argued that it is ethically justified to regard human dignity and needs as privileged, it is also necessary to provide adequate protection of the environment;
- In addition to science, policy making for environmental protection must include social, philosophical, ethical (including the fair distribution of harms/benefits), political and economic considerations. The development of such policy should be conducted in an open, transparent and participatory manner,

and statements, e.g.

- There are several reasons to protect the environment including ethical values, sustainable development, conservation (species and habitat) and biodiversity;
- The best available technology including consideration of economic costs and environmental benefits should be applied to control any release of radionuclides into the environment in a balanced manner with respect to other insults to the environment;
- When a product or activity may cause serious harm to the human population or to the environment, and significant uncertainties exist about the probability of harm, precautionary measures to reduce the potential risk within reasonable cost constraints should be applied. In making such assessments and decisions, an improved mechanism for incorporating developing scientific knowledge needs to be established.

The full consensus statement can be found on www.iur-uir.org. Despite the high degree of consensus achieved, participants also noted the need for furthering the debate through ongoing work. Notable issues were the harmonisation of standards for radiation with other environmental stressors, guidance for balancing different interests and values within practical management, and the needs for assessment criteria. Future developments in the protection of the environment from radiation are likely to be of interest not only to those working within radiation protection, but for environmental risk management in general.

This contribution is a summary of the conference proceedings: Oughton, D.H. and Strand, P. (ed.) Radiation Protection in the 21st Century: Consensus Conference on Protection of the Environment, NKS/IUR: Østerås 2002 (in press).

Dr. Deborah Ougthon is Assistant Professor at the Department of Chemistry and Biotechnology at the Agricultural University of Norway, Aas. She is a member of the Europäische Akademie's project group *"Environmental standards. Dose effect relations in the low dose range and their risk evaluation"*.

## Working groups

### *Climate Prediction and Climate Precautions*

On May 6th 2002 the Europäische Akademie's project group "Climate Prediction and Climate Precautions" presented its final report to the public at the "Berlin-Brandenburgische Akademie der Wissenschaften" in Berlin. The aim of the study was to develop and evaluate argumentations for appropriate action under conditions of uncertainty on climate risks and limitations given by the principle of precaution. The report "Klimavorhersage und Klimavorsorge" by Schröder et al. may be ordered by the Springer-Verlag (Berlin, Heidelberg). An executive summary in English is currently prepared as volume of the Graue Reihe of the Europäische Akademie and can be expected in the near future.

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### *Study on international goals of climate protection*

Recently, a follow-on study on concrete interpretations and questions on legitimation and application of the international FCCC's climate protection goal was started on behalf of the Umweltbundesamt, Berlin. The study work is scheduled to end in late 2002 and will provide the opportunity to go forward from the just presented findings of the "Climate Prediction and Precautions" project. Persons involved are Professor G. Klepper (Kiel), Professor K. Ott (Greifswald) and D. Sprinz, Ph.D. (Potsdam).

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### *TAMI*

The TAMI (Technology Assessment in Europe: between Method and Impact) Kick-off meeting takes place in Brussels, the 20/21st June 2002. It is the official start of the two-year EU-project, which aims at creating a first discussion with representatives of the national policy-making community of TAMI members as well as industry with intense R&D efforts. The presentations, given by leading European politicians and R&D experts, will refer to the expectations of the policy-making community towards TA-institutions.

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### *Sustainable Development and Innovation in the Energy Sector*

The project group's last meeting took place on May 10th 2002 in Bad Neuenahr-Ahrweiler. A final draft of the group's report was discussed and, with minor changes, unanimously accepted. The group has fully exploited the transdisciplinary synergies set up by the explicitly non-disciplinary structure of the study. As a result a strategy is presented which will contribute to a sustainable transformation of the relevant energy systems. The report is expected to be presented in October 2002.

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### *Robotics*

On April 30th the project group was invited to present its results in the German Federal Ministry for Science and Education (BMBF). The presentation was opened by the state secretary Dr-Ing. h.c. U. Thomas. The chair of the project group, Professor Dr. T. Christaller, gave an overview about the major results, the project group members Professor Dr. J.M. Gilsbach and Professor Dr. D. Sturma focussed on surgical and philosophical aspects.

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## Conferences

### *Symposium: Biodiversität – Wissenschaftliche Grundlagen und gesellschaftliche Relevanz*

Das Institut für Philosophie der Philipps-Universität Marburg veranstaltet zusammen mit der Europäischen Akademie vom 9. bis 10. September 2002 in Marburg (Sitzungssaal 01, Biegenstrasse 12) ein Symposium zum Thema "Biodiversität – Wissenschaftliche Grundlagen und gesellschaftliche Relevanz". Im Rahmen dieses Symposiums sollen insbesondere Status und Bedeutung der Molekularbiologie für die Beschreibung von Biodiversität sowie das Verhältnis der Molekularbiologie zu anderen Disziplinen diskutiert werden.

Referenten sind unter anderem: Professor Dr. Rudolf Amman (Bremen), Professor Dr. Jürgen Bereiter-Hahn (Frankfurt), Michael Bölker (Marburg), PD Dr. Broder Breckling (Bremen), Dr. Michael Gudo (Frankfurt), Dr. Dr. Mathias Gutmann (Marburg), Professor Dr. Peter Janich (Marburg), Professor Dr. Dr. Peter Kämpfer (Giessen), Professor Dr. Rainer Marggraf (Göttingen), Professor Dr. Ramón Rosselló-Mora (Mallorca), Professor Dr. Heinz Saedler (Köln), Professor Dr. Fritz Steininger (Frankfurt), Dr. Michael Türkay (Frankfurt), Dr. Michael Weingarten (Jena).

