The Dialogue Continues

Scientists and nonscientist citizens meet for the second "round table" discussion of "Science et Cité"

In July 2000, the second in a series of "round table" discussions was held in Kastanienbaum on Lake Lucerne. Twelve citizens and 12 scientists spent two days discussing the topic "Chemicals in the Water".

The goal of the foundation "Science et Cité" is to promote dialogue between science and society. One of its projects is the "round table", a platform for regular discussions between scientists and the general public. The pilot project, including citizens from the Zurich area and representatives from EAWAG, started in February 2000. The topic for the second discussion in July 2000 was "Nutrients and Pharmaceuticals in Streams and Lakes".

The Fascination with Lakes

The second "round table" was held at the idyllic location of the EAWAG's Research Center for Limnology in Kastanienbaum on Lake Lucerne. To give participants a first-hand experience in practical aspects of limnological research, the first day began with a sampling trip on the lake. An EAWAG research vessel took the participants out to the sampling location, and the questions soon started to roll. The tools of the trade were of interest, such as the water sampling devices, the temperature probe, the plankton net, but also more fundamental questions on temperature stratification of lakes and fish kills. Answers and explanations were covered in more detail back in the laboratory, where the samples were examined under magnifying glasses and under the microscope. Participants were fascinated by the variety of organisms, such as diatoms and small freshwater shrimp, became engaged in deep discussions and looked up information in the scientific literature.

Intensive Discussions

On the second day, the discussions continued, but were supplemented by scientific presentations and gradually organized into a more structured format. The main topics were the pollution of lakes, streams and ground water by phosphate and nitrogen, on the one hand, and by pharmaceuticals used in humans or animals on the other.

One of the points receiving special attention was the behavior of society as a whole towards the environment. The entire group contemplated new ways to move towards sustainable use of the environment and how to change the general way of thinking. Participants noted that environmental research often cannot provide definitive answers. This led to the conclusion that decisions on possible remedial actions should not be delegated to the scientific community and that the ordinary citizen has to take on some of the responsibility at present assumed mainly by political entities. There was broad consensus among the participants, however, that in order to fulfill this role, citizens need to receive better information. Scientific results are public information and freely accessible as such, although the language is often not understood by the nonscientist. Sometimes, even scientists have difficulties understanding terminology used in other disciplines. Scientists are faced with important challenges: how can scientific results be "packaged" such that they can be communicated to the average citizen, and what arguments and counter-arguments should be presented to the public? The goal would be to maintain scientific objectivity, while allowing the public to make informed decisions and share the responsibility for them.

Communication

Communication between science and the public was identified as one of the central problem areas during this second "round table". My own experience confirms the importance of these issues and the difficulties they often pose. I was confronted with a number of questions during our sampling event on Lake Lucerne and was met with insistent follow-up questions on points that remained unclear. Upon re-reading a scientific report that was authored by a sociologist on our team, I realized however, that my explications had not been understood by the public as I had intended.

At the conclusion of the July meeting, it was decided to dedicate the third meeting, scheduled for January 2001, to the topic of communication. In another of EAWAG's projects, means of communication have been explored previously and were practiced under the guidance of a media expert. The topic was the "NoMix Toilet", a new type of toilet separating urine and solid waste in separate waste streams, which is being studied in the group working on urban drainage systems.

(Gabriella Meier Bürgisser, EAWAG Dubendorf)

2000 Otto Jaag Prize

On November 18, Nina Schweigert, who conducted her doctoral research at EAWAG, was awarded the 2000 *Otto Jaag Prize for Water Protection* for her dissertation entitled "Modes of Action and Toxicity of (Chloro-)Catechol/Copper Combinations".

Her work examined the correlation between the toxicity of a pollutant (assessed with the use of bacteria) and its chemical properties. In the environment, pollutants rarely occur alone but are present as mixtures. In her exemplary work, she investigated the interaction between a heavy metal (copper) and organic contaminants (catechol and its chlorinated forms).

In the presence of oxygen, catechol and copper can form dangerous reactive oxygen species, so-called ROS. These reactions also occur inside bacteria where DNA, membranes and proteins can be damaged by the ROS that is produced. However, the toxicity of the catechol-copper mixture is not due to the formation of ROS, because bacteria readily detoxify the ROS before detectable damage occurs. From the literature, it was known that the lipophilic character of catechols increases with the number of chlorines attached to the ring, and that catechols bind copper in strong complexes, which lose protons relatively easily. Nina Schweigert was able to show that the combination of these three properties is the actual source of toxicity to bacteria. Due to complex formation, the charge of the copper ion is neutralized, and the complexes accumulate in the membranes. The copper-catechol complexes are able to migrate in the membrane; they can therefore release protons on one side and take them up on the other side of the membrane, thereby destroying the membrane potential. Finally, Nina Schweigert developed a model that accurately reproduces toxicity data observed for the copper-catechol mixture.

ETH Council Approves "Socio-Economics of Water"

EAWAG maintains a high level of competence in the natural and engineering sciences and has considerable experience in collaborating with experts from the practice (government, NGOs, industry). EAWAG's group "Human Ecology" was already formed in 1992 (see EAWAG news no. 50), and now EAWAG is making a renewed effort to improve its competence in the socio-economic field. We aim at better understanding which factors determine how water is utilized and then influence decisions that foster sustainable management of the nonrenewable resource "water". Important themes include the ongoing development of water policies with the incorporation of various aspects of natural, engineering and social sciences, citizen participation in the decision-making process, and the way risks and uncertainties are handled.

In October 2000, the ETH Council approved the EAWAG project "Socio-Economy of Water", awarding it a 3 Million CHF budget. This is one of six projects within the ETH Council's framework of projects on "Autonomy Dividend – Innovation and Cooperation Projects". They will be conducted during the period 2000–2003 in collaboration with cantonal universities.

The Ecotoxicology Course "coetox"

In addition to their benefits, chemicals can have undesirable side effects on humans and the environment. Ecotoxicology is the field that identifies and prevents these effects. Since extensive regulations were not in place until the 1980s (Ordinance on Substances 1986), we still have relatively little experience in the practical application of ecotoxicology. Since 1994, scientists at ETH Lausanne (EPFL) and EAWAG, in collaboration with other partners, have held a series of courses in ecotoxicology. The main goal of these courses is to disseminate knowledge and promote dialogue between stakeholders.

In 1999, it was decided to divide the course into distinct modules, such that within a three-year period, a survey of the entire field of ecotoxicology and its practical applications can be given. Under the patronage of SAEFL (Swiss Agency for the Environment, Forests and Landscape), the course is co-organized by representatives from Cémagref Lyon, the Universities of Constance, Geneva and Zürich, and Syngenta.

In September 2000, 30 persons participated in the fundamental course, offered in French and German. Participants acquired an overview of some basic chemical and biological principles and were introduced to some of the methods and concepts currently used in ecotoxicology. The module *Evaluation of Pollutants* took place in May 2001 and between 2002 and 2003, the courses *Impact on Natural Systems* and *Risk Analysis* will be offered, each held in a three-day session.

Additional information:
http://www.eawag.ch/events/peak/coetox

coetox = "collaboration en écotoxicologie"