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### *Autumn Conference 2002: Nanotechnology Assessment*

The European Academy will hold its annual autumn conference on the topic "Nanotechnology Assessment" on 13th and 14th September.

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### *NanoDE*

The German Federal Ministry for Science and Education (BMBF) organised the congress "NanoDE. Innovationen durch Nanotechnologie" in Bonn from 6th to 7th May. The congress was opened by the German Minister for Science and Education Ms E. Bulmahn. Professor Dr. C.F. Gethmann (Europäische Akademie) was appointed as a member of the programme committee. The workshop on chances and risks of Nanotechnology in society was organised by the Europäische Akademie in collaboration with the BMBF. The following experts contributed to the workshop, chaired by Dr. M. Decker (Europäische Akademie): Professor Dr. T. Christaller (Sankt Augustin), Dr. S. Bellucci (Bern), Professor Dr.-Ing. H. Fissan (Duisburg), Professor Dr. P. Borm (Düsseldorf), Dr. M. Werner (Frankfurt).

## News

### *Bonner Wissenschaftsnacht*

Am 5. Juli 2002 werden anlässlich der "Bonner Wissenschaftsnacht" die Forschungseinrichtungen der Bonner Wissenschaftsregion Resultate ausgewählter Forschungsarbeiten der Öffentlichkeit präsentieren. Die Wissenschaftsnacht ist Bestandteil des aktuellen "Jahres der Geowissenschaften". Sie wird von der Universität Bonn und der Strukturförderungsgesellschaft Bonn/Rhein-Sieg/Ahrweiler koordiniert. Die Europäische Akademie wird an dem Ereignis mit einem Diskussionsbeitrag von S. Lingner zum Thema "Weltklima. Was verpflichtet uns zur Vorsorge?" teilnehmen.

### *Colloquium*

On 16th May 2002 Professor Dr. Marco Buzzoni (University of Macerata, Italy) gave a lecture on "Wissenschaftstheoretische Probleme der Medizin als Humanwissenschaft". The talk was given in the Europäische Akademie within the framework of the academy's internal colloquium.

### *HGF-Pogrammausschuss "Systemanalyse und Technikfolgenabschätzung"*

Since 1997 the Europäische Akademie has been an associate member of the above mentioned commission on systems analysis and technology assessment of the so- called "Helmholtz-Society" of German Research Institutions. On 5th March 2002 the members of this commission held their 37th regular meeting at the "Wissenschaftszentrum" in Bonn. Main topics were current involvements of the members in projects of environmental monitoring and modelling and a joint book publication "Umwelt und Technik im Gleichschritt? Technikfolgenforschung und Systemanalyse in Deutschland" (ed. von G. Stein). M. Decker, C. Langenbach and S. Lingner are contributing (co-)authors from the Europäische Akademie. The volume will be published by Springer in summer 2002.

### *Welcome*

The Europäische Akademie welcomes Susanne Stephan, Dipl. Kfm., who commenced work for the Europäische Akademie in February 2002. She is the administrative project manager of the EU-project TAMI (Technology Assessment in Europe; between Method and Impact).

## Book Series

The 16th volume of the Europäische Akademie's book series "Wissenschaftsethik und Technikfolgenbeurteilung" was published recently:

M. Schröder et al.: Klimavorhersage und Klimavorsorge. Band 16, Springer-Verlag, Berlin 2002, ISBN 3-540-43239-6.

## Lectures

Michael Decker:
7.5.2002 "Einführung in die Diskussion: Auswirkungen der Nanotechnologie auf die Gesellschaft", Kongress NanoDE. Innovationen durch Nanotechnologie, Bundeshaus Bonn

Carl Friedrich Gethmann:
24.4.2002 "Ethische Anmerkungen zur Diskussion um den moralischen Status des menschlichen Embryo", Essener Mittwochsgesellschaft – Public Lecture "Gentechnologie. Fakten, Ethik, Rechtliche und Soziale Probleme"
25.4.2002 "Professionelle Ethik und Bürgermoral", Nationaler Ethikrat, Berlin
27.4.2002 "Ethische Anmerkungen zur Diskussion um den moralischen Status des menschlichen Embryo", The Hebrew University of Jerusalem, European Conference 2002, Berlin
27.04.02 "Ethische Gesellschaftsberatung", The Hebrew University of Jerusalem, European Conference 2002, Berlin

## New Publications

C. F. Gethmann:
"Ethische Grundfragen einiger aktueller Entwicklungen biomedizinischer Forschung und von ihnen ausgehender diagnostischer und therapeutischer Optionen. (Präimplantationsdiagnostik, Forschung an humanen embryonalen Stammzellen, therapeutisches Klonen)", in: Der Präsident des Landtages Rheinland-Pfalz (Hrsg.), *Was kann, was darf der Mensch*?, Symposium zu aktuellen Fragen der Bioethik im Landtag Rheinland-Pfalz am 16. Oktober 2001, Mainz 2002, 107–113

## Personalities

Dr. Michael Decker studied physics (minor subject economics) at the Ruprecht Karls-Universität Heidelberg and received his diploma 1992. 1995 he concluded his doctorate with a dissertation on temperature measurements in high pressure combustion by laser-induced fluorescence of molecular oxygen at the university of Heidelberg. Between 1995-1997 he worked as researcher at the German Aerospace Center (DLR) in Stuttgart.

Since February 1997 Dr. Decker has been a member of the scientific staff of the European Academy. He was project manager of the project group "Robotics. Options for the replaceability of human beings" and is now preparing a project on nanotechnology. He is also coordinator of the project "Technology Assessment in Europe: Between Method and Impact (TAMI)" funded by the European Commission and a member of the study group "Practical Philosophy". His research is in the field methodology of Technology Assessment and concepts of the realisation of interdisciplinary research.

